APPENDIX 3-6: WATER QUALITY SCREENING TABLES

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID	Unit	BC ENV Drinking WQG					QUL-57-AP	QUL-57-AP	QUL-57-AP	QUL-57-AP	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-B
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	AP	AP	AP	AP	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	B
Date Sampled							2020-09-16	2021-09-16	2022-10-19	2023-09-14	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2022-06-27	2024-09-05	2025-07-15	2025-09-16	2015-12-09
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.2	8.6	7.9	8.4	7.9	7.8	7.9	7.9	8.0	7.6	7.9	8.1	8.1	7.8	8.1	7.8
Temperature	°C	**15**[d]	-	-	-	-	11	**15.4**[DW]	10	**16.6**[DW]	5.3	5.5	9.5	10	**16.8**[DW]	13	10	8.6	11	10	14	5.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	10	9.4	9.9	-	12	11	11	103	9.4	11	10	11	9.8	13	8.8	11
Dissolved oxygen	%	-	-	-	-	-	90	94	89	-	91	89	98	11	97	102	90	95	90	105	88	84
Turbidity	NTU	**1.0**	-	-	-	-	0.08	0.04	0.31	0.27	0.14	0.75	0	0.83	0.12	0.57	0	0.48	0.44	0.6	**1.01**[DW]	0.8
Conductivity	µS/cm	-	-	-	-	-	105	108	105	109	114	113	113	103	101	101	100	106	111	108.8	116	150
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	8.0	7.9	8.0	8.0	8.0	7.9	7.8	8.0	7.9	7.8	8.0	8.0	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	52	53	54	59	54	51	46	46	49	47	52	50	48	51	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	46	44	50	51	50	48	44	46	46	43	48	48	47	50	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	66	76	68	84	81	69	69	65	68	70	70	72	70	66	72	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	2.8	<1.0	1.0	<1.0	1.1	<1.0	1.5	<1.1	<1.0	<1.0	<1.0	<1.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.3	1.8	1.9	2.5	2.0	2.2	2.3	1.9	2.0	2.9	3.2	2.9	2.0	1.9	1.8	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.16	0.15	0.18	0.57	0.19	0.31	0.57	0.22	0.26	0.75	0.42	0.7	0.14	0.45	0.16	0.49
Conductivity	µS/cm	-	-	-	-	-	103	104	106	109	117	116	115	102	101	99	98	106	111	104	108	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	56	52	50	50	-	-	-	-	-	47	45	51	-	50	53	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	18	18	18	20	18	17	15	15	16	15	17	17	16	17	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.032	0.032	0.035	0.032	0.036	0.04	0.038	0.038	0.033	0.038	0.034	0.032	0.03	0.031	0.037	0.033
Magnesium	mg/L	-	-	-	-	-	2.0	1.9	2.1	2.2	2.3	2.3	2.2	1.9	2.0	2.0	2.0	2.2	1.9	2.0	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.48	0.49	0.51	0.52	0.56	0.47	0.52	0.5	0.47	0.48	0.54	0.52	0.48	0.52	0.49	0.47
Sodium	mg/L	-	-	-	-	-	0.95	0.88	0.95	0.96	1.2	1.1	1.1	0.96	0.95	0.97	0.98	1.0	0.86	0.96	0.89	0.92
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	5.9	6.5	6.3	6.2	7.4	7.6	6.7	5.9	5.8	5.9	5.6	5.8	6.5	6.1	7.0	6.7
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.075	0.042	0.06	0.0076	0.13	0.12	0.11	0.086	0.047	0.08	0.029	0.092	0.085	0.057	0.032	0.11
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.075	0.042	0.06	0.0076	0.13	0.12	0.11	0.086	0.047	0.081	0.029	0.092	0.085	0.057	0.032	0.11
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0054	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0058	<0.0050	<0.0050	0.0063	<0.005	0.0084	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.15	0.11	0.16	0.11	0.2	0.2	0.25	0.17	0.13	0.37	0.16	0.17	0.16	0.14	0.084	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0025[Bc]	0.002[Bc]	0.0027[Bc]	0.004[Bc]	0.0066	0.033[Bc, DW]	0.0033[Bc]	0.0036[Bc]	0.0057	0.0034[Bc]	0.0078	0.0026[Bc]	0.0024[Bc]	0.0022[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0024	<0.0020	<0.0020	0.0032	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	<0.0020	<0.0020	0.0055	<0.002	0.0022
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.014	0.012	0.012	0.014	0.015	0.022	0.014	0.017	0.014	0.028	0.024	0.038	0.0092	0.018	0.011	0.043
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00011	0.0001	0.00011	0.00018	0.00024	0.00016	0.00012	0.00011	0.00013	0.00015	0.00015	0.00012	0.00013	0.00011	0.00018
Barium	mg/L	-	1.0	-	-	-	0.005	0.0053	0.0047	0.0053	0.005	0.0053	0.0056	0.0053	0.0057	0.0058	0.0057	0.0059	0.0052	0.0055	0.0053	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000054	<0.0000050	0.0000053	<0.0000050	<0.000005	<0.000005	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	17	17	17	16	17	17	17	16	15	17	16	17	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00083	0.00051	<0.00050	0.00052	0.00075	0.001	0.0007	0.00064	0.0007	0.00082	0.00079	0.00075	0.00057	0.00070	0.00054	0.0016
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.044	0.034	0.042	<0.030	<0.03	<0.03	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00029	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000068
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	1.9	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	1.9	2.1	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0014	0.00082	0.0016	0.00098	0.001	0.0017	0.0018	0.0019	0.0012	0.0025	0.0021	0.0023	0.00078	0.0016	0.0018	0.0016
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00036	0.00033	0.00036	0.00036	0.00064	0.0006	0.00048	0.00036	0.00033	0.00041	0.00036	0.00042	0.00035	0.00037	0.00034	0.00044
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Potassium	mg/L	-	-	-	-	-	0.43	0.5	0.46	0.53	0.49	0.47	0.49	0.51	0.5	0.5	0.52	0.49	0.51	0.50	0.48	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000094	0.00011	0.000094	0.00014	0.00016	0.00018	0.00015	0.00013	0.00013	0.00015	0.00013	0.00014	0.00011	0.00016	0.00013	0.00012
Silicon	mg/L	-	-	-	-	-	1.7	1.5	1.5	0.8	1.7	1.8	1.7	1.7	1.7	2.0	2.0	2.1	1.4	1.6	1.4	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010
Sodium	mg/L	-	-	-	-	-	0.88	0.87	0.84	0.97	1.1	1.1	1.1	0.96	0.93	0.96	0.96	1.0	0.88	0.89	0.93	0.95
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.13	0.14	0.15	0.13	0.13	0.12	0.13	0.12	0.11	0.12	0.14	0.12	0.12	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00016	0.00016	0.00017	0.00016	0.00016	0.00016	0.00015	0.00015	0.00013	0.00013	0.00015	0.00016	0.00015	0.00017	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-AP	QUL-57-AP	QUL-57-AP	QUL-57-AP	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-AT	QUL-57-B
Depth							AP	AP	AP	AP	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2020-09-16	2021-09-16	2022-10-19	2023-09-14	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2022-06-27	2024-09-05	2025-07-15	2025-09-16	2015-12-09
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0094	0.0073	0.0073	0.0061	0.0063	0.0068	0.0068	0.011	0.0093	0.012	0.014	0.01	0.007	0.010	0.0074	0.0055
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	0.00013	0.00011	0.0001	0.00012	0.00011	0.00012	0.00011	0.0001	0.00015	0.00013	<0.00010	0.00011	0.00012	0.00014
Barium	mg/L	-	-	-	-	-	0.0053	0.005	0.0052	0.0055	0.0057	0.0055	0.0058	0.0055	0.0052	0.0055	0.0057	0.0058	0.0049	0.0057	0.0053	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050	<0.000005	<0.000005	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00063	<0.00050	<0.00050	0.00057	0.00056	0.00063	0.00057	<0.00050	<0.00050	0.00058	0.0006	0.00067	<0.00050	0.00057	0.00061	0.00081[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.00006
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00042	0.00027	0.0012	0.00019	0.00032	0.00037	0.00028	0.00078	0.00013	0.00022	0.00014	0.00042	0.00024	0.00059	0.0012	0.0003
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00033	0.00031	0.00035	0.00035	0.00063	0.00061	0.00048	0.00035	0.00034	0.00041	0.00038	0.00042	0.00033	0.00038	0.00035	0.00037
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.00013	0.000096	0.00009	0.00019	0.00017	0.00016	0.00012	0.00013	0.00016	0.00012	0.00017	0.000091	0.00014	0.000076	0.000089
Silicon	mg/L	-	-	-	-	-	1.7	1.4	1.4	0.77	1.7	1.7	1.8	1.7	1.6	1.9	2.0	2.1	1.4	1.6	1.3	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.12	0.13	0.14	0.14	0.15	0.14	0.14	0.12	0.12	0.13	0.11	0.12	0.13	0.12	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010
Tin	mg/L	-	-	-	-	-	0.00023	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00014	0.00016	0.00017	0.00018	0.00017	0.00016	0.00015	0.00014	0.00014	0.00012	0.00014	0.00015	0.00014	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-06-04	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2020-09-16	2020-11-10
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.7	7.9	-	7.5	7.8	7.8	7.9	7.8	7.8	7.7	7.7	7.6	7.7	8.0	7.5
Temperature	°C	**15**[d]	-	-	-	-	4.8	4.5	2.9	-	4.8	3.4	3.8	4.7	3.9	6.9	4.4	5.3	5.5	5.0	5.2	5.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	12	-	12	12	12	12	12	12	12	11	12	11	11	11
Dissolved oxygen	%	-	-	-	-	-	85	82	87	-	92	88	88	90	88	95	93	85	94	89	86	89
Turbidity	NTU	**1.0**	-	-	-	-	0.58	0.59	0.47	-	0	0.81	0.8	0.13	0.69	0.25	0.76	0.15	0.42	0	0.08	**1.63**[DW]
Conductivity	µS/cm	-	-	-	-	-	145	152	109	-	112	112	115	114	114	113	109	110	111	109	110	111
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.8	7.9	7.9	7.8	7.9	8.0	8.0	8.0	8.0	7.8	7.8	7.9	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	57	55	55	54	48	57	53	58	54	55	51	51	55	53	53	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	48	49	49	48	49	51	51	50	49	50	49	48	46	49	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	65	68	68	74	68	74	81	69	70	68	74	73	79	70	-
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.1	<1.1	-
Dissolved organic carbon	mg/L	-	-	-	-	-	1.4	1.8	1.8	1.5	2.0	2.2	2.2	1.9	2.2	2.2	1.7	1.7	2.4	2.6	2.0	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.55	0.55	0.5	0.53	0.35	0.39	0.3	0.21	0.13	0.18	0.13	0.17	**1.2**[DW]	0.2	<0.10	-
Conductivity	µS/cm	-	-	-	-	-	113	114	112	114	105	112	113	117	114	117	113	110	106	109	109	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	51	56	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	19	19	18	16	20	18	20	18	18	17	17	18	18	18	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.035	0.036	0.033	0.036	0.036	0.036	0.033	0.038	0.033	0.038	0.04	0.035	0.037	0.035	0.033	-
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.1	2.2	2.0	2.2	2.2	2.2	2.3	2.0	2.2	2.1	2.1	2.1	-
Potassium	mg/L	-	-	-	-	-	0.47	0.49	0.47	0.54	0.54	0.48	0.53	0.51	0.49	0.53	0.5	0.48	0.47	0.54	0.51	-
Sodium	mg/L	-	-	-	-	-	0.93	0.96	0.95	1.1	1.1	1.2	1.2	1.1	1.1	1.2	1.0	1.1	0.99	1.1	1.0	-
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.6	6.9	6.8	7.3	6.8	7.5	7.8	7.4	6.9	7.4	6.7	6.5	6.7	6.7	6.6	-
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.13	0.13	0.13	0.14	0.13	0.12	0.14	0.14	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.12	0.12	0.13	0.13	0.14	0.14	0.13	0.13	0.13	0.14	0.13	0.12	0.14	0.14	-
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0063	<0.0050	0.014	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.15	0.17	0.17	0.19	0.2	0.2	0.18	0.22	0.2	0.2	0.19	0.19	0.22	0.2	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0023[Bc]	0.0031[Bc]	0.0085	0.0028[Bc]	0.0049[Bc]	0.0048[Bc]	0.0041[Bc]	0.0033[Bc]	0.004[Bc]	<0.002[Bc]	<0.002[Bc]	0.0032[Bc]	0.0028[Bc]	0.0024[Bc]	-
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	0.0036	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.036	0.042	0.023	0.044	0.019	0.023	0.025	0.018	0.016	0.014	0.0095	0.01	0.02	0.023	0.014	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00014	<0.00010	0.00012	0.00011	0.00013	0.00014	0.00018	0.00013	0.00011	<0.00010	<0.00010	0.00011	0.00012	0.00013	-
Barium	mg/L	-	1.0	-	-	-	0.0059	0.006	0.0053	0.006	0.0055	0.0054	0.0053	0.0055	0.0055	0.0054	0.0051	0.0052	0.0054	0.0052	0.005	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-
Calcium	mg/L	-	-	-	-	-	19	19	18	18	16	18	19	17	18	18	18	17	17	17	19	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.0016	0.0012	0.0016	0.00085	0.0011	0.001	0.0008	0.00094	0.00072	0.00057	0.00064	0.00074	0.0007	0.00075	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	0.00024	0.00022	0.00025	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.2	2.0	2.1	2.1	2.0	2.0	2.0	2.1	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0017	0.0011	0.0018	0.0017	0.0014	0.0015	0.0012	0.0012	0.0011	0.00055	0.00085	0.0015	0.0012	0.00085	-
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00042	0.00047	0.00055	0.0006	0.00039	0.00082	0.00076	0.00068	0.00079	0.00062	0.00043	0.00041	0.00044	0.0004	0.00043	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Potassium	mg/L	-	-	-	-	-	0.49	0.51	0.48	0.53	0.49	0.52	0.5	0.53	0.47	0.48	0.49	0.5	0.5	0.52	0.45	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000093	0.00011	0.00014	0.00012	0.00012	0.00011	0.00017	0.00014	0.0002	0.00018	0.00012	0.00014	0.00012	0.0001	0.00013	-
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.8	1.8	1.6	1.8	1.8	1.6	1.7	1.7	1.8	1.9	2.0	1.9	-
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium	mg/L	-	-	-	-	-	0.96	1.0	0.96	1.0	1.0	1.1	1.1	1.2	1.0	1.1	1.0	1.0	0.98	1.0	0.94	-
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	0.13	0.14	0.14	0.15	0.13	0.13	0.14	0.13	0.14	0.14	0.14	-
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00017	0.00017	0.00017	0.00017	0.00015	0.00017	0.00017	0.00017	0.00017	0.00015	0.00015	0.00016	0.00015	-

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-06-04	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2020-09-16	2020-11-10
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0048	0.0052	0.0054	0.0059	0.0076	0.0073	0.0065	0.0059	0.0071	0.0066	0.0076	0.0053	0.0074	0.007	0.007	-
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Arsenic	mg/L	-	-	-	-	-	0.0001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	-
Barium	mg/L	-	-	-	-	-	0.0053	0.0052	0.0049	0.0054	0.0056	0.0054	0.0052	0.0055	0.0056	0.006	0.0053	0.0052	0.0052	0.0053	0.0054	-
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00077[Bc]	0.00089[Bc]	0.0007	0.001[Bc]	0.0008[Bc]	0.00061	0.00065	0.00055	0.00065	0.0006	0.00051	<0.00050	0.00056	<0.00050	0.00071	-
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	0.00021	0.00014	0.00008	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Manganese	mg/L	-	-	-	-	-	0.00015	0.00033	0.00026	0.00072	0.00023	0.00022	0.00025	0.00029	0.00017	0.00012	0.00082	<0.00010	0.00012	0.00017	0.00011	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00039	0.00044	0.00043	0.00063	0.00037	0.00087	0.00074	0.00067	0.00075	0.00068	0.00043	0.00045	0.00041	0.00037	0.0004	-
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Selenium	mg/L	-	-	-	-	-	0.000089	0.00012	0.0001	0.00011	0.0001	0.00022	0.00019	0.00014	0.00018	0.00016	0.00012	0.00012	0.00015	0.00014	0.000078	-
Silicon	mg/L	-	-	-	-	-	1.7	1.6	1.7	1.7	1.7	1.6	1.8	1.7	1.7	1.8	1.7	1.8	1.8	1.9	1.9	-
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.14	0.12	0.15	0.14	0.15	0.14	0.15	0.13	0.14	0.14	0.14	0.13	-
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00015	0.00016	0.00015	0.00018	0.00016	0.00018	0.00017	0.00016	0.00016	0.00016	0.00015	0.00015	0.00015	-
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.3	7.7	7.6	8.6	7.9	7.7	7.9	7.9	7.8	**6.4**[Ba,Bc]	7.6	7.7	7.8	7.7	7.6	7.9
Temperature	°C	**15**[d]	-	-	-	-	5.6	5.5	6.1	5.3	8.9	4.0	5.0	4.6	6.4	3.8	4.1	5.3	5.5	6.4	5.9	5.2
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	11	11	10	12	12	11	11	-	-	-	-	-	12	12
Dissolved oxygen	%	-	-	-	-	-	94	96	92	87	90	91	91	86	85	-	-	-	-	-	95	93
Turbidity	NTU	**1.0**	-	-	-	-	0.02	1.0	0	0.11	0.21	0	0.45	0.29	0.16	0.1	0.49	0.08	0.05	-	0.45	0.21
Conductivity	µS/cm	-	-	-	-	-	113	110	130	113	108	114	111	110	109	116	115	109	112	111	111	114
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.9	7.9	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	56	53	51	53	52	55	55	53	54	52	54	53	54	53	53	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	48	51	45	49	48	51	47	45	51	50	51	51	52	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	68	73	81	62	71	72	65	76	78	86	78	81	67	74	73
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.1	<1.0	3.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	1.8	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	2.2	1.9	1.9	1.8	2.3	2.5	2.0	1.9	2.5	1.8	2.3	2.7	1.9	2.1	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.25	0.16	<0.10	<0.10	<0.10	0.18	0.25	0.15	0.12	0.23	0.17	0.15	0.13	0.37	0.42	0.1
Conductivity	µS/cm	-	-	-	-	-	112	109	108	109	114	114	112	111	109	116	116	107	110	114	113	109
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	53	54	55	53	56	53	54	50	56	54	54	50	52	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	17	18	18	18	18	18	18	17	18	18	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	0.55	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.029	0.03	0.032	0.037	0.036	0.04	0.031	0.039	0.036	0.036	0.038	0.034	0.034	0.032	0.027	0.031
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.2	2.0	1.9	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1
Potassium	mg/L	-	-	-	-	-	0.53	0.54	0.52	0.5	0.46	0.49	0.51	0.53	0.52	0.49	0.53	0.53	0.53	0.5	0.49	0.5
Sodium	mg/L	-	-	-	-	-	1.1	1.1	0.97	1.0	0.85	1.0	1.0	0.97	1.0	1.1	1.1	0.97	1.0	0.96	1.0	0.95
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.1	7.1	6.7	7.2	7.0	7.6	6.3	6.8	6.4	7.9	8.2	6.6	6.6	6.4	6.6	6.7
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.12	0.13	0.14	0.15	0.084	0.13	0.13	0.14	0.12	0.14	0.15	0.14	0.14	0.077	0.12	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.12	0.13	0.14	0.15	0.084	0.13	0.13	0.14	0.12	0.14	0.15	0.14	0.14	0.077	0.12	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0074	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0054
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.19	0.2	0.2	0.12	0.21	0.17	0.18	0.19	0.19	0.2	0.18	0.2	0.15	0.18	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	<0.002[Bc]	0.0023[Bc]	0.0032[Bc]	**0.0126** [DW]	0.0021[Bc]	0.0031[Bc]	<0.002[Bc]	0.0023[Bc]	0.0023[Bc]	0.0027[Bc]	0.0026[Bc]	0.0027[Bc]	0.0023[Bc]	0.0029[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	0.0039	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.016	0.019	0.014	0.013	0.011	0.048	0.019	0.011	0.011	0.027	0.014	0.011	0.011	0.012	0.012	0.0083
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00012	<0.00010	0.00012	0.00011	0.00013	0.00011	0.00014	0.00011	0.00014	0.00013	<0.00010	0.0001	0.00013	0.00012	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0056	0.0053	0.0054	0.0051	0.0057	0.0051	0.0052	0.0049	0.0053	0.0051	0.0053	0.0053	0.0054	0.0051	0.0052
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	17	18	18	18	19	18	18	17	19	18	18	17	17	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00084	0.00082	0.00056	0.00062	0.00052	0.0022	0.00065	0.0006	<0.00050	0.00085	0.00075	0.00072	0.0006	0.00056	0.00077	0.00058
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.047	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.1	2.2	2.0	2.1	2.1	2.1	1.9	2.3	2.2	2.2	2.1	2.3	2.0	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0014	0.0016	0.0011	0.00079	0.00096	0.0025	0.0014	0.00093	0.001	0.0015	0.0012	0.0012	0.00068	0.00088	0.0013	0.00097
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00056	0.00055	0.00041	0.0005	0.00039	0.00072	0.00046	0.00045	0.00037	0.00093	0.00086	0.00042	0.00051	0.00044	0.00047	0.00048
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.53	0.51	0.52	0.48	0.51	0.51	0.48	0.46	0.51	0.51	0.52	0.53	0.55	0.48	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00016	0.00016	0.00012	0.00012	0.000089	0.00013	0.00015	0.00011	0.000092	0.00024	0.00019	0.00012	0.00017	0.00012	0.00013	0.00012
Silicon	mg/L	-	-	-	-	-	1.9	2.0	2.0	1.9	1.5	1.9	1.9	2.0	1.7	2.0	1.9	1.9	1.8	1.3	1.5	1.6
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	0.99	1.0	0.87	1.1	0.98	0.98	0.89	1.2	1.1	0.98	1.0	1.1	0.98	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.13	0.15	0.15	0.14	0.15	0.14	0.14	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00016	0.00016	0.00016	0.00018	0.00016	0.00017	0.00016	0.00015	0.00015	0.00016	0.00017	0.00019	0.00017	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0088	0.0089	0.0066	0.0066	0.0066	0.0077	0.0095	0.0076	0.0069	0.009	0.0079	0.0076	0.0061	0.0066	0.0048	0.0067
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.0001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.0054	0.0053	0.0051	0.0047	0.0054	0.0055	0.0051	0.0053	0.0053	0.0053	0.0055	0.0057	0.0049	0.005	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00073	0.00075[Bc]	<0.0005	0.00051	<0.00050	0.00073	0.00076	0.00064	0.00054	0.00064[Bc]	0.00058	0.00061	0.00076	0.00056	0.00061	0.00057
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00038	0.00018	<0.00010	<0.00010	0.00026	0.00022	0.00025	0.00015	0.00019	0.00037	0.00026	0.00016	0.00016	0.00026	0.00044	0.00016
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00062	0.00055	0.0004	0.00044	0.00039	0.00071	0.00043	0.00048	0.00036	0.00092	0.00085	0.0004	0.0005	0.00039	0.00045	0.00044
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00014	0.00016	0.000096	0.00014	0.00011	0.00019	0.00015	0.0001	0.00011	0.00027	0.00023	0.00012	0.00015	0.00011	0.00012	0.000092
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.7	1.4	1.7	2.0	1.9	1.7	1.8	1.9	1.8	1.8	1.2	1.6	1.4
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.13	0.13	0.13	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.14	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00016	0.00015	0.00015	0.00017	0.00015	0.00016	0.00016	0.00015	0.00016	0.00016	0.00017	0.00016	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,j]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID	Unit	BC ENV Drinking WQG					QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-BT	QUL-57-BT	QUL-57-BT	QUL-57-BT	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	B	B	B	B	B	BT	BT	BT	BT	MID	MID	MID	MID	MID	MID	MID
Date Sampled							2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2019-05-15	2019-05-21	2019-06-18	2022-06-27	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-06-04	2019-04-25
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.8	7.8	7.9	7.8	7.8	7.8	7.8	8.0	7.8	7.8	7.7	7.9	-	7.6	7.8
Temperature	°C	**15**[d]	-	-	-	-	5.7	8.8	5.7	5	5.4	4.0	7.0	4.9	5.3	5.0	4.8	4.5	2.9	-	7.1	3.4
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	10	12	12	11	12	12	12	12	11	11	11	12	-	11	12
Dissolved oxygen	%	-	-	-	-	-	90	89	95	92	89	88	95	94	91	84	85	85	88	-	94	88
Turbidity	NTU	**1.0**	-	-	-	-	0.58	0.36	**1.29**[DW]	0.5	**1.14**[DW]	0.76	0	0.77	0.39	0.79	0.62	0.74	0.45	-	0	0.75
Conductivity	µS/cm	-	-	-	-	-	110	110	115	117.4	113	113	113	109	111	150	144	152	109	-	108	112
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	8.0	7.9	7.9	8.0	8.0	8.0	7.9	7.8	7.9	7.9	7.9	7.8	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	50	51	54	54	57	52	51	53	53	56	55	55	54	51	57
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	49	49	51	51	50	48	48	50	48	51	49	49	49	46	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	78	59	78	70	76	68	73	73	70	65	67	66	69	70	71	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<3.0	<3.0	<3.0	<3.0	3.6	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	1.7	1.9	1.7	1.8	2.2	2.3	1.7	2.7	1.6	1.3	1.7	1.7	1.5	2.1	2.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.15	0.21	0.22	0.13	0.10	0.23	0.41	0.19	0.43	0.49	0.55	0.49	0.43	0.59	0.44	0.37
Conductivity	µS/cm	-	-	-	-	-	115	110	115	115	113	117	113	112	110	112	114	114	113	114	100	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	51	55	56	-	-	-	52	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	17	18	18	19	17	17	18	18	19	19	19	18	17	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.031	0.033	0.034	0.033	0.038	0.04	0.038	0.04	0.031	0.033	0.035	0.036	0.033	0.036	0.036	0.036
Magnesium	mg/L	-	-	-	-	-	1.9	2.1	1.9	2.3	2.1	2.4	2.2	1.9	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.49	0.49	0.51	0.56	0.50	0.49	0.54	0.48	0.51	0.49	0.49	0.48	0.47	0.57	0.55	0.46
Sodium	mg/L	-	-	-	-	-	0.91	0.92	0.97	1.1	0.97	1.2	1.1	1.0	0.99	0.97	0.94	0.95	0.97	1.1	1.0	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.8	6.6	7.4	7.0	7.3	7.9	6.6	6.6	6.2	6.7	6.6	6.8	6.8	7.3	6.5	7.4
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.092	0.13	0.14	0.14	0.13	0.12	0.13	0.12	0.11	0.12	0.11	0.12	0.13	0.11	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.092	0.13	0.14	0.14	0.13	0.12	0.13	0.12	0.11	0.12	0.11	0.12	0.13	0.11	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.005	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.16	0.19	0.16	0.16	0.2	0.2	0.27	0.17	0.15	0.17	0.16	0.16	0.18	0.19	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0037[Bc]	0.0026[Bc]	0.0027[Bc]	0.0024[Bc]	<0.002[Bc]	0.0041[Bc]	0.0056	0.0042[Bc]	0.0056	0.0022[Bc]	0.002[Bc]	0.0023[Bc]	0.0033[Bc]	0.005	0.0033[Bc]	0.0046[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	0.0023
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.0078	0.011	0.0095	0.0091	0.0090	0.028	0.016	0.023	0.026	0.039	0.036	0.038	0.024	0.038	0.027	0.02
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	<0.00010	0.00012	0.00010	0.00010	0.00014	0.00012	0.00012	0.00013	0.00012	0.00012	0.00012	0.00011	0.0001	0.00013	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0052	0.0049	0.0051	0.0051	0.0055	0.0051	0.0053	0.0052	0.0059	0.0059	0.0058	0.0052	0.0058	0.0057	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000057	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	17	19	19	17	17	18	17	18	18	18	18	18	15	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0006	0.00055	0.00064	0.00064	0.00057	0.001	0.00065	0.0014	0.00072	0.0015	0.0014	0.0017	0.0011	0.0018	0.00076	0.0011
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	0.03	<0.030	<0.030	0.035	<0.030	<0.030	<0.030	<0.030	<0.030	0.036	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000092	<0.000050	<0.000050	0.00032	0.00025	0.00023	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.1	2.1	2.2	2.2	1.9	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00087	0.00084	0.001	0.00085	0.00076	0.0017	0.0021	0.0013	0.0017	0.0014	0.0013	0.0014	0.001	0.0019	0.0021	0.0014
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00041	0.00036	0.00052	0.00052	0.00045	0.00071	0.00047	0.0004	0.0005	0.00043	0.0004	0.00046	0.00045	0.0006	0.00038	0.00083
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.48	0.49	0.50	0.48	0.46	0.5	0.52	0.51	0.5	0.5	0.49	0.52	0.51	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	0.000081	0.0001	0.00018	0.00010	0.00019	0.00013	0.000073	0.00015	0.000095	0.000093	0.00011	0.00011	0.00012	0.00012	0.00022
Silicon	mg/L	-	-	-	-	-	1.6	1.6	1.7	1.8	1.8	1.8	1.7	1.7	2.0	1.7	1.7	1.7	1.7	1.7	1.8	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.95	0.92	1.0	0.97	1.0	1.2	0.99	1.0	1.0	1.0	0.94	0.97	0.97	1.0	1.0	1.2
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.12	0.14	0.14	0.14	0.12	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00018	0.00018	0.00017	0.00016	0.00016	0.00016	0.00016	0.00017	0.00015	0.00018	0.00016	0.00017	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-B	QUL-57-BT	QUL-57-BT	QUL-57-BT	QUL-57-BT	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	B	B	B	B	B	BT	BT	BT	BT	MID	MID	MID	MID	MID	MID
Date Sampled							2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2019-05-15	2019-05-21	2019-06-18	2022-06-27	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-06-04	2019-04-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	0.021	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0054	0.0068	0.0057	0.0064	0.0058	0.0074	0.0077	0.0053	0.011	0.0053	0.0052	0.0049	0.0053	0.0069	0.0086	0.0069
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	0.00012	<0.00010	<0.00010	0.0001	0.00011	0.00011	0.00011	<0.00010	<0.00010	0.00011	0.0001
Barium	mg/L	-	-	-	-	-	0.0048	0.0053	0.0048	0.0056	0.0052	0.0057	0.0059	0.0049	0.0055	0.0052	0.0053	0.0052	0.0049	0.0059	0.0059	0.0054
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[(g)]	**0.00025 - 0.00043[(g)]**	-	-	<0.0000050	<0.0000050	<0.0000050	0.0000056	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[(g)]	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[(q)]	**0.0008 - 0.0359[(q)]**	-	-	<0.00050	0.00054	0.00058	0.00184[(Bc)]	0.0006	0.00069	0.00055	<0.00050	0.00063	0.00081[(Bc)]	0.00078[(Bc)]	0.00083[(Bc)]	0.00076[(Bc)]	0.0011[(Bc)]	0.00069	0.00058
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[(g,l)]	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000095	<0.000050	<0.000050	0.0003	0.00014	0.00014	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00024	0.00024	0.00028	0.00022	0.00030	0.00036	0.00019	<0.00010	0.00025	0.00017	0.00017	0.00018	0.00025	0.00075	0.00055	0.00018
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00039	0.00033	0.00052	0.00050	0.00046	0.00073	0.00046	0.0004	0.00042	0.00038	0.00038	0.0004	0.00043	0.0006	0.00039	0.00082
Nickel	mg/L	-	0.0017 - 0.0098[(q)]	**0.0255 - 0.0812[(q)]**	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.0001	0.0001	0.00014	0.000094	0.00016	0.00011	0.00012	0.00017	0.000099	0.000096	0.000093	0.00012	0.00015	0.00011	0.00018
Silicon	mg/L	-	-	-	-	-	1.5	1.4	1.8	1.7	1.7	1.7	1.7	1.7	2.0	1.6	1.7	1.6	1.7	1.7	1.7	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.14	0.13	0.15	0.14	0.13	0.13	0.14	0.12	0.13	0.14	0.14	0.13	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00018	0.00016	0.00017	0.00017	0.00017	0.00016	0.00017	0.00015	0.00016	0.00015	0.00015	0.00015	0.00016	0.00016	0.00018
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[(g,k,l)]	**0.022 - 0.051[(g,l)]**	-	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-05-02	2020-11-10	2021-05-19	2021-06-02	2021-07-21	2021-10-27	2022-05-10	2022-08-16	2023-05-10	2023-05-17	2023-06-27	2023-10-31	2024-05-30	2024-07-04	2024-10-30	2025-05-27
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.6	8.3	7.7	7.8	7.9	7.7	8.2	**6.4**[Ba,Bc]	7.6	7.8	7.8	7.6	8.0	7.8	7.8
Temperature	°C	**15**[d]	-	-	-	-	3.8	5.7	6.8	6.9	9.0	8.9	4.0	5.9	3.8	5.1	12	6.9	7.2	6.7	9.0	7.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	11	12	12	11	11	12	11	-	-	-	-	12	12	10	12
Dissolved oxygen	%	-	-	-	-	-	88	89	96	97	95	90	91	86	-	-	-	-	98	94	90	99
Turbidity	NTU	**1.0**	-	-	-	-	0.89	**1.63**[DW]	0	**1.15**[DW]	0	0.21	0	0.27	0.11	0.47	0	-	0.58	0.26	0.34	**1.33**[DW]
Conductivity	µS/cm	-	-	-	-	-	115	111	112	108	125	108	115	107	116	117	108	110	110	111	110	109
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	-	7.7	7.9	7.9	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	-	54	53	49	53	56	49	53	54	51	53	52	53	50	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	52	-	48	48	47	48	48	44	50	49	49	52	50	48	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	79	-	78	65	67	69	81	90	83	67	78	66	75	74	60	77
Total suspended solids	mg/L	-	-	-	-	-	<1.0	-	<1.1	<1.1	<1.0	<1.0	1.3	<1.1	<1.0	2.2	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.1	-	2.3	2.7	2.6	1.7	2.0	2.2	2.4	2.9	2.3	1.8	2.1	2.0	1.7	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.26	-	0.22	0.24	0.17	0.11	0.22	0.27	0.32	0.25	0.16	0.33	0.28	0.11	0.2	0.36
Conductivity	µS/cm	-	-	-	-	-	114	-	109	108	102	114	115	102	115	115	105	114	112	107	110	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	54	49	53	54	56	52	56	55	52	53	-	-	-	51
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	-	18	18	16	18	19	17	17	18	17	18	18	18	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	-	0.029	0.03	0.03	0.036	0.039	0.037	0.035	0.039	0.034	0.032	0.029	0.032	0.034	0.033
Magnesium	mg/L	-	-	-	-	-	2.2	-	2.1	2.1	2.0	1.9	2.2	1.9	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.52	-	0.52	0.53	0.5	0.46	0.5	0.5	0.51	0.54	0.54	0.5	0.49	0.49	0.46	0.52
Sodium	mg/L	-	-	-	-	-	1.2	-	1.0	1.1	0.88	0.86	1.0	0.85	1.1	1.1	0.96	0.94	1.0	0.93	0.88	0.97
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.8	-	6.8	6.7	6.1	7.0	7.6	6.3	7.9	8.1	6.3	6.4	6.6	6.5	6.6	7.0
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	-	0.12	0.12	0.11	0.084	0.13	0.11	0.14	0.14	0.097	0.074	0.12	0.12	0.09	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	-	0.12	0.12	0.11	0.084	0.13	0.11	0.14	0.14	0.097	0.074	0.12	0.12	0.09	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0077	0.0099	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0064	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	-	0.18	0.19	0.17	0.12	0.2	0.16	0.19	0.22	0.15	0.15	0.17	0.2	0.15	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.003[Bc]	-	<0.002[Bc]	<0.002[Bc]	0.0071	<0.002[Bc]	<0.002[Bc]	0.0028[Bc]	0.0026[Bc]	**0.0136**[DW]	0.0023[Bc]	0.0026[Bc]	0.0022[Bc]	0.0021[Bc]	<0.002[Bc]	0.0076
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.027	-	0.018	0.025	0.015	0.013	0.042	0.017	0.023	0.021	0.014	0.011	0.009	0.0096	0.0091	0.011
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	-	0.00013	0.00015	<0.00010	0.00012	0.00015	0.00013	0.00012	0.00012	0.0001	0.00013	0.00011	0.00013	0.00012	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0053	-	0.0055	0.0053	0.0051	0.0052	0.0062	0.0052	0.0054	0.0057	0.0054	0.0052	0.0051	0.0052	0.005	0.0051
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	-	18	16	18	18	19	18	19	18	18	18	18	17	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00098	-	0.00076	0.00076	<0.00050	0.00062	0.0021	0.0006	0.00081	0.0011	0.00094	0.00053	0.00058	0.00059	<0.00050	0.00062
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	-	<0.030	0.033	<0.030	<0.030	0.063	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	-	2.2	2.0	2.0	2.1	2.1	1.9	2.3	2.3	2.1	2.2	2.0	2.2	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0015	-	0.0015	0.0022	0.0012	0.001	0.0076	0.0014	0.0014	0.0016	0.0019	0.00081	0.0012	0.00093	0.0008	0.0014
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00079	-	0.00049	0.00042	0.00032	0.00038	0.00074	0.00031	0.00097	0.00094	0.00039	0.00043	0.00044	0.00045	0.00036	0.00044
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	-	0.52	0.49	0.49	0.52	0.51	0.48	0.51	0.54	0.51	0.52	0.48	0.5	0.49	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0002	-	0.00012	0.00017	0.000094	0.00012	0.00024	0.000076	0.00026	0.00026	0.00012	0.00015	0.00013	0.00012	0.000076	0.00014
Silicon	mg/L	-	-	-	-	-	1.8	-	2.0	1.9	1.8	1.5	1.9	1.9	1.9	1.9	1.7	1.3	1.5	1.7	1.6	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	-	1.1	1.0	0.89	0.98	1.0	0.87	1.2	1.2	0.93	1.0	1.0	1.0	0.87	0.97
Strontium	mg/L	**7.0**	-	-	-	-	0.14	-	0.14	0.13	0.13	0.13	0.15	0.13	0.15	0.14	0.13	0.15	0.14	0.14	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	-	0.00018	0.00016	0.00016	0.00017	0.00018	0.00015	0.00016	0.00017	0.00016	0.00019	0.00015	0.00017	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID	QUL-57-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-05-02	2020-11-10	2021-05-19	2021-06-02	2021-07-21	2021-10-27	2022-05-10	2022-08-16	2023-05-10	2023-05-17	2023-06-27	2023-10-31	2024-05-30	2024-07-04	2024-10-30	2025-05-27
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0073	-	0.0088	0.01	0.0093	0.0062	0.017	0.011	0.0099	0.01	0.0082	0.0044	0.0055	0.0057	0.0063	0.0081
Antimony	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00012	-	0.0001	0.00013	<0.00010	0.00011	<0.00010	0.0001	<0.00010	0.0001	0.00012	<0.00010	<0.00010	0.00011	<0.00010	0.00011
Barium	mg/L	-	-	-	-	-	0.0051	-	0.0052	0.0055	0.0054	0.0049	0.0055	0.0048	0.0054	0.0054	0.0055	0.005	0.005	0.0051	0.0048	0.005
Beryllium	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000083	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00064	-	0.00072	0.00081	<0.00050	<0.00050	0.0011[Bc]	<0.00050	0.00068[Bc]	0.00081	0.00054	<0.00050	0.00058	0.00053	<0.00050	0.00065
Iron	mg/L	-	-	**0.35**	-	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00027	-	0.00043	0.00032	0.00014	0.00026	0.00048	0.00025	0.00041	0.00062	0.00034	0.00018	0.00046	0.00012	0.00023	0.00049
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00074	-	0.00051	0.00046	0.00031	0.0004	0.00074	0.00031	0.00093	0.00083	0.00035	0.0004	0.00042	0.00039	0.00035	0.00046
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00024	-	0.00014	0.00013	0.000082	0.000086	0.00017	0.00008	0.0002	0.00023	0.00013	0.000099	0.000095	0.000085	0.00011	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	-	1.8	1.8	1.6	1.4	1.7	1.8	1.9	1.9	1.7	1.2	1.5	1.6	1.4	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	-	0.14	0.13	0.12	0.13	0.15	0.13	0.14	0.14	0.13	0.13	0.14	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	-	0.00015	0.00015	0.00016	0.00016	0.00017	0.00015	0.00016	0.00016	0.00016	0.00016	0.00016	0.00018	0.00015	
Vanadium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-05-03	2018-05-22	2018-06-04	2018-06-13	2018-07-16	2018-08-27	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	7.8	7.9	-	7.7	7.5	7.6	7.8	7.9	7.7	7.9	7.6	7.7	7.8	7.6
Temperature	°C	**15**[d]	-	-	-	-	5.1	4.8	4.5	2.9	-	3.5	14	11	9.6	**17.7**[DW]	**15.7**[DW]	**15.9**[DW]	9.8	8.7	9.0	8.3
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	12	-	11	8.8	11	11	**7.9**[Bc]	9.6	9.7	11	11	10	12
Dissolved oxygen	%	-	-	-	-	-	85	86	86	92	-	84	86	98	94	85	97	98	92	91	90	98
Turbidity	NTU	**1.0**	-	-	-	-	0.76	0.52	0.69	0.7	-	0	0.41	0	0	0	0.52	0.11	0	0	0.49	0
Conductivity	µS/cm	-	-	-	-	-	150	144	151	108	-	116	111	100	101	96	97	100	104	107	103	100
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.9	7.9	7.8	-	-	7.9	-	-	-	-	-	-	-	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	57	55	55	53	-	-	49	-	-	-	-	-	-	-	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	50	49	48	50	-	-	44	-	-	-	-	-	-	-	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	59	67	64	66	75	-	-	70	-	-	-	-	-	-	-	-
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	<1.0	-	-	<1.0	-	-	-	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	1.5	1.3	1.7	1.6	1.5	-	-	2.4	-	-	-	-	-	-	-	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.5	0.61	0.46	0.47	0.96	-	-	0.65	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	112	113	113	114	113	-	-	94	-	-	-	-	-	-	-	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	19	19	19	18	-	-	16	-	-	-	-	-	-	-	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	-	-	-	-	-	-	-	-
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.035	0.036	0.033	0.033	-	-	0.035	-	-	-	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.0	2.1	-	-	2.1	-	-	-	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.49	0.47	0.54	-	-	0.56	-	-	-	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	0.99	0.96	0.96	0.96	1.0	-	-	1.0	-	-	-	-	-	-	-	-
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	6.6	6.8	6.8	7.2	-	-	6.0	-	-	-	-	-	-	-	-
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.11	0.12	0.12	0.13	-	-	0.086	-	-	-	-	-	-	-	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	-	-	-	-	-	-	-	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.11	0.12	0.12	0.13	-	-	0.086	-	-	-	-	-	-	-	-
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	-	-	-	-	-	-	-	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.17	0.19	0.17	0.18	-	-	0.17	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0022[Bc]	0.0058	<0.002[Bc]	0.0043[Bc]	0.0037[Bc]	-	-	0.0044[Bc]	-	-	-	-	-	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	0.001	-	-	-	-	-	-	-	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	-	0.0034	-	-	-	-	-	-	-	-
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.039	0.04	0.034	0.028	0.036	-	-	0.028	-	-	-	-	-	-	-	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	0.00013	0.00012	<0.00010	-	-	0.00014	-	-	-	-	-	-	-	-
Barium	mg/L	-	1.0	-	-	-	0.0059	0.0059	0.0058	0.0054	0.0057	-	-	0.0056	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	-	-	-	-	-	-	-	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	18	19	18	19	18	-	-	15	-	-	-	-	-	-	-	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0015	0.0014	0.0014	0.0013	0.0014	-	-	0.00075	-	-	-	-	-	-	-	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	0.04	-	-	-	-	-	-	-	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000053	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	-	-	<0.0010	-	-	-	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.0	2.1	-	-	2.0	-	-	-	-	-	-	-	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0012	0.0012	0.0026	0.0016	-	-	0.0025	-	-	-	-	-	-	-	-
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00042	0.00041	0.00044	0.00048	0.00062	-	-	0.00038	-	-	-	-	-	-	-	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.51	0.52	0.5	0.5	0.51	-	-	0.51	-	-	-	-	-	-	-	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000093	0.00011	0.000096	0.0001	0.00014	-	-	0.00012	-	-	-	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.7	1.7	1.7	-	-	1.8	-	-	-	-	-	-	-	-
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	1.0	0.98	0.99	1.0	1.0	-	-	0.94	-	-	-	-	-	-	-	-
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.14	0.14	-	-	0.11	-	-	-	-	-	-	-	-
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	-	-	-	-	-	-	-	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00016	0.00017	0.00018	-	-	0.00015	-	-	-	-	-	-	-	-

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2018-05-03	2018-05-22	2018-06-04	2018-06-13	2018-07-16	2018-08-27	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	<0.0030	-	-	-	-	-	-	-	-
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0061	0.0053	0.0057	0.0068	0.0065	-	-	0.012	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	-	-	0.00012	-	-	-	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	0.0051	0.0054	0.0053	0.005	0.0055	-	-	0.0059	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	0.0000056	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-	-
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00077[Bc]	0.00078[Bc]	0.00085[Bc]	0.00076[Bc]	0.00085[Bc]	-	-	0.00061	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	<0.030	-	-	-	-	-	-	-	-
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	-	-	<0.0010	-	-	-	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	0.00013	0.00017	0.00021	0.00038	0.00067	-	-	0.0011	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00038	0.0004	0.00042	0.00042	0.00053	-	-	0.0004	-	-	-	-	-	-	-	-
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00065	-	-	0.00062	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	0.000086	0.000092	0.000096	0.00011	0.0001	-	-	0.00011	-	-	-	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.6	1.7	1.7	-	-	1.7	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-	-
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.14	0.14	-	-	0.12	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	-	-	-	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	-	-	-	-	-	-	-	-
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00015	0.00015	0.00016	-	-	0.00014	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	-	-	-	-	-	-	-	-
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	<0.0030	-	-	-	-	-	-	-	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary*. Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture*. Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-11-07	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2019-10-30	2020-06-02	2020-06-16	2020-06-24	2020-06-29	2020-08-11	2020-09-16	2020-11-10
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.8	8.0	8.0	7.8	8.1	7.9	8.0	7.9	8.1	7.8	7.7	7.8	8.0	8.1	7.7
Temperature	°C	**15**[d]	-	-	-	-	7.9	3.4	4.8	6.2	9.7	13	**15.3**[DW]	**17.6**[DW]	7.7	9.1	11	**15.3**[DW]	11	**16.5**[DW]	**15.4**[DW]	5.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	10	12	10	10	11	8.8	11	9.4	11	10	11	9.5	10	9.6	9.9	11
Dissolved oxygen	%	-	-	-	-	-	86	89	79	83	95	83	109	98	92	90	103	96	94	98	99	91
Turbidity	NTU	**1.0**	-	-	-	-	0	0.75	0.67	0.04	0.97	0	0.77	0.21	0.03	**1.7**[DW]	0.53	0.23	0.59	0	0.11	**1.66**[DW]
Conductivity	µS/cm	-	-	-	-	-	103	112	118	113	110	115	100	98	109	122	112	104	103	99	105	111
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.8	7.9	7.9	7.9	8.1	8.0	8.0	-	-	-	7.8	-	8.0	8.0	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	-	58	53	57	53	52	48	46	-	-	-	55	-	47	51	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	-	49	51	50	51	49	44	46	-	-	-	52	-	43	46	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	-	66	79	67	84	69	66	68	-	-	-	75	-	68	67	-
Total suspended solids	mg/L	-	-	-	-	-	-	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	-	-	-	1.4	-	<1.1	<1.0	-
Dissolved organic carbon	mg/L	-	-	-	-	-	-	2.3	2.0	2.2	7.4	2.5	2.0	2.0	-	-	-	4.5	-	3.3	2.2	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	-	0.38	0.28	0.24	0.75	0.23	0.21	0.34	-	-	-	0.78	-	0.35	0.19	-
Conductivity	µS/cm	-	-	-	-	-	-	111	113	116	113	115	101	101	-	-	-	107	-	99	104	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56	-	44	54	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	-	20	18	19	16	17	16	15	-	-	-	18	-	16	17	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	-	<0.50	<0.50	-
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	-	0.032	0.033	0.037	0.043	0.031	0.038	0.033	-	-	-	0.041	-	0.034	0.03	-
Magnesium	mg/L	-	-	-	-	-	-	2.1	2.1	2.2	2.9	2.2	1.9	2.0	-	-	-	2.5	-	2.0	2.0	-
Potassium	mg/L	-	-	-	-	-	-	0.51	0.51	0.55	0.46	0.53	0.52	0.46	-	-	-	0.5	-	0.53	0.49	-
Sodium	mg/L	-	-	-	-	-	-	1.2	1.1	1.2	1.5	1.1	0.97	0.96	-	-	-	1.4	-	0.99	0.94	-
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	-	7.4	7.8	7.2	5.6	6.6	5.9	5.8	-	-	-	6.5	-	5.6	5.7	-
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	-	0.14	0.14	0.13	0.081	0.11	0.084	0.045	-	-	-	0.071	-	0.027	0.031	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	-	0.14	0.14	0.13	0.081	0.11	0.084	0.045	-	-	-	0.072	-	0.027	0.031	-
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	-	<0.0050	<0.0050	<0.0050	0.0051	<0.0050	<0.0050	<0.0050	-	-	-	0.0055	-	<0.0050	<0.0050	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	-	0.2	0.21	0.19	0.29	0.19	0.17	0.13	-	-	-	0.22	-	0.16	0.11	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	-	0.0028[Bc]	0.0053	0.0055	0.0052	0.0036[Bc]	<0.002[Bc]	0.023[Bc, DW]	-	-	-	0.0042[Bc]	-	0.0059	0.0026[Bc]	-
Orthophosphate	mg-P/L	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	-	<0.0020	<0.0020	0.0026	0.004	<0.0020	<0.0020	<0.0020	-	-	-	0.0026	-	<0.0020	0.0022	-
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	-	0.026	0.028	0.016	0.064	0.014	0.016	0.014	-	-	-	0.047	-	0.026	0.016	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	-	0.00012	0.00014	0.00015	0.00025	0.00013	0.00012	0.00013	-	-	-	0.00026	-	0.00015	0.00015	-
Barium	mg/L	-	1.0	-	-	-	-	0.0056	0.0053	0.0051	0.0069	0.0053	0.0051	0.0055	-	-	-	0.0074	-	0.0057	0.0052	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Bismuth	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	0.0000088	-	0.0000051	<0.0000050	-
Calcium	mg/L	-	-	-	-	-	-	19	19	17	16	17	16	15	-	-	-	18	-	15	18	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	-	0.0013	0.0012	0.00078	0.0018	0.00085	0.00071	0.00063	-	-	-	0.0018	-	0.00098	0.00066	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	-	<0.030	<0.030	<0.030	0.1	0.052	<0.030	<0.030	-	-	-	0.083	-	0.033	<0.030	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-
Magnesium	mg/L	-	-	-	-	-	-	2.1	2.1	2.0	2.8	2.0	1.9	1.9	-	-	-	2.6	-	1.9	2.0	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	-	0.0015	0.0016	0.0011	0.0037	0.0022	0.0017	0.0014	-	-	-	0.0065	-	0.0021	0.001	-
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	-	0.00074	0.00076	0.00066	0.00052	0.00049	0.00035	0.00041	-	-	-	0.0007	-	0.00035	0.00034	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	-	<0.00050	<0.00050	<0.00050	0.0007	<0.00050	<0.00050	<0.00050	-	-	-	0.00066	-	0.00053	<0.00050	-
Potassium	mg/L	-	-	-	-	-	-	0.53	0.49	0.49	0.47	0.47	0.47	0.48	-	-	-	0.54	-	0.5	0.44	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	-	0.00015	0.00021	0.00012	0.00014	0.00014	0.000086	0.000091	-	-	-	0.00032	-	0.0001	0.00011	-
Silicon	mg/L	-	-	-	-	-	-	1.7	1.8	1.7	2.5	1.8	1.7	1.7	-	-	-	2.3	-	2.0	1.8	-
Silver	mg/L	-	0.00012	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-
Sodium	mg/L	-	-	-	-	-	-	1.2	1.1	1.1	1.5	1.1	0.9	0.91	-	-	-	1.5	-	0.93	0.88	-
Strontium	mg/L	**7.0**	-	-	-	-	-	0.15	0.14	0.14	0.12	0.13	0.12	0.12	-	-	-	0.13	-	0.11	0.13	-
Thallium	mg/L	-	0.000030	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	0.0001	-	<0.00010	0.00023	-
Titanium	mg/L	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	-	0.00018	0.00016	0.00016	0.00013	0.00016	0.00015	0.00014	-	-	-	0.00013	-	0.00013	0.00014	-

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-11-07	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-08-20	2019-10-30	2020-06-02	2020-06-16	2020-06-24	2020-06-29	2020-08-11	2020-09-16	2020-11-10
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	<0.0030	-	<0.0030	<0.0030	-
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	-	0.0077	0.0062	0.0078	0.032	0.007	0.011	0.0097	-	-	-	0.016	-	0.013	0.01	-
Antimony	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Arsenic	mg/L	-	-	-	-	-	-	<0.00010	0.00012	0.00011	0.00024	0.00011	0.00011	0.00011	-	-	-	0.00016	-	0.00014	0.00011	-
Barium	mg/L	-	-	-	-	-	-	0.0059	0.0052	0.0058	0.0067	0.0061	0.0055	0.0052	-	-	-	0.0067	-	0.006	0.0053	-
Beryllium	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.0010	-	<0.0010	<0.0010	-
Bismuth	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-
Boron	mg/L	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	0.0000076	-	<0.0000050	<0.0000050	-
Chromium	mg/L	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	-	0.00063	0.00063	0.00057	0.0016	0.00061	0.0005	<0.00050	-	-	-	0.001	-	0.0006	0.00059	-
Iron	mg/L	-	-	**0.35**	-	-	-	<0.030	<0.030	<0.030	0.046	<0.030	<0.030	<0.030	-	-	-	<0.030	-	<0.030	<0.030	-
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-
Manganese	mg/L	-	-	-	-	-	-	0.00033	0.00031	0.00031	0.0017	0.00067	0.00094	0.00022	-	-	-	0.00036	-	<0.00010	0.00027	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	0.00084	0.00074	0.00062	0.00054	0.00049	0.00036	0.00036	-	-	-	0.00054	-	0.00037	0.00035	-
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	-	<0.00050	<0.00050	<0.00050	0.00065	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-
Selenium	mg/L	-	-	-	-	-	-	0.00021	0.00023	0.00015	0.00017	0.00011	0.00013	0.00012	-	-	-	0.00013	-	0.00011	0.000096	-
Silicon	mg/L	-	-	-	-	-	-	1.6	1.8	1.7	2.5	1.8	1.7	1.7	-	-	-	2.2	-	2.0	1.7	-
Silver	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-
Strontium	mg/L	-	1.3	-	-	-	-	0.15	0.14	0.14	0.13	0.14	0.12	0.12	-	-	-	0.13	-	0.11	0.13	-
Thallium	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-
Titanium	mg/L	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-
Uranium	mg/L	-	-	-	-	-	-	0.00019	0.00016	0.00018	0.00014	0.00015	0.00015	0.00014	-	-	-	0.00014	-	0.00012	0.00015	-
Vanadium	mg/L	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	<0.0030	-	<0.0030	<0.0030	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.2	7.8	7.9	8.5	7.9	7.7	7.9	8.0	8.0	**6.4**[Ba,Bc]	7.6	7.8	8.4	7.9	7.6	8.1
Temperature	°C	**15**[d]	-	-	-	-	8.4	13	**19.8**[DW]	**15.6**[DW]	9.0	4.1	**15.9**[DW]	**21**[DW]	14	4.0	9.9	**17.2**[DW]	**16.9**[DW]	7.0	7.4	15
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	11	101	9.4	11	12	11	8.9	9.9	-	-	-	-	-	12	10
Dissolved oxygen	%	-	-	-	-	-	98	101	9.2	94	91	91	108	99	95	-	-	-	-	-	98	103
Turbidity	NTU	**1.0**	-	-	-	-	0.08	**1.06**[DW]	0	0.05	0.15	0	0.72	0.32	0.19	0.08	0.49	0	0.25	-	0.55	0.44
Conductivity	µS/cm	-	-	-	-	-	110	115	119	107	107	114	106	98	104	116	113	106	109	110	110	106
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	8.0	8.0	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	66	47	54	52	54	50	48	52	53	53	51	53	52	52	47
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	53	45	46	47	48	49	42	44	51	51	46	50	51	49	46
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	81	66	77	63	84	72	60	68	86	81	69	71	64	76	70
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	1.4	<1.0	1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	2.4	6.5	2.0	2.0	1.6	2.1	3.7	2.3	1.9	2.6	3.1	2.4	2.6	2.0	2.0	2.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.31	0.46	0.26	0.18	0.13	0.16	0.7	0.23	0.22	0.3	0.36	0.23	0.58	0.38	0.34	0.46
Conductivity	µS/cm	-	-	-	-	-	107	121	98	104	114	115	105	98	106	116	115	106	108	114	113	101
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	61	48	51	52	55	50	48	51	55	55	52	49	52	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	21	16	19	18	18	16	16	18	18	18	17	17	18	17	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.029	0.034	0.03	0.035	0.037	0.039	0.035	0.035	0.035	0.035	0.04	0.035	0.032	0.032	0.026	0.031
Magnesium	mg/L	-	-	-	-	-	2.1	3.4	2.0	1.9	1.9	2.1	2.2	1.9	2.1	2.2	2.1	2.0	2.2	2.0	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.55	0.67	0.51	0.49	0.46	0.47	0.52	0.5	0.51	0.5	0.52	0.51	0.53	0.49	0.48	0.49
Sodium	mg/L	-	-	-	-	-	1.0	2.6	0.88	0.9	0.85	0.98	1.1	0.82	0.94	1.1	1.0	0.91	1.0	0.94	1.0	0.94
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	8.7	5.9	6.5	8.7	7.6	5.7	5.6	6.3	7.8	7.6	6.0	6.3	6.4	6.6	6.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.09	0.055	0.042	0.084	0.13	0.064	0.019	0.027	0.14	0.14	0.094	0.0075	0.074	0.12	0.058
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.09	0.055	0.042	0.084	0.13	0.064	0.019	0.027	0.14	0.14	0.094	0.0075	0.074	0.12	0.058
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0069	<0.0050	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.23	0.12	0.11	0.13	0.21	0.17	0.086	0.11	0.19	0.21	0.15	0.11	0.14	0.17	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0034[Bc]	0.0043[Bc]	<0.002[Bc]	0.0032[Bc]	<0.002[Bc]	0.0028[Bc]	0.0051	<0.002[Bc]	0.0025[Bc]	0.0027[Bc]	0.004[Bc]	0.0029[Bc]	0.0027[Bc]	0.0023[Bc]	0.0023[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0025	<0.0020	0.002	<0.0020	<0.0020	0.0033	<0.0020	<0.0020	0.0027	0.002	<0.0020	0.002	<0.0020	<0.0020	0.0028
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.021	0.036	0.015	0.011	0.012	0.016	0.029	0.016	0.011	0.024	0.15	0.017	0.012	0.012	0.015	0.02
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00029	0.00012	0.00011	0.00011	0.0001	0.00017	0.00012	0.00012	0.00013	0.00024	0.00011	0.00012	0.00013	0.00013	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0055	0.0079	0.0056	0.0052	0.0048	0.0052	0.0061	0.0051	0.005	0.0052	0.0093	0.0054	0.0054	0.0051	0.0052	0.0058
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	0.0000054	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050	0.000006	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	16	17	18	19	16	16	17	18	18	18	16	17	18	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00086	0.0022	0.00061	0.00055	0.00059	0.00078	0.001	0.0005	0.00053	0.0009	0.008	0.00075	0.00057	0.0029	0.0009	0.00075
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	0.059	<0.030	<0.030	<0.030	<0.030	0.041	<0.030	<0.030	<0.030	0.14	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000074	<0.000050	<0.000050	0.0001	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	3.1	1.9	2.0	1.9	2.0	2.2	1.8	2.0	2.2	2.3	2.0	2.1	2.2	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0018	0.0073	0.0017	0.00094	0.00095	0.0011	0.0029	0.0013	0.00097	0.0015	0.0057	0.0015	0.00088	0.00082	0.0013	0.0025
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00044	0.0012	0.00037	0.00035	0.00043	0.00075	0.00047	0.00033	0.00036	0.00095	0.00075	0.00036	0.00035	0.00043	0.00043	0.00046
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.62	0.5	0.48	0.48	0.48	0.5	0.45	0.48	0.49	0.6	0.51	0.53	0.51	0.48	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00014	0.00022	0.00015	0.00012	0.00012	0.00017	0.00017	0.000095	0.00013	0.00022	0.00019	0.00011	0.00011	0.00012	0.00012	0.00015
Silicon	mg/L	-	-	-	-	-	2.0	2.5	1.8	1.5	1.5	1.9	2.2	1.6	1.3	1.9	2.2	1.6	0.81	1.3	1.5	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	2.1	0.9	0.86	0.86	1.0	1.1	0.81	0.89	1.1	1.1	0.91	0.97	0.99	1.0	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.11	0.13	0.14	0.14	0.11	0.11	0.14	0.15	0.15	0.13	0.14	0.14	0.13	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00014	0.00015	0.00016	0.00018	0.00013	0.00014	0.00017	0.00015	0.00017	0.00016	0.00017	0.00018	0.00017	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-57
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.01	0.02	0.011	0.0071	0.0066	0.0083	0.017	0.011	0.0072	0.022	0.009	0.0096	0.0069	0.0068	0.0059	0.0086
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00029	0.00014	<0.00010	<0.00010	<0.00010	0.00015	0.00011	<0.00010	0.00013	<0.00010	0.00012	0.00011	<0.00010	0.00011	0.00012
Barium	mg/L	-	-	-	-	-	0.0053	0.0087	0.0057	0.0051	0.0049	0.0051	0.0061	0.0051	0.0053	0.0056	0.0053	0.0054	0.0059	0.0049	0.005	0.0056
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00064	0.0024	0.00052	<0.00050	<0.00050	0.00068	0.00097	<0.00050	<0.00050	**0.00085[Bc,Ba]**	0.00064	0.00057	0.00087	0.00055	0.0006	0.00065
Iron	mg/L	-	-	**0.35**	-	-	<0.030	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00067	0.0069	0.00067	0.00028	0.0003	0.00028	0.0015	0.00043	0.00028	0.00094	0.00082	0.00047	0.00022	0.00025	0.00044	0.00099
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00047	0.0014	0.00037	0.00029	0.00039	0.00074	0.00049	0.00033	0.00033	0.00095	0.00069	0.00034	0.00037	0.00039	0.00045	0.00043
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.00025	0.000091	0.000081	0.00011	0.00018	0.00014	0.0001	0.000075	0.00023	0.00019	0.00012	0.00009	0.00012	0.00012	0.00012
Silicon	mg/L	-	-	-	-	-	1.9	2.5	1.7	1.4	1.4	1.7	2.2	1.6	1.3	1.8	1.9	1.6	0.79	1.2	1.5	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.15	0.11	0.12	0.13	0.15	0.12	0.11	0.13	0.14	0.14	0.13	0.13	0.13	0.15	0.12
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00014	0.00015	0.00015	0.00016	0.00013	0.00013	0.00016	0.00016	0.00016	0.00015	0.00017	0.00015	0.00016	0.00014
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP
Depth							S	S	S	S	S	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2015-12-21	2016-11-21	2018-01-10	2018-01-31	2018-10-11	2019-05-15	2019-05-21	2019-10-30	2020-09-16	2021-05-19	2021-07-21
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.1	7.8	7.7	7.8	8.0	7.6	7.7	-	-	7.6	7.8	7.6	7.9	8.2	8.6	7.9
Temperature	°C	**15**[d]	-	-	-	-	**17.9**[DW]	9.0	8.8	**16.4**[DW]	**18.1**[DW]	4.5	7.7	-	-	9.1	3.8	3.9	7.5	9.8	8.0	8.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	9.2	11	12	11	9.0	11	10	-	-	10	12	12	11	10	12	11
Dissolved oxygen	%	-	-	-	-	-	97	90	101	107	96	83	87	-	-	90	87	88	91	89	97	95
Turbidity	NTU	**1.0**	-	-	-	-	0.34	0.4	**1.36**[DW]	0.8	0.95	0.74	0.2	-	-	0.14	0.55	0	0.13	0.07	0.13	0.14
Conductivity	µS/cm	-	-	-	-	-	107	105	110	104.5	110	152	110	-	-	106	114	117	108	105	110	124
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	8.0	8.1	7.9	7.9	7.8	8.0	7.9	8.0	8.0	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	50	51	48	50	55	53	55	53	49	54	56	50	52	53	49
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	49	51	46	50	49	50	49	50	45	51	49	48	48	48	47
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	65	63	79	66	74	65	71	66	67	74	77	66	67	66	66	75
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.1	<1.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.3	<1.1	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	1.6	2.4	1.9	1.9	1.5	1.9	1.7	1.7	1.1	1.9	2.1	2.0	2.1	2.4	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.18	0.21	0.34	0.37	0.17	0.58	0.26	0.33	0.31	0.24	0.23	0.29	0.2	0.18	0.29	0.18
Conductivity	µS/cm	-	-	-	-	-	109	110	115	104	108	113	110	122	110	104	114	118	110	104	110	103
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	52	49	54	-	-	-	-	-	-	-	-	52	51	50
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	17	16	16	19	18	18	18	16	18	19	17	17	18	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.03	0.033	0.034	0.031	0.038	0.035	0.035	0.038	0.035	0.033	0.042	0.038	0.03	0.034	<0.020	0.03
Magnesium	mg/L	-	-	-	-	-	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.3	1.9	2.2	2.3	2.0	2.0	2.1	1.8
Potassium	mg/L	-	-	-	-	-	0.48	0.47	0.54	0.54	0.50	0.49	0.52	0.48	0.52	0.46	0.48	0.55	0.5	0.5	0.53	0.48
Sodium	mg/L	-	-	-	-	-	0.86	0.9	1.1	0.98	0.91	0.96	1.0	1.1	1.1	0.91	1.2	1.2	0.92	0.94	1.0	0.88
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.5	6.7	7.2	6.1	7.1	6.8	7.7	8.2	6.9	6.5	8.1	7.9	6.7	6.0	<0.30	6.1
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.047	0.09	0.11	0.056	0.032	0.12	0.1	0.15	0.13	0.069	0.14	0.14	0.089	0.068	<0.0050	0.11
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.047	0.09	0.11	0.056	0.032	0.12	0.1	0.15	0.13	0.069	0.14	0.14	0.089	0.068	<0.0051	0.11
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	0.016	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	0.0056	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.13	0.15	0.2	0.15	0.083	0.16	0.17	0.19	0.16	0.28	0.2	0.22	0.2	0.14	0.19	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0025[Bc]	<0.002[Bc]	0.0037[Bc]	0.0021[Bc]	<0.002[Bc]	0.002[Bc]	0.0022[Bc]	0.0024[Bc]	0.0022[Bc]	0.0048[Bc]	0.0079	0.003[Bc]	0.0073	0.0022[Bc]	0.0036[Bc]	0.0043[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0024	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0061	0.0026	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.011	0.011	0.012	0.014	0.012	0.043	0.021	0.024	0.023	0.0097	0.021	0.015	0.023	0.015	0.019	0.013
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00016	0.00011	0.00015	0.00012	0.00011	0.00016	0.00014	0.00013	0.00027	0.00012	0.00012	0.00011	0.00012	0.00016	0.00013	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0052	0.0052	0.0055	0.0052	0.0059	0.0058	0.006	0.006	0.005	0.0054	0.0051	0.0055	0.005	0.0054	0.0049
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	18	17	17	18	18	18	18	19	17	17	18	18	18	17	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00061	0.00058	0.0021	0.00064	0.00053	0.0016	0.001	0.0013	0.0015	0.00062	0.0009	0.00085	0.0012	0.00061	0.0008	<0.00050
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000052	0.00034	0.00073	0.00022	0.00052	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.2	1.9	2.1	2.0	2.1	2.2	2.2	2.0	2.1	2.0	2.0	1.9	2.1	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00088	0.00089	0.0023	0.0015	0.0012	0.0016	0.0016	0.0011	0.0011	0.00099	0.0012	0.0011	0.0013	0.001	0.0016	0.0011
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00035	0.00035	0.00049	0.00041	0.00034	0.00046	0.00068	0.0007	0.00046	0.00033	0.00074	0.00077	0.00043	0.00033	0.00042	0.00031
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	0.0017	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	0.00058	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.52	0.5	0.49	0.47	0.51	0.58	0.48	0.5	0.48	0.48	0.47	0.45	0.42	0.5	0.46
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000093	0.000089	0.00011	0.00013	0.000090	0.00011	0.00016	0.00024	0.00011	0.0001	0.00019	0.00019	0.00017	0.00014	0.00013	0.00011
Silicon	mg/L	-	-	-	-	-	1.4	1.6	1.8	1.6	1.4	1.7	1.7	1.7	1.6	1.5	1.8	1.6	1.6	1.7	2.0	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.87	0.93	1.1	0.87	0.93	0.99	1.1	1.1	1.0	0.97	1.2	1.1	0.94	0.85	1.0	0.85
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.13	0.12	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.13	0.13	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	0.00054	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00016	0.00018	0.00015	0.00017	0.00016	0.00016	0.00016	0.00017	0.00016	0.00016	0.00016	0.00015	0.00013	0.00017	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-57	QUL-57	QUL-57	QUL-57	QUL-57	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-57-S	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP
Depth							S	S	S	S	S	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2015-12-21	2016-11-21	2018-01-10	2018-01-31	2018-10-11	2019-05-15	2019-05-21	2019-10-30	2020-09-16	2021-05-19	2021-07-21
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0069	0.0057	0.0082	0.010	0.012	0.0053	0.0084	0.0052	0.0041	0.009	0.0071	0.007	0.0078	0.0092	0.0098	0.0085
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.00011	0.00011	0.00013	0.00012	0.00012	0.00011	0.00011	<0.00010	<0.00010	0.0001	0.00011	0.00012	0.00012	0.00011	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0051	0.0052	0.0057	0.0051	0.0052	0.0056	0.0055	0.0056	0.0052	0.0055	0.0061	0.0051	0.0054	0.0051	0.0049
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	0.0000051	0.0000054	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	<0.00050	0.00051	0.00072	0.00056	0.00066	0.00089(Bc)	0.0014(Bc)	0.00074(Bc)	0.00082(Bc)	0.00084(Bc)	0.00062	0.00065	0.0019(Bc)	0.0007	0.00067	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000055	0.00033	0.00022	0.00022	0.00039	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00027	0.00029	0.0013	0.00055	0.00085	0.00026	0.00023	0.00022	0.0001	0.00051	0.00014	0.00015	0.00022	0.0002	0.00062	0.00013
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.00033	0.00051	0.00037	0.00036	0.0004	0.00066	0.00062	0.00037	0.00036	0.00076	0.00079	0.00043	0.00036	0.00042	0.00032
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000066	0.000073	0.00014	0.00015	0.00011	0.000087	0.00022	0.00026	0.0001	0.000071	0.00017	0.00016	0.00011	0.00011	0.000097	0.000093
Silicon	mg/L	-	-	-	-	-	1.3	1.4	1.8	1.3	1.3	1.6	1.6	1.5	1.6	1.4	1.7	1.7	1.6	1.7	1.8	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.12	0.12	0.14	0.12	0.13	0.13	0.14	0.14	0.14	0.13	0.14	0.15	0.14	0.13	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00018	0.00016	0.00014	0.00015	0.00015	0.00015	0.00016	0.00015	0.00015	0.00016	0.00016	0.00015	0.00014	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID	Unit	BC ENV Drinking WQG					QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP
Depth							AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-09-16	2021-10-27	2022-06-27	2022-08-16	2022-10-19	2023-05-17	2023-05-25	2023-05-30	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2025-06-05	2025-06-16
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.4	7.9	7.8	7.8	7.9	7.5	7.4	7.4	7.2	7.4	7.6	8.4	7.8	7.5	7.6	7.2
Temperature	°C	**15**[d]	-	-	-	-	**15.4**[(DW)]	8.8	4.5	4.5	10	4.0	3.9	4.0	4.0	5.7	4.8	**16.6**[(DW)]	5.7	4.5	4.8	4
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	9.4	10	12	11	9.9	-	-	-	-	-	-	-	-	12	12	12
Dissolved oxygen	%	-	-	-	-	-	94	90	91	87	89	-	-	-	-	-	-	-	-	93	91	91
Turbidity	NTU	**1.0**	-	-	-	-	0.03	0.17	0.41	0.41	0	-	0.76	0.53	0.23	0	0	0.29	-	**1.03**[(DW)]	0.25	0.2
Conductivity	µS/cm	-	-	-	-	-	109	108	111	111	105	115	115	114	112	68	110	109	111	116	116	118.3
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.9	8.0	7.8	8.0	7.8	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	55	54	54	52	53	59	54	51	52	52	52	53	54	55	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	51	47	43	51	49	51	50	49	48	51	51	50	51	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	78	71	73	66	94	83	88	80	66	90	78	73	73	82	68	70
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	1.3	<1.1	7.2	<1.0	<1.0	25	<1.2	<1.0	2.7	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.6	2.2	1.9	2.3	1.8	2.7	2.5	2.5	2.0	2.4	2.2	2.1	1.9	1.8	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.16	0.13	0.24	0.16	0.22	0.16	0.26	0.24	0.37	0.37	0.2	0.62	0.17	0.18	0.14	0.22
Conductivity	µS/cm	-	-	-	-	-	112	109	112	112	106	115	117	114	116	112	112	109	115	116	113	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	52	52	53	55	50	55	54	55	54	52	54	51	54	52	54	57
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	19	18	18	18	18	20	18	17	17	18	17	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.03	0.036	0.034	0.039	0.036	0.039	0.04	0.032	0.041	0.036	0.036	0.034	0.033	0.034	0.038	0.031
Magnesium	mg/L	-	-	-	-	-	1.9	2.0	2.2	2.1	2.0	2.1	2.2	2.3	2.1	2.2	2.1	2.1	2.1	2.0	2.2	2.2
Potassium	mg/L	-	-	-	-	-	0.48	0.51	0.5	0.54	0.51	0.51	0.5	0.53	0.5	0.55	0.52	0.5	0.5	0.52	0.51	0.50
Sodium	mg/L	-	-	-	-	-	0.88	0.88	0.99	1.0	0.95	1.1	1.1	1.1	1.0	1.1	0.98	0.97	0.99	1.0	1.1	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.4	7.0	6.7	7.1	6.3	8.3	8.7	7.2	7.9	6.3	6.6	6.4	6.6	8.0	7.7	7.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.043	0.086	0.13	0.15	0.028	0.15	0.15	0.14	0.15	0.13	0.14	0.0088	0.14	0.15	0.14	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.043	0.086	0.13	0.15	0.028	0.15	0.15	0.14	0.15	0.13	0.14	0.0088	0.14	0.15	0.14	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0055	<0.0050	0.01	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.16	0.18	0.18	0.11	0.2	0.2	0.21	0.23	0.19	0.19	0.11	0.18	0.21	0.2	0.17
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0026[(Bc)]	<0.002[(Bc)]	0.0031[(Bc)]	0.002[(Bc)]	<0.002[(Bc)]	0.0021[(Bc)]	0.0028[(Bc)]	0.0025[(Bc)]	0.038[(Bc, DW)]	0.0036[(Bc)]	0.0029[(Bc)]	0.0025[(Bc)]	0.0025[(Bc)]	0.0027[(Bc)]	0.0024[(Bc)]	0.0027[(Bc)]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.002
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.012	0.01	0.015	0.011	0.012	0.017	0.08	0.014	**0.38**[(Bc)]	0.016	0.015	0.013	0.0094	0.011	0.01	0.026
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	<0.00010	0.00011	0.00011	0.00011	0.00012	0.00011	0.00018	0.00015	0.00029	0.00011	0.00014	0.00011	0.00013	0.00012	0.00011	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0048	0.005	0.0053	0.0052	0.0052	0.0057	0.0077	0.0053	0.0099	0.0055	0.0057	0.0054	0.0051	0.005	0.005	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000011	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Calcium	mg/L	-	-	-	-	-	18	18	18	19	17	18	18	18	18	17	18	17	18	17	18	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0006	0.00057	0.00058	0.00062	0.00054	0.00078	0.004	0.00086	0.0072	0.00059	0.00077	0.00054	0.00056	0.00066	0.0023	0.0013
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.072	<0.030	**0.395**[(DW)]	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050	0.00016	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.2	2.1	2.0	2.3	2.2	2.3	2.3	2.0	2.1	2.1	2.2	2.1	2.2	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00098	0.00096	0.0013	0.00088	0.0017	0.0013	0.0034	0.0012	0.018	0.0014	0.0013	0.00098	0.00076	0.0011	0.00088	0.0022
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000005
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00042	0.00046	0.00055	0.00034	0.001	0.0011	0.00098	0.00081	0.00037	0.00052	0.00037	0.00054	0.00077	0.00065	0.00052
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00078	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Potassium	mg/L	-	-	-	-	-	0.51	0.5	0.49	0.49	0.47	0.55	0.5	0.53	0.59	0.53	0.53	0.52	0.52	0.48	0.5	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00013	0.00012	0.00013	0.000067	0.00028	0.00026	0.00021	0.00024	0.00012	0.00016	0.00012	0.00015	0.00017	0.00021	0.00013
Silicon	mg/L	-	-	-	-	-	1.5	1.6	1.9	1.9	1.3	1.9	2.0	1.9	2.7	1.8	1.9	0.82	1.7	1.6	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Sodium	mg/L	-	-	-	-	-	0.94	0.91	1.0	1.0	0.86	1.1	1.1	1.1	1.1	0.98	1.0	1.0	1.0	1.0	1.1	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.14	0.13	0.14	0.14	0.15	0.14	0.14	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00017	0.00016	0.00017	0.00016	0.00018	0.00016	0.00017	0.00019	0.00016	0.00017	0.00017	0.00019	0.00018	0.00019	0.00018

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP	QUL-58-AP
Depth							AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AP
Date Sampled							2021-09-16	2021-10-27	2022-06-27	2022-08-16	2022-10-19	2023-05-17	2023-05-25	2023-05-30	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2025-06-05	2025-06-16
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00092	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0086	0.0068	0.0078	0.0074	0.0074	0.0072	0.0092	0.0099	0.0078	0.0075	0.008	0.01	0.0062	0.0061	0.0057	0.0078
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.0001	0.00011	<0.00010	0.0001	0.0001	<0.00010	<0.00010	<0.00010	0.00012	0.00011
Barium	mg/L	-	-	-	-	-	0.0051	0.0049	0.0055	0.0052	0.0053	0.0051	0.0049	0.0053	0.0052	0.0052	0.0054	0.0058	0.005	0.0049	0.0049	0.0054
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000071	<0.0000050	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00062	<0.00050	0.00053	0.00065	0.00051	0.00062[Bc]	0.00072[Bc]	0.00072[Bc]	0.00065[Bc]	0.00054[Bc]	0.00067	0.00072	0.00051	0.00061[Bc]	0.00067[Bc]	0.00096[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Manganese	mg/L	-	-	-	-	-	0.0003	0.00029	0.00015	0.00019	0.00054	0.00023	0.00026	0.00019	0.0002	0.00016	0.00023	0.00028	0.0002	0.00026	0.00021	0.0014
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00029	0.0004	0.00044	0.00057	0.00034	0.00088	0.0011	0.00094	0.00077	0.00036	0.00048	0.00036	0.00047	0.00084	0.00062	0.00047
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Selenium	mg/L	-	-	-	-	-	0.000073	0.000086	0.00013	0.00013	0.000067	0.00027	0.00026	0.00023	0.00017	0.00011	0.00016	0.000095	0.00014	0.00024	0.00018	0.00015
Silicon	mg/L	-	-	-	-	-	1.4	1.4	1.9	1.9	1.3	1.9	1.8	1.9	1.8	2.1	1.8	0.77	1.6	1.8	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.12	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	-	-	-	-	-	0.00014	0.00016	0.00015	0.00016	0.00016	0.00016	0.00015	0.00017	0.00016	0.00015	0.00016	0.00017	0.00016	0.00016	0.00018	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID	Unit	BC ENV Drinking WQG					QUL-58-AP	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	AP	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
Date Sampled							2025-06-18	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2016-11-16	2016-11-30	2017-03-06	2017-04-10	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.2	7.9	8.0	8.0	8.1	-	-	7.7	7.7	7.8	7.4	7.7	7.7	7.8	7.8	8.3
Temperature	°C	**15**[d]	-	-	-	-	4	14	14	12	**16.2**[DW]	13	7.4	8.1	6.8	2.2	2.7	9.9	10	8.7	5.3	11
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	9.9	8.9	9.8	9.2	10	10	11	10	12	12	11	11	11	11	10
Dissolved oxygen	%	-	-	-	-	-	89	96	89	90	94	94	84	89	85	85	85	95	94	91	86	91
Turbidity	NTU	**1.0**	-	-	-	-	0.1	0	0	0	0.17	0.03	0.57	0.38	0	0.44	0.83	0.64	0.34	0.74	0	0
Conductivity	µS/cm	-	-	-	-	-	117.7	97	102	99	100	100	104	107	107	107	110	110	104	103	122	105
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.7	8.0	7.8	7.8	7.8	7.9	7.8	7.9	7.9	8.0	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	56	48	48	51	50	53	53	49	53	58	55	50	49	48	57	49
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	52	43	45	46	50	49	50	49	50	49	50	49	46	46	51	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	63	70	74	71	54	72	62	73	83	67	61	72	67	72	79	69
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.8	1.2	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	2.3	2.2	2.6	1.9	1.8	1.8	1.9	2.0	1.8	1.9	2.3	1.9	1.9	2.1	2.5
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.22	0.81	0.41	0.35	0.3	0.28	0.55	0.41	0.47	0.74	0.59	0.63	0.73	0.41	0.31	0.28
Conductivity	µS/cm	-	-	-	-	-	113	97	99	102	103	102	110	110	109	112	117	108	101	100	119	105
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	19	16	16	17	17	18	18	16	18	20	18	17	16	16	19	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.036	0.034	0.032	0.03	0.034	0.03	0.034	0.033	0.037	0.035	0.032	0.034	0.033	0.032	0.037	0.03
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	1.9	1.9	1.9	2.1	2.0	2.1	2.2	2.2	2.1	2.1	2.0	2.4	1.9
Potassium	mg/L	-	-	-	-	-	0.49	0.52	0.52	0.6	0.48	0.51	0.54	0.49	0.54	0.52	0.57	0.52	0.51	0.51	0.55	0.47
Sodium	mg/L	-	-	-	-	-	0.91	0.95	0.96	1.0	0.86	0.93	1.1	0.95	1.1	1.7	1.1	1.0	1.0	0.96	1.4	0.87
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.4	5.8	5.6	5.8	6.4	6.4	8.0	7.2	7.8	7.2	7.4	6.5	6.2	6.2	11	6.2
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.069	0.066	0.095	0.052	0.055	0.14	0.094	0.11	0.14	0.14	0.12	0.11	0.12	0.2	0.086
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.069	0.066	0.095	0.052	0.055	0.14	0.094	0.11	0.14	0.14	0.12	0.11	0.12	0.2	0.086
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.005	<0.0050	<0.0050	0.0057	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0076
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.16	0.15	0.23	0.12	0.29	0.22	0.16	0.17	0.19	0.2	0.2	0.2	0.19	0.24	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0025[Bc]	0.0042[Bc]	<0.002[Bc]	0.007	0.0028[Bc]	0.0088	0.0055	<0.002[Bc]	0.0049[Bc]	0.13[Bc, DW]	0.0031[Bc]	<0.002[Bc]	0.0047[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.013	0.0023	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0035	0.12	0.0032	0.0027	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.0066	0.027	0.025	0.025	0.015	0.029	0.04	0.023	0.036	0.014	0.031	0.026	0.035	0.026	0.02	0.011
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00018	0.00011	0.00011	0.00013	<0.00010	0.00011	0.00013	0.00011	0.00012	0.00013	0.00014	0.00013	0.00014	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0052	0.0057	0.0059	0.0055	0.0053	0.0055	0.0059	0.0055	0.0055	0.0051	0.0058	0.0057	0.0061	0.0055	0.0061	0.0051
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	16	16	17	17	18	16	18	17	18	19	17	18	16	19	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0013	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00092	0.001	0.00099	0.0018	0.00064	0.0018	0.0013	0.0013	0.0013	0.0021	0.0012	0.00083	0.00081	0.0007	0.0009	0.00057
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.033	0.04	0.032	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.00005	0.00027	0.00013	0.00072	0.000077	0.0004	0.00026	0.001	0.0003	0.0003	0.00014	0.0002	0.000097	0.00006	0.00022	0.00006
Lithium	mg/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	0.0012	0.0011	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
Magnesium	mg/L	-	-	-	-	-	2.1	1.9	2.0	1.9	1.9	1.9	2.0	2.1	1.8	2.1	2.2	2.0	2.1	2.0	2.3	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00087	0.0023	0.0025	0.0016	0.0011	0.0015	0.0019	0.0014	0.0017	0.00087	0.002	0.0019	0.0024	0.0018	0.0019	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00045	0.00034	0.00037	0.00034	0.00031	0.00045	0.00075	0.00058	0.00072	0.00061	0.00066	0.00047	0.00042	0.00043	0.0015	0.00033
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.0005	<0.00050	0.00059	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.48	0.49	0.54	0.49	0.48	0.51	0.56	0.52	0.49	0.5	0.53	0.51	0.52	0.52	0.58	0.43
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00011	0.00011	0.000095	0.00011	0.00011	0.00018	0.00012	0.00017	0.00013	0.00015	0.000097	0.00011	0.000096	0.00039	0.000092
Silicon	mg/L	-	-	-	-	-	1.7	1.8	1.8	1.6	1.6	1.6	1.7	1.7	1.6	1.7	1.9	1.7	1.8	1.8	1.8	1.5
Silver	mg/L	-	0.00012	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.96	0.93	0.97	0.92	0.94	0.92	1.1	1.0	0.94	1.4	1.1	0.99	0.97	0.96	1.4	0.84
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.11	0.11	0.13	0.13	0.14	0.13	0.14	0.14	0.15	0.14	0.13	0.13	0.12	0.16	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00014	0.00014	0.00015	0.00016	0.00017	0.00016	0.00016	0.00017	0.00015	0.00017	0.00014	0.00014	0.00015	0.00018	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-AP	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	AP	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
Date Sampled							2025-06-18	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2016-11-16	2016-11-30	2017-03-06	2017-04-10	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.003	<0.0030	<0.0030	0.003	<0.0030	<0.0030	<0.0030	0.0065	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0049	0.013	0.015	0.015	0.0086	0.012	0.0058	0.0065	0.0077	0.0063	0.0072	0.0096	0.01	0.0089	0.0084	0.0076
Antimony	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.0001	0.00012	0.00012	<0.00010	<0.00010	0.00011	0.00011	<0.00010	0.0001	0.0001	0.00011	0.00011	0.00013	0.00012	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0055	0.0056	0.0058	0.0051	0.0052	0.0052	0.0051	0.0053	0.0053	0.0053	0.0055	0.0053	0.0054	0.0056	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.000005	<0.0000050	<0.0000050	0.000012	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00078[Bc]	0.00086	0.00085	0.0048[Bc]	0.0016[Bc]	0.001[Bc]	0.0008[Bc]	0.00077[Bc]	0.00083[Bc]	0.0034[Bc]	0.00076[Bc]	0.00089[Bc]	0.0007	0.00057	0.0009[Bc]	0.0006
Iron	mg/L	-	-	**0.35**	-	-	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.00005	0.00033	0.00023	0.0012	0.00014	0.00047	0.00024	0.0011	0.00022	0.00061	0.00028	0.00038	0.00013	0.000053	0.00028	0.00012
Lithium	mg/L	-	-	-	-	-	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00025	0.001	0.0012	0.0018	0.00033	0.00045	0.00018	0.00016	0.00028	0.00011	0.00066	0.00053	0.00043	0.00024	0.00084	0.00027
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00045	0.00034	0.00033	0.00038	0.00031	0.00045	0.00078	0.0005	0.00068	0.00067	0.0006	0.00044	0.00042	0.00045	0.0016	0.00027
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.0005	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00010	0.00011	0.000096	0.000098	0.000095	0.00011	0.00019	0.00014	0.00015	0.00014	0.00012	0.00014	0.00011	0.00011	0.00034	0.000078
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.8	1.6	1.5	1.5	1.6	1.5	1.8	1.7	1.7	1.7	1.8	1.8	1.7	1.6
Silver	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.11	0.11	0.13	0.13	0.14	0.14	0.13	0.14	0.16	0.13	0.13	0.13	0.12	0.15	0.13
Thallium	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00014	0.00013	0.00015	0.00014	0.00016	0.00016	0.00016	0.00016	0.00015	0.00016	0.00015	0.00015	0.00014	0.00015	0.00014
Vanadium	mg/L	-	-	-	-	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.003	<0.0030	<0.0030	**0.012[Bc]**	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID	Unit	BC ENV Drinking WQG					QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
Date Sampled							2017-10-01	2017-10-26	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-08-23	2018-09-04	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-05-08	2019-05-15	2019-06-18
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.9	7.3	7.6	7.6	7.9	7.6	7.8	7.8	7.8	7.3	7.7	7.8	7.9	7.9	7.9
Temperature	°C	**15**[d]	-	-	-	-	5.0	8.9	6.1	6.8	9.4	14	7.3	**16.4**[DW]	15	8.6	8.5	8.4	6.6	5.1	4.7	14
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	11	11	11	11	10	11	9.2	9.6	10	10	12	11	12	12	11
Dissolved oxygen	%	-	-	-	-	-	-	94	92	91	94	97	94	94	95	88	88	99	90	91	90	105
Turbidity	NTU	**1.0**	-	-	-	-	0.32	0.2	0	0	0	0	0.22	**6.19**[DW]	0.05	0	0	0.1	0.26	0.22	0.44	0.48
Conductivity	µS/cm	-	-	-	-	-	122	113	111	104	101	100	94	102	101	107	106	102	105	114	113	100
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	8.0	7.9	8.0	7.8	8.0	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	49	50	51	51	50	48	50	49	50	52	52	51	54	57	54	48
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	49	48	48	47	46	48	47	48	49	50	50	50	52	50	45
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	62	65	72	67	68	59	70	69	64	66	68	68	64	76	70	64
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	1.7	2.2	2.3	2.4	2.5	2.1	1.7	1.7	1.7	1.6	2.7	1.8	1.8	2.3	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.25	0.35	0.54	0.39	0.38	0.4	0.54	0.28	0.35	0.26	0.25	0.25	0.17	0.23	0.17	0.24
Conductivity	µS/cm	-	-	-	-	-	105	103	102	106	100	101	105	99	107	107	109	109	110	117	113	101
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	17	17	17	16	17	17	17	18	17	17	18	19	18	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.032	0.033	0.036	0.037	0.035	0.033	0.032	0.032	0.032	0.033	0.035	0.032	0.032	0.036	0.039	0.036
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.2	2.0	2.2	2.2	2.3	1.9
Potassium	mg/L	-	-	-	-	-	0.48	0.48	0.54	0.52	0.52	0.52	0.51	0.51	0.49	0.5	0.5	0.49	0.53	0.54	0.48	0.5
Sodium	mg/L	-	-	-	-	-	0.94	0.9	1.1	1.0	0.96	0.94	0.96	0.92	0.94	0.91	1.0	0.92	0.98	1.2	1.1	0.9
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.5	6.6	6.6	6.2	6.0	6.0	6.1	6.3	6.3	6.6	6.6	6.1	6.6	7.4	7.5	6.0
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.078	0.12	0.12	0.098	0.083	0.11	0.037	0.05	0.081	0.076	0.079	0.087	0.13	0.13	0.086
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.078	0.12	0.12	0.098	0.083	0.11	0.037	0.05	0.081	0.076	0.079	0.087	0.13	0.13	0.086
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.007	0.0091	<0.0050	<0.0050	<0.0050	0.0053	<0.0050	<0.0050	0.0053
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.14	0.17	0.19	0.14	0.19	0.17	0.12	0.16	0.17	0.14	0.14	0.16	0.2	0.2	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0038[Bc]	0.0031[Bc]	0.0043[Bc]	0.0042[Bc]	0.005	0.0054	0.0049[Bc]	0.0058	0.0033[Bc]	<0.002[Bc]	<0.002[Bc]	0.0045[Bc]	0.0032[Bc]	0.0041[Bc]	**0.0134 [DW]**
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.0022	<0.0010	0.0016	0.0018	<0.0010	0.0018	0.0012	0.0011	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0029	<0.0020	<0.0020	0.0029	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020	0.0034	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.011	0.011	0.025	0.016	0.018	0.015	0.013	0.016	0.02	0.0081	0.008	0.0095	0.018	0.016	0.018	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00012	0.00013	0.00013	0.00014	0.00014	0.00024	0.00012	0.00011	<0.00010	0.00013	0.00012	0.00017	0.00013	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0057	0.0056	0.0057	0.0058	0.006	0.0055	0.0059	0.0055	0.0052	0.005	0.0054	0.0057	0.0051	0.0051	0.005
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	16	17	17	16	16	17	16	18	17	17	17	17	17	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00068	0.00066	0.0008	0.00093	0.00082	0.00081	0.00097	0.0014	0.00097	0.00052	<0.0005	0.00054	0.00092	0.00079	0.00085	0.00062
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00015	0.00015	0.00024	0.00089	0.00044	0.00045	0.00068	0.00081	0.0003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.1	2.2	2.0	2.0	1.9	1.9	2.0	1.8	2.1	2.0	2.0	2.2	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0016	0.001	0.0022	0.0016	0.0017	0.0014	0.0011	0.0015	0.0013	0.00095	0.00084	0.001	0.00099	0.001	0.0012	0.0017
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00037	0.00034	0.0004	0.00038	0.00039	0.00037	0.00035	0.00036	0.00032	0.00036	0.00035	0.00035	0.00039	0.00066	0.00063	0.00035
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.5	0.51	0.52	0.52	0.54	0.51	0.47	0.44	0.46	0.46	0.5	0.51	0.48	0.48	0.48
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000074	0.00012	0.00014	0.00011	0.00016	0.00011	0.00012	0.00012	0.00012	0.0001	0.000093	0.000078	0.00013	0.00014	0.00015	0.000068
Silicon	mg/L	-	-	-	-	-	1.6	1.6	1.8	1.8	2.0	1.8	1.8	1.6	1.5	1.5	1.5	1.5	1.5	1.7	1.8	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.95	0.95	1.0	0.99	0.98	0.99	1.0	0.87	0.84	0.88	0.9	0.94	0.99	1.1	1.2	0.88
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00014	0.00016	0.00015	0.00015	0.00014	0.00016	0.00015	0.00016	0.00015	0.00014	0.00015	0.00016	0.00016	0.00016	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT
Depth							AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-10-01	2017-10-26	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-08-23	2018-09-04	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-05-08	2019-05-15	2019-06-18
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0058	0.0054	0.008	0.0077	0.01	0.012	0.0083	0.008	0.041	0.0053	0.0057	0.0054	0.006	0.0062	0.0067	0.01
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.0001	0.0001	0.00012	0.00012	0.00017	0.00011	0.00011	0.00013	<0.00010	0.0001	<0.00010	0.0001	<0.00010	0.00011	0.0001
Barium	mg/L	-	-	-	-	-	0.0053	0.0055	0.006	0.0056	0.0059	0.0058	0.0057	0.0058	0.01	0.0049	0.0053	0.0053	0.0055	0.0057	0.0056	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00059[Bc]	0.00055	0.0007[Bc]	0.00062	0.00065	0.00054	0.00079[Bc]	0.00088[Bc]	0.0016[Bc]	0.00053	0.00056[Bc]	<0.00050	0.00058	0.00056	0.00058	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.032	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	0.00014	0.000077	0.00027	0.001	0.0003	0.00037	0.0009	0.00046	0.00024	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00088	0.00015	0.00074	0.00029	0.00037	0.00054	0.00032	0.00032	0.0012	0.00024	0.00025	0.0001	0.00013	0.00025	0.00016	0.00072
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00034	0.0003	0.00043	0.00038	0.00035	0.00035	0.00036	0.00034	0.00033	0.00033	0.00036	0.00036	0.0004	0.00071	0.00064	0.00033
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000065	0.000062	0.00011	0.000095	0.0001	0.00011	0.0001	0.000081	0.00011	0.000083	0.000083	0.000062	0.000092	0.00017	0.00017	0.00011
Silicon	mg/L	-	-	-	-	-	1.6	1.5	1.8	1.7	1.7	1.7	1.7	1.5	1.5	1.3	1.4	1.4	1.5	1.7	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.13	0.13	0.12	0.13	0.12	0.13	0.13	0.14	0.14	0.15	0.14	0.14	0.12
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00013	0.00015	0.00015	0.00016	0.00014	0.00015	0.00015	0.00015	0.00016	0.00015	0.00015	0.00017	0.00019	0.00017	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0053	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-11	2019-07-25	2019-08-20	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-11-05	2015-11-30	2015-12-02	2015-12-09
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	7.9	7.9	7.8	7.5	7.6	-	7.6	8.1	7.7	7.3	7.8	-	7.8	7.7	7.7
Temperature	°C	**15**[d]	-	-	-	-	**15.7**[DW]	8.1	**16.7**[DW]	9.1	13	7.8	-	11	11	7.1	11	**15.5**[DW]	-	5.4	5.2	5.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	9.7	10	9.4	11	11	11	-	10	9.9	10	13	9.0	-	10	10	10
Dissolved oxygen	%	-	-	-	-	-	98	88	97	97	102	91	-	91	91	86	107	91	-	82	82	82
Turbidity	NTU	**1.0**	-	-	-	-	**1.11**[DW]	0.38	0	0.52	0.66	0.24	-	0	0.21	0.1	0.3	**1.36**[DW]	-	0.71	0.71	0.76
Conductivity	µS/cm	-	-	-	-	-	102	109	101	111	101	104	-	100	107	115	101.9	114	-	151	148	150
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	7.8	7.8	7.9	7.5	8.0	7.8	7.9	8.0	8.0	8.0	7.8	7.6	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	48	46	51	49	52	47	46	49	51	50	50	53	53	53	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	46	45	45	48	47	45	43	44	47	50	47	49	51	51	48	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	59	58	64	68	60	70	73	66	74	57	69	68	66	60	71	63
Total suspended solids	mg/L	-	-	-	-	-	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.4	1.7	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	2.2	2.0	3.1	3.0	2.4	3.9	3.1	1.9	1.6	2.0	1.8	1.5	1.5	1.5	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.2	0.33	0.28	0.78	0.55	0.3	**1.18**[DW]	0.47	0.2	0.19	0.42	0.16	0.25	0.91	0.79	0.46
Conductivity	µS/cm	-	-	-	-	-	100	101	100	107	97	105	98	100	110	110	106	106	111	112	111	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	50	47	50	49	50	-	-	47	55	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	16	15	17	16	18	15	15	17	17	17	16	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.037	0.037	0.033	0.037	0.038	0.038	0.037	0.035	0.031	0.033	0.032	0.036	0.032	0.035	0.035	0.033
Magnesium	mg/L	-	-	-	-	-	1.9	2.0	2.1	2.2	2.0	2.0	2.1	2.0	1.9	2.1	2.0	2.1	2.0	2.0	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.47	0.48	0.46	0.53	0.47	0.51	0.56	0.51	0.48	0.47	0.53	0.50	0.5	0.52	0.43	0.5
Sodium	mg/L	-	-	-	-	-	0.94	0.93	0.95	1.0	0.95	0.97	1.0	0.98	0.86	0.93	0.98	0.93	0.89	0.98	0.85	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.3	6.1	5.8	6.3	5.8	6.3	5.2	5.6	6.5	6.7	6.2	7.1	6.7	6.7	6.6	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.082	0.092	0.047	0.093	0.082	0.11	0.016	0.028	0.087	0.12	0.060	0.032	0.068	0.1	0.11	0.11
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.082	0.092	0.047	0.094	0.083	0.11	<0.050	0.029	0.087	0.12	0.060	0.032	0.068	0.1	0.11	0.11
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	0.0061	<0.0050	0.0056	<0.0050	0.0078	<0.0050	<0.0050	0.0092	<0.0050	<0.005	0.0076	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.18	0.13	0.2	0.18	0.2	0.16	0.15	0.17	0.19	0.14	0.11	0.12	0.15	0.14	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0065	**0.0129** [DW]	0.0028[Bc]	0.007	0.005	**0.0137** [DW]	0.0069	0.0035[Bc]	0.0025[Bc]	<0.002[Bc]	0.0023[Bc]	<0.002[Bc]	<0.002[Bc]	0.0041[Bc]	0.0022[Bc]	0.0031[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0032	<0.0020	0.0032	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.012	0.017	0.011	0.042	0.029	0.022	0.07	0.034	0.0083	0.01	0.015	0.011	0.011	0.037	0.036	0.045
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00012	0.00014	0.00014	0.00015	0.00019	0.00016	0.00014	0.00011	0.00013	0.00013	0.00013	0.00014	0.00013	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0058	0.0057	0.0053	0.0061	0.0058	0.0054	0.0072	0.006	0.0054	0.0051	0.0054	0.0054	0.0055	0.0058	0.0057	0.0058
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	0.0000074	0.0000056	0.0000055	0.0000058	0.0000051	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	16	16	15	16	16	17	16	16	16	18	16	18	17	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00053	0.00089	0.00051	0.00096	0.00074	0.00063	0.0011	0.001	0.00051	0.00083	0.0010	0.00053	0.00066	0.0014	0.0014	0.0028
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	0.058	0.043	<0.030	0.085	0.04	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	0.031	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.00014	0.000095	0.00013	0.00031
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	1.9	1.9	1.8	2.1	2.0	2.1	2.1	2.2	2.1	2.0	1.9	2.1	1.9	2.0	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0011	0.0014	0.0011	0.0033	0.0023	0.0015	0.0031	0.0036	0.00078	0.0009	0.0017	0.0016	0.0011	0.0016	0.0017	0.0016
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00032	0.00037	0.00032	0.00045	0.00038	0.00036	0.00044	0.00036	0.00034	0.00038	0.00038	0.00034	0.0003	0.00041	0.0004	0.00047
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	0.00051	0.00051	<0.00050	0.00067	0.00052	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.47	0.48	0.54	0.49	0.51	0.57	0.51	0.5	0.51	0.50	0.47	0.5	0.5	0.5	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00013	0.00008	0.00014	0.00014	0.00014	0.00017	0.00013	0.000095	0.00009	0.00012	0.000096	0.000088	0.00013	0.000089	0.0001
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.6	2.1	1.9	1.9	2.3	2.0	1.5	1.7	1.7	1.4	1.5	1.7	1.7	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.9	0.94	0.89	1.1	0.92	1.0	1.1	1.0	0.93	0.93	0.90	0.94	0.88	0.97	0.96	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.12	0.13	0.11	0.12	0.11	0.12	0.11	0.11	0.14	0.14	0.12	0.13	0.12	0.14	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00015	0.00013	0.00014	0.00013	0.00014	0.00013	0.00014	0.00015	0.00016	0.00015	0.00017	0.00016	0.00017	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-AT	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-11	2019-07-25	2019-08-20	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-11-05	2015-11-30	2015-12-02	2015-12-09
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0094	0.0086	0.0095	0.013	0.012	0.0095	0.019	0.013	0.0069	0.0073	0.010	0.0079	0.0049	0.006	0.0056	0.0046
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00012	0.00013	<0.00010	0.00011	0.00018	0.00017	<0.00010	<0.00010	0.00011	0.00012	<0.00010	0.00011	0.00011	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0053	0.0054	0.006	0.0055	0.0056	0.0059	0.0061	0.0048	0.0051	0.0057	0.0051	0.0052	0.0052	0.0045	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	<0.00050	<0.00050	<0.00050	0.00077	0.00054	0.00052	0.00084	0.00074	<0.00050	0.00055	0.00066[Bc]	0.00052	0.00056[Bc]	0.00078[Bc]	0.00078[Bc]	0.00086[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.00016	0.00011	0.00015	0.00017
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	0.0005	0.0002	0.00012	0.00024	0.00011	0.00024	0.00022	0.00042	0.0010	0.00031	0.00033	0.00022	0.00023
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.00034	0.00036	0.00044	0.00036	0.00038	0.00045	0.00044	0.00032	0.00035	0.00038	0.00035	0.00028	0.00039	0.0004	0.00041
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000099	0.000097	0.00014	0.00012	0.00014	0.0001	0.00014	0.00014	0.000084	0.000072	0.00012	0.00012	0.000088	0.000074	0.000091	0.00013	0.000091
Silicon	mg/L	-	-	-	-	-	1.5	1.7	1.7	2.0	2.0	1.9	2.2	1.9	1.3	1.5	1.5	1.3	1.5	1.6	1.6	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.12	0.12	0.12	0.12	0.12	0.13	0.1	0.11	0.13	0.13	0.12	0.12	0.13	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00014	0.00014	0.00014	0.00013	0.00013	0.00014	0.00014	0.00012	0.00015	0.00017	0.00014	0.00016	0.00016	0.00016	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-14	2015-12-30	2016-01-25	2016-02-23	2016-03-28	2016-04-11	2016-04-25	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2016-06-28	2016-07-06
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.5	7.6	-	7.7	7.9	7.8	7.8	8.0	7.8	7.5	7.6	7.4	-	7.7	7.5	7.7
Temperature	°C	**15**[d]	-	-	-	-	4.8	3.7	-	2.7	3.1	3.7	3.2	4.1	4.3	4.4	4.8	4.6	-	4.9	4.5	4.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	-	11	12	12	11	12	11	11	11	11	-	11	11	11
Dissolved oxygen	%	-	-	-	-	-	83	83	-	84	87	87	84	88	88	85	86	86	-	85	86	84
Turbidity	NTU	**1.0**	-	-	-	-	0.81	0.62	-	**1.05**[DW]	0.69	0.64	0.88	0.85	0.79	1.0	0.57	0.4	-	0	0	0
Conductivity	µS/cm	-	-	-	-	-	143	160	-	109	110	117	109	104	109	109	112	109	-	111	110	109
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.8	7.8	7.8	-	-	7.9	7.9	7.9	8.0	7.4	7.8	7.8	7.8	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	58	53	55	54	53	-	-	54	56	56	55	55	58	57	56	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	49	49	49	-	-	50	49	49	52	48	52	49	47	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	72	71	58	74	-	-	63	69	75	54	73	74	82	79	88
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	1.9	<1.0	-	-	<1.0	<1.0	<1.0	4.3	2.2	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.5	1.8	1.6	1.6	1.5	-	-	1.8	1.9	1.8	1.7	1.7	1.9	1.7	1.6	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.66	0.9	0.63	0.64	0.73	-	-	0.44	0.45	0.37	**1.95**[DW]	0.37	0.36	0.42	0.35	0.31
Conductivity	µS/cm	-	-	-	-	-	113	113	113	115	113	-	-	115	114	113	120	114	123	116	110	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	20	18	19	18	18	-	-	18	19	19	19	19	19	19	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.035	0.037	0.033	0.035	0.033	-	-	0.038	0.04	0.036	0.035	0.036	0.038	0.038	0.035	0.035
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.1	2.0	2.1	-	-	2.1	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.1
Potassium	mg/L	-	-	-	-	-	0.5	0.52	0.49	0.49	0.54	-	-	0.5	0.51	0.5	0.57	0.5	0.63	0.57	0.54	0.54
Sodium	mg/L	-	-	-	-	-	0.95	0.99	1.0	1.0	1.1	-	-	1.0	1.2	1.1	1.2	1.1	1.5	1.3	1.0	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.6	6.8	7.2	7.0	7.3	-	-	7.5	8.6	7.3	9.4	7.8	11	10	7.2	7.3
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.12	0.12	0.12	0.13	-	-	0.13	0.15	0.13	0.17	0.14	0.2	0.18	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.12	0.12	0.12	0.13	-	-	0.13	0.15	0.13	0.17	0.14	0.2	0.18	0.14	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.17	0.17	0.16	0.18	-	-	0.19	0.19	0.17	0.22	0.2	0.25	0.24	0.22	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0041[Bc]	0.003[Bc]	0.0082	0.0041[Bc]	0.0067	-	-	<0.002[Bc]	0.0027[Bc]	<0.002[Bc]	0.0045[Bc]	0.0056	0.0035[Bc]	0.003[Bc]	0.0033[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.0024	<0.0020	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.05	0.033	0.033	0.035	0.046	-	-	0.035	0.038	0.035	**0.14**[Bc]	0.036	0.025	0.024	0.02	0.022
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00013	0.00011	0.0001	0.0001	-	-	0.00012	0.00012	0.00012	0.0002	0.00014	0.00013	0.0001	0.00013	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0065	0.0058	0.0057	0.0053	0.0059	-	-	0.0058	0.006	0.0056	0.0077	0.0061	0.0061	0.0061	0.0057	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000082	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	19	18	18	-	-	18	19	18	18	18	19	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0016	0.0017	0.0015	0.0014	0.0019	-	-	0.0015	0.0077	0.0014	0.0044	0.0015	0.0013	0.0012	0.0014	0.0014
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.032	<0.030	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	<0.030	0.093	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00026	0.000062	0.00019	0.00063	0.00011	-	-	0.00018	0.00067	0.000071	0.00015	0.000071	0.000063	0.00037	0.000094	0.0001
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	0.0011	0.0012	<0.0010	0.0012	<0.0010	0.0011	<0.0010	<0.0010	0.0014
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.0	2.1	-	-	2.1	2.2	2.1	2.3	2.1	2.3	2.3	2.1	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.002	0.0012	0.0016	0.0014	0.0019	-	-	0.0021	0.0025	0.0016	0.0039	0.0018	0.0027	0.0017	0.0013	0.0012
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	<0.0000050	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00044	0.00047	0.00059	0.0005	0.00061	-	-	0.00058	0.00087	0.00057	0.0012	0.00081	0.0018	0.0015	0.00057	0.00072
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055
Potassium	mg/L	-	-	-	-	-	0.51	0.55	0.51	0.48	0.54	-	-	0.52	0.54	0.51	0.62	0.51	0.65	0.59	0.55	0.56
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00013	0.00011	0.00012	0.00013	-	-	0.00015	0.00018	0.00012	0.00022	0.00017	0.00039	0.00032	0.00013	0.00017
Silicon	mg/L	-	-	-	-	-	1.8	1.6	1.7	1.7	1.8	-	-	1.8	1.8	1.8	2.0	1.8	1.8	1.8	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.96	1.1	1.1	0.99	1.1	-	-	1.1	1.2	1.1	1.2	1.1	1.5	1.4	1.1	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	0.14	-	-	0.14	0.14	0.14	0.14	0.14	0.16	0.15	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	0.0005	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00017	0.00017	0.00017	-	-	0.00017	0.00017	0.00016	0.00017	0.00017	0.00017	0.00017	0.00017	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2015-12-14	2015-12-30	2016-01-25	2016-02-23	2016-03-28	2016-04-11	2016-04-25	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2016-06-28	2016-07-06
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	0.00092	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0064	0.0063	0.0049	0.0054	0.0066	-	-	0.0063	0.0064	0.007	0.0074	0.0075	0.008	0.0079	0.0063	0.0064
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.0001	0.00011	0.0001	<0.00010	-	-	<0.00010	0.00011	0.00011	0.0001	0.00012	0.00011	0.00012	<0.00010	0.00011
Barium	mg/L	-	-	-	-	-	0.0054	0.0055	0.005	0.005	0.0053	-	-	0.0053	0.0054	0.0053	0.0055	0.0053	0.0061	0.0058	0.0054	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0008[Bc]	0.00078[Bc]	0.00087[Bc]	0.00093[Bc]	0.00097[Bc]	-	-	0.00098[Bc]	0.001[Bc]	0.0011[Bc]	0.001[Bc]	0.0013[Bc]	0.00095[Bc]	0.00097[Bc]	0.001[Bc]	0.0011[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	0.0001	<0.000050	0.00036	0.00045	0.00019	-	-	0.000097	0.00028	0.00013	0.000098	0.00011	0.00013	0.00051	0.00013	0.00014
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	<0.0010	0.001	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.0002	0.0002	0.00038	0.00031	0.00075	-	-	0.00077	0.00099	0.00032	0.00076	0.00037	0.0013	0.00074	0.00018	0.00012
Mercury	mg/L	-	-	-	-	-	<0.0000050	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00041	0.00045	0.00053	0.00047	0.00055	-	-	0.00055	0.00079	0.00053	0.001	0.00069	0.0018	0.0014	0.00055	0.00063
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	0.00011	0.00011	0.00012	0.00014	-	-	0.00012	0.00019	0.00014	0.00027	0.00016	0.00038	0.00028	0.00013	0.00012
Silicon	mg/L	-	-	-	-	-	1.7	1.6	1.7	1.7	1.7	-	-	1.7	1.7	1.8	1.7	1.7	1.8	1.7	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.12	0.14	0.14	0.14	0.14	-	-	0.13	0.14	0.14	0.14	0.14	0.16	0.15	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00016	0.00016	0.00016	-	-	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID	Unit	BC ENV Drinking WQG					QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2016-11-16	2016-11-30	2017-02-02	2017-03-06	2017-04-10	2017-05-09	2017-05-15	2017-05-22	2017-05-29	2017-06-05	2017-06-12	2017-06-19
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.7	-	-	7.5	7.8	7.7	7.8	7.4	7.4	7.5	7.5	7.4	7.7	-	-
Temperature	°C	**15**[d]	-	-	-	-	4.7	5.0	5.1	5.4	5.5	6.0	3.0	3.3	3.0	3.9	4.0	4.0	4.2	4.1	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	10	10	10	11	11	11	12	12	11	11	11	-	-
Dissolved oxygen	%	-	-	-	-	-	83	83	83	81	81	82	83	81	80	88	93	85	88	86	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0	0.34	0.48	**1.41**[DW]	**1.07**[DW]	0	0.76	**1.17**[DW]	**1.14**[DW]	0.64	0	0	0.71	0.66	-	-
Conductivity	µS/cm	-	-	-	-	-	108	111	111	109	113	107	120	109	111	113	114	111	111	119	-	-
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.9	7.8	7.8	7.7	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	56	55	56	54	51	54	57	51	55	55	53	52	53	53	52	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	52	52	50	49	50	50	49	50	49	50	50	51	51	50	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	78	80	79	64	74	83	83	71	68	71	76	70	74	65	69	75
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	1.6	<1.0	<1.0	4.0	1.0	<1.0	<1.0	1.8	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.3	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.7	1.8	1.9	2.2	1.7	2.0	1.9	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.31	0.26	0.74	0.67	0.97	0.94	0.5	0.62	0.99	0.89	0.65	0.44	0.43	0.55	0.36	0.35
Conductivity	µS/cm	-	-	-	-	-	116	117	113	113	113	112	115	114	118	112	113	114	113	112	111	105
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	19	18	17	18	19	17	18	18	18	17	18	18	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.035	0.039	0.034	0.037	0.036	0.038	0.034	0.037	0.034	0.033	0.036	0.034	0.042	0.035	0.035	0.033
Magnesium	mg/L	-	-	-	-	-	2.2	2.3	2.1	2.2	1.9	2.3	2.2	2.0	2.2	2.3	2.1	2.3	2.1	2.2	2.3	2.1
Potassium	mg/L	-	-	-	-	-	0.6	0.64	0.58	0.58	0.48	0.57	0.6	0.57	0.57	0.56	0.51	0.52	0.49	0.54	0.52	0.52
Sodium	mg/L	-	-	-	-	-	1.4	1.3	1.2	1.2	1.0	1.2	1.4	1.3	1.2	1.2	1.1	1.2	1.1	1.1	1.2	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	8.9	10	8.8	8.8	8.5	8.3	9.9	9.2	8.0	7.5	7.6	7.5	7.4	7.3	7.8	7.0
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.18	0.2	0.18	0.18	0.17	0.15	0.17	0.16	0.15	0.14	0.14	0.14	0.14	0.14	0.15	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.18	0.2	0.18	0.18	0.17	0.15	0.17	0.16	0.15	0.14	0.14	0.14	0.14	0.14	0.15	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.26	0.23	0.23	0.23	0.22	0.21	0.22	0.21	0.2	0.19	0.2	0.19	0.2	0.2	0.19	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0043[Bc]	0.0066	0.002[Bc]	<0.002[Bc]	0.0054	<0.002[Bc]	0.023[Bc, DW]	<0.01	0.0022[Bc]	<0.002[Bc]	<0.002[Bc]	<0.01	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.007	0.0099	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	<0.0020	<0.0020	0.023	0.012	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.043	0.023	0.038	0.063	0.058	0.064	0.041	0.023	0.044	0.051	0.029	0.034	0.028	0.026	0.023	0.019
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00011	0.00013	0.00011	0.00012	0.00013	0.00021	0.00013	0.00014	0.00012	0.00013	0.00013	0.00012	0.00012	0.00011	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0065	0.006	0.0061	0.0067	0.0066	0.0065	0.0062	0.0054	0.0061	0.0061	0.0058	0.0059	0.0058	0.0054	0.006	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	20	16	19	17	18	18	18	19	19	19	18	17	20	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0028	0.0014	0.0019	0.002	0.002	0.0022	0.0015	0.0013	0.0018	0.0015	0.0016	0.0013	0.0013	0.0012	0.0011	0.00079
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.035	<0.030	<0.030	0.042	0.042	0.039	<0.030	<0.030	0.03	0.033	<0.030	<0.030	0.041	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00032	0.00016	0.00019	0.00019	0.00019	0.00016	0.00018	0.000051	0.00027	0.00016	0.00018	0.00016	0.00011	0.00013	0.00011	<0.000050
Lithium	mg/L	-	-	-	-	-	0.0013	0.0011	0.0012	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.001	0.0013	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.001
Magnesium	mg/L	-	-	-	-	-	2.3	2.2	2.1	2.2	2.2	1.8	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.0	2.3	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.002	0.0017	0.0017	0.0026	0.0023	0.0021	0.0018	0.0016	0.0018	0.0019	0.0018	0.0017	0.0018	0.0015	0.0018	0.0014
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0013	0.0015	0.0012	0.001	0.001	0.00095	0.0014	0.0012	0.00089	0.00069	0.00074	0.00071	0.00066	0.00066	0.00076	0.00052
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.59	0.6	0.59	0.6	0.59	0.52	0.6	0.55	0.54	0.55	0.54	0.52	0.54	0.49	0.52	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00026	0.00034	0.00024	0.00021	0.00021	0.00018	0.00027	0.00024	0.0002	0.00015	0.00014	0.00016	0.00016	0.00014	0.00017	0.00013
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.9	1.9	1.8	1.7	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.6	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.4	1.4	1.2	1.3	1.2	1.0	1.5	1.4	1.2	1.1	1.1	1.1	1.1	1.0	1.2	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.15	0.16	0.13	0.15	0.14	0.15	0.16	0.14	0.15	0.15	0.14	0.14	0.14	0.15	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00018	0.00017	0.00017	0.00017	0.00019	0.00015	0.00017	0.00016	0.00016	0.00017	0.00016	0.00015	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2016-11-16	2016-11-30	2017-02-02	2017-03-06	2017-04-10	2017-05-09	2017-05-15	2017-05-22	2017-05-29	2017-06-05	2017-06-12	2017-06-19
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.013	0.0056	0.005	0.013	0.005	0.0062	0.0061	0.007	0.0056	0.0074	0.0066	0.0068	0.0064	0.0065	0.0066	0.0052
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.00011	0.0001	<0.00010	0.0001	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.006	0.0057	0.0056	0.0056	0.0051	0.0057	0.0058	0.0053	0.0053	0.0057	0.0053	0.0055	0.0052	0.0052	0.0052	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	0.0000064	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000059	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0032[Bc]	0.00096[Bc]	0.00096[Bc]	0.0014[Bc]	0.00075[Bc]	0.001[Bc]	0.00081[Bc]	0.0011[Bc]	0.00092[Bc]	0.00098[Bc]	0.00097[Bc]	0.00089[Bc]	0.00075[Bc]	0.00092[Bc]	0.00077[Bc]	0.00065[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	0.00044	0.00012	0.00017	0.00048	0.00033	0.00019	0.0002	0.00013	0.00024	0.00029	0.0003	0.00033	<0.000050	0.00019	0.00017	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0011	0.001	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00092	0.00034	0.00024	0.00065	0.00018	0.00022	0.00047	0.00053	0.00023	0.00026	0.0002	0.00022	0.0002	0.00025	0.0003	0.0001
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0012	0.0014	0.0011	0.001	0.00086	0.0009	0.0014	0.0011	0.00083	0.00064	0.00062	0.00069	0.00064	0.00062	0.00076	0.00049
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00025	0.00031	0.00025	0.00024	0.00024	0.00021	0.00027	0.00024	0.00018	0.00017	0.00018	0.00011	0.00013	0.00016	0.00018	0.00013
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.7	1.7	1.9	1.6	1.6	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.15	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00016	0.00016	0.00016	0.00015	0.00016	0.00015	0.00016	0.00015	0.00015	0.00016	0.00016	0.00016	0.00017	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-06-27	2017-08-22	2017-10-01	2017-10-26	2017-11-20	2017-12-07	2018-01-04	2018-01-18	2018-05-03	2018-05-13	2018-05-22	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.5	-	7.5	-	7.8	7.8	7.7	7.0	7.5	7.1	7.0	7.3	7.3	7.6	7.1
Temperature	°C	**15**[d]	-	-	-	-	4.5	4.7	1.3	5.3	6.0	5.3	3.8	3.1	3.3	3.9	3.9	4.5	4.2	4.4	4.2	4.2
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	-	11	12	11	11	11	12	12	12	12	12	12	12	12
Dissolved oxygen	%	-	-	-	-	-	84	83	-	90	95	88	85	85	88	89	89	91	89	90	89	93
Turbidity	NTU	**1.0**	-	-	-	-	0	0	0.31	0.51	0.62	0.31	0.28	0.41	0.01	-	0.94	0	0	0	0.54	0.78
Conductivity	µS/cm	-	-	-	-	-	114	112	145	117	107	111	110	110	116	108	116	126	110	112	114	112
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.9	7.9	-	7.9	7.7	7.9	7.9	7.8	7.9	7.9	7.9	7.8	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	54	50	53	-	54	55	51	44	55	55	52	53	51	56
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	46	51	50	50	-	49	49	50	48	52	49	49	50	47	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	80	74	77	79	65	-	59	53	70	78	66	75	70	75	74	74
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	2.0	1.7	1.8	1.7	-	1.5	1.7	2.0	1.8	1.9	2.1	1.9	2.0	2.2	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.37	0.21	0.24	0.35	0.29	-	0.49	0.31	0.75	0.68	0.37	0.3	0.39	0.38	0.33	0.31
Conductivity	µS/cm	-	-	-	-	-	112	105	116	105	103	-	108	103	115	111	112	106	114	111	101	110
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	18	16	18	-	18	19	17	15	18	18	17	18	17	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.036	0.032	0.037	0.035	0.033	-	0.033	0.034	0.035	0.034	0.037	0.036	0.035	0.038	0.032	0.033
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.3	2.1	2.2	-	2.0	2.0	2.0	1.8	2.3	2.3	2.1	2.2	2.1	2.2
Potassium	mg/L	-	-	-	-	-	0.51	0.5	0.55	0.51	0.5	-	0.46	0.47	0.47	0.41	0.54	0.56	0.52	0.55	0.51	0.54
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.4	1.0	0.99	-	1.0	0.91	1.0	0.88	1.1	1.1	1.1	1.1	0.97	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.7	7.2	11	7.2	6.7	-	6.9	6.6	7.9	7.6	7.6	7.2	7.0	7.9	6.1	7.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.19	0.15	0.11	-	0.12	0.12	0.14	0.14	0.14	0.14	0.14	0.15	0.1	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.19	0.15	0.11	-	0.12	0.12	0.14	0.14	0.14	0.14	0.14	0.15	0.1	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.2	0.25	0.2	0.17	-	0.17	0.17	0.21	0.18	0.18	0.18	0.23	0.16	0.19	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0029[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	-	0.0025[Bc]	0.0031[Bc]	0.0042[Bc]	0.0039[Bc]	0.0032[Bc]	0.0044[Bc]	0.0042[Bc]	0.0024[Bc]	0.0036[Bc]	0.0036[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0021	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	<0.0020	<0.0020	0.0031	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.024	0.013	0.015	0.0097	0.018	-	0.024	0.019	0.036	0.037	0.022	0.021	0.019	0.021	0.015	0.018
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00013	0.00011	0.00012	-	0.00011	0.00016	0.00013	0.00013	0.00013	0.0001	0.00014	0.00014	0.00013	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0054	0.0059	0.0055	0.0055	-	0.006	0.0052	0.0058	0.0062	0.0062	0.0054	0.0057	0.006	0.0056	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	18	18	17	18	-	18	20	18	18	18	16	18	18	16	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.00091	0.00093	0.00057	0.00092	-	0.0011	0.001	0.0017	0.0013	0.0012	0.00086	0.0012	0.001	0.001	0.001
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00016	0.000066	0.000099	<0.000050	0.000095	-	0.00029	0.00026	0.00045	<0.000050	0.00071	0.00066	0.00054	0.00052	0.00054	0.0014
Lithium	mg/L	-	-	-	-	-	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	-	<0.0010	0.001	0.001	<0.0010	0.001	<0.0010	0.0011	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.3	2.1	1.9	-	2.2	2.0	2.3	2.2	2.2	2.1	2.2	2.4	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0014	0.0008	0.0019	0.00086	0.0013	-	0.0017	0.001	0.0024	0.0017	0.0016	0.0015	0.0014	0.0017	0.0012	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00076	0.00061	0.0013	0.00033	0.00043	-	0.00044	0.00044	0.00072	0.00063	0.00066	0.00047	0.00054	0.00093	0.00036	0.00052
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.47	0.55	0.49	0.46	-	0.45	0.48	0.5	0.54	0.52	0.5	0.53	0.56	0.53	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00018	0.00014	0.00031	0.0001	0.00011	-	0.000099	0.00012	0.00025	0.00016	0.00016	0.00015	0.00012	0.00028	0.00012	0.00013
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.6	1.6	-	1.6	1.6	1.7	1.7	1.8	1.8	1.8	2.0	1.8	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.0	1.4	0.95	0.91	-	1.1	0.91	1.1	1.1	1.1	1.1	1.1	1.2	1.0	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.15	0.14	0.14	-	0.14	0.15	0.14	0.14	0.15	0.13	0.14	0.14	0.13	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00018	0.00017	0.00017	0.00014	0.00019	-	0.00016	0.00015	0.00018	0.00016	0.00017	0.00017	0.00016	0.00018	0.00015	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-06-27	2017-08-22	2017-10-01	2017-10-26	2017-11-20	2017-12-07	2018-01-04	2018-01-18	2018-05-03	2018-05-13	2018-05-22	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0041	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0067	0.0058	0.0062	0.005	0.0054	-	0.0046	<0.0052	0.0063	0.006	0.0069	0.0074	0.0065	0.0074	0.0094	0.0069
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	<0.00010	<0.00010	0.00011	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	0.00017	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0055	0.0058	0.0056	0.0053	-	0.0054	0.0051	0.005	0.0048	0.0056	0.0059	0.0056	0.0054	0.0058	0.0059
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0009[Bc]	0.00078[Bc]	0.00079[Bc]	0.00068[Bc]	0.00065[Bc]	-	0.00069[Bc]	0.00078[Bc]	0.001[Bc]	0.00061[Bc]	0.00082[Bc]	0.00076[Bc]	0.00075[Bc]	0.00097[Bc]	0.00065	0.00086[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	0.00017	0.00012	0.000092	0.000058	0.000072	-	0.00023	0.00012	0.00032	<0.000050	0.00051	0.0003	0.00041	0.00036	0.00034	0.0015
Lithium	mg/L	-	-	-	-	-	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00031	0.00013	0.00097	0.00013	0.00014	-	0.00077	<0.00015	0.0008	0.00029	0.00021	0.00021	0.00011	0.0003	0.00031	0.00013
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00076	0.0005	0.0013	0.00049	0.00038	-	0.00038	0.00037	0.00063	0.00052	0.00062	0.00051	0.00053	0.00083	0.00035	0.00057
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00019	0.00013	0.00031	0.00015	0.000076	-	0.00011	0.0001	0.00019	0.00016	0.00016	0.00012	0.00012	0.00017	0.00013	0.00019
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.8	1.6	-	1.5	1.6	1.5	1.4	1.7	1.7	1.7	1.8	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.14	0.13	-	0.14	0.14	0.13	0.12	0.14	0.14	0.14	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00017	0.00013	0.00015	-	0.00016	0.00015	0.00016	0.00014	0.00017	0.00017	0.00015	0.00016	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-08-23	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-08	2019-05-21	2019-06-18	2019-07-11
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.6	7.3	7.5	7.0	7.5	7.6	7.8	7.7	7.8	7.7	7.8	7.8	7.6	7.7	7.8
Temperature	°C	**15**[d]	-	-	-	-	7.9	4.6	4.9	4.7	4.8	6.3	4.9	4.5	2.9	3.2	3.5	3.8	4.1	4.0	4.1	8.4
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	11	11	12	11	12	11	12	12	12	12	12	12	11
Dissolved oxygen	%	-	-	-	-	-	86	86	87	83	82	98	87	89	85	86	88	88	88	88	93	93
Turbidity	NTU	**1.0**	-	-	-	-	**1.71**[DW]	0.13	0.17	0	0	**2.99**[DW]	0	0	**6.45**[DW]	0.08	1.0	0.33	0.31	0	0.52	**1.12**[DW]
Conductivity	µS/cm	-	-	-	-	-	112	109	115	118	117	107	112	120	127	111	115	127	131	124	125	113
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	8.0	7.9	7.9	7.9	7.9	8.0	7.8	7.9	7.8	7.9	7.8	7.9	8.0	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	53	54	58	59	53	56	53	53	55	58	54	54	60	61	58
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	50	50	50	52	51	51	48	49	46	50	51	51	49	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	79	80	77	77	72	75	66	66	102	70	78	103	74	76	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.7	1.1	1.8	1.8	1.8	1.8	1.7	1.7	1.6	2.8	2.0	2.4	2.3	1.7	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.27	0.26	0.24	0.24	0.19	0.25	0.25	0.33	0.24	0.22	0.38	0.37	0.39	0.23	0.12	0.17
Conductivity	µS/cm	-	-	-	-	-	110	115	114	114	122	114	117	110	113	113	112	111	119	130	119	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	20	20	18	19	18	18	19	20	18	18	20	20	20
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.034	0.035	0.038	0.037	<0.10	0.034	0.036	0.035	0.039	0.036	0.032	0.034	0.037	0.042	0.039	0.04
Magnesium	mg/L	-	-	-	-	-	2.0	2.3	2.2	2.1	2.5	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.2	2.5	2.4	2.1
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.53	0.59	0.61	0.55	0.57	0.5	0.51	0.52	0.48	0.51	0.52	0.62	0.59	0.5
Sodium	mg/L	-	-	-	-	-	1.1	1.2	1.3	1.3	1.6	1.2	1.3	1.1	1.1	1.1	1.1	1.1	1.2	1.6	1.5	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.7	7.8	9.1	8.7	9.7	7.3	8.7	7.6	8.3	7.1	7.4	7.9	7.9	12	10	7.9
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.17	0.17	0.18	0.15	0.18	0.13	0.14	0.14	0.14	0.14	0.14	0.2	0.17	0.15
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.17	0.17	0.18	0.15	0.18	0.13	0.14	0.14	0.14	0.14	0.14	0.2	0.17	0.15
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.26	0.21	0.21	0.29	0.23	0.23	0.24	0.2	0.2	0.17	0.21	0.21	0.21	0.26	0.24	0.22
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0041[Bc]	0.005	0.0033[Bc]	0.0029[Bc]	<0.002[Bc]	<0.002[Bc]	0.0024[Bc]	0.0025[Bc]	**0.012** [DW]	0.007	0.0034[Bc]	0.0023[Bc]	0.0027[Bc]	0.0086	0.002[Bc]	0.0068
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	0.0019	0.0013	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0026	<0.0020	0.0024	0.0023	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	0.0034	<0.0020	0.0026	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.014	0.015	0.018	0.014	0.016	0.017	0.016	0.023	0.017	0.022	0.024	0.03	0.029	0.021	0.018	0.013
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00013	0.00012	0.00013	0.00014	0.00013	0.00011	0.00011	0.00013	<0.00010	0.00015	0.00019	0.00011	0.00011	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0057	0.006	0.0057	0.0054	0.0058	0.006	0.0054	0.0053	0.0053	0.0055	0.0056	0.0055	0.0055	0.0059	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	19	18	18	18	17	18	19	18	19	17	19	19	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00099	0.00081	0.0011	0.00077	0.00084	0.00092	0.00095	0.00089	0.00083	0.001	0.001	0.0011	0.00096	0.00082	0.0012	0.00078
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00088	0.00046	0.00032	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.2	2.1	2.0	2.3	2.2	2.2	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00088	0.001	0.0012	0.00098	0.00096	0.001	0.0012	0.0014	0.0011	0.0013	0.0015	0.0017	0.0016	0.0014	0.0011	0.00083
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00071	0.00085	0.0011	0.0011	0.0014	0.00084	0.0012	0.00067	0.0008	0.00071	0.00077	0.00078	0.00074	0.002	0.0013	0.00066
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	0.00077	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.5	0.55	0.53	0.55	0.56	0.59	0.54	0.51	0.51	0.54	0.5	0.5	0.51	0.54	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.0002	0.00025	0.00019	0.00022	0.00016	0.00021	0.00018	0.00016	0.00017	0.00019	0.00017	0.00021	0.00055	0.00032	0.00018
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.7	1.8	1.8	1.8	1.7	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.4	1.2	1.3	1.2	1.3	1.2	1.0	1.1	1.1	1.1	1.2	1.5	1.4	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.15	0.15	0.15	0.13	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.16	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00017	0.00017	0.00015	0.00015	0.00017	0.00017	0.00017	0.00016	0.00017	0.00016	0.00016	0.00017	0.00016	0.00018	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-08-23	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-08	2019-05-21	2019-06-18	2019-07-11
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0072	0.0074	0.0073	0.0071	0.0076	0.0066	0.0075	0.0071	0.0059	0.006	0.007	0.0075	0.0097	0.014	0.0098	0.0059
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	<0.00010	0.0001	0.00012	0.0001	0.00011	0.00012	<0.00010	0.0001	0.00011	0.0001	0.00011	0.0001	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.0059	0.0054	0.0054	0.0057	0.0056	0.0056	0.0053	0.0054	0.0054	0.0053	0.0053	0.0058	0.0065	0.0059	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000066	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00074[Bc]	0.00075[Bc]	0.00075[Bc]	0.00062[Bc]	0.0007[Bc]	0.00071[Bc]	0.0007[Bc]	0.00058	0.00056	0.00056	0.00063	0.00065	0.00068	0.00065	0.00069[Bc]	0.00056
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	0.00039	0.0003	0.00024	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00018	0.00039	0.00028	0.00025	0.00041	0.00014	0.00021	0.00018	0.00012	<0.00010	0.00026	0.00028	0.0003	0.00026	0.00018	0.00012
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00071	0.00082	0.0011	0.00098	0.0015	0.00082	0.0011	0.0007	0.00079	0.00071	0.00082	0.00078	0.00081	0.002	0.0014	0.00063
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00019	0.00017	0.00022	0.00021	0.00027	0.00017	0.00024	0.0002	0.00016	0.00013	0.0002	0.0002	0.00021	0.0005	0.00033	0.00015
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.6	1.7	1.7	1.8	1.7	1.5	1.6	1.6	1.7	1.8	1.8	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.15	0.14	0.16	0.14	0.15	0.13	0.13	0.14	0.15	0.14	0.14	0.16	0.16	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00015	0.00017	0.00017	0.00016	0.00017	0.00015	0.00015	0.00017	0.00017	0.00016	0.00017	0.00017	0.00018	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-25	2019-08-20	2019-10-30	2020-06-02	2020-06-09	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-04	2021-05-11	2021-05-19	2021-05-25
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	7.5	7.7	7.7	7.5	7.6	7.3	7.6	-	7.3	7.8	8.1	7.7	7.8	8.4	7.7
Temperature	°C	**15**[d]	-	-	-	-	7.6	4.3	5.4	4.2	4.2	4.7	4.3	4.3	-	4.6	4.7	5.8	4.0	4.2	4.1	4.1
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	12	13	12	13	12	-	12	11	11	12	12	12	12
Dissolved oxygen	%	-	-	-	-	-	86	85	87	93	97	94	96	90	-	90	88	87	93	94	91	92
Turbidity	NTU	**1.0**	-	-	-	-	0.57	0	0.09	0.51	0.66	0.22	0.35	0.24	-	0	0.15	0.28	**1.18**[(DW)]	0	0.1	0.17
Conductivity	µS/cm	-	-	-	-	-	117	114	115	120	115	127	115	114	-	119	119	111	115	120	120	114
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	8.0	7.8	7.8	8.0	7.8	7.8	7.9	7.5	7.9	7.9	7.8	8.0	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	53	53	57	56	55	57	58	55	52	58	54	58	55	55	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	50	50	49	48	51	51	48	48	48	49	48	50	49	49	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	67	81	68	76	83	70	75	81	76	72	78	66	67	67	68	82
Total suspended solids	mg/L	-	-	-	-	-	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	1.7	1.7	2.1	2.7	2.1	2.3	2.2	2.2	2.4	2.3	13	2.2	2.1	2.3	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.2	0.19	0.14	0.33	0.2	0.32	0.25	0.24	0.29	0.19	<0.10	0.22	0.25	0.14	0.18	0.14
Conductivity	µS/cm	-	-	-	-	-	113	114	117	115	116	113	112	119	114	115	122	110	113	114	115	116
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	53	54	56	57	55	61	52	55	51	50	53
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	19	19	18	19	20	19	17	19	18	19	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.039	0.036	0.033	0.037	0.034	0.039	0.04	0.039	0.041	0.037	0.038	0.036	0.038	0.034	0.039	0.036
Magnesium	mg/L	-	-	-	-	-	2.2	2.3	2.1	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.4	2.1	2.2	2.2	2.2	2.3
Potassium	mg/L	-	-	-	-	-	0.52	0.49	0.53	0.55	0.53	0.52	0.47	0.51	0.5	0.52	0.55	0.52	0.47	0.54	0.52	0.52
Sodium	mg/L	-	-	-	-	-	1.2	1.1	1.0	1.2	1.2	1.0	1.1	1.2	1.0	1.1	1.4	1.0	1.1	1.1	1.1	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	8.2	7.3	7.9	7.7	8.2	7.3	8.3	9.6	7.2	7.9	10	7.3	7.9	7.7	8.1	8.0
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.16	0.13	0.14	0.13	0.14	0.15	0.13	0.14	0.17	0.12	0.14	0.13	0.14	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.16	0.13	0.14	0.13	0.14	0.15	0.13	0.14	0.17	0.12	0.14	0.13	0.14	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0051	<0.0050	<0.0050	<0.0050	0.0072	0.0078	0.005	0.0076	0.006	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.23	0.2	0.34	0.2	0.22	0.21	0.2	0.22	0.21	0.21	0.22	0.22	0.19	0.19	0.19	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0055	0.004[Bc]	0.0051	0.0031[Bc]	0.0067	0.007	0.002[Bc]	**0.0125 [DW]**	0.0048[Bc]	<0.002[Bc]	<0.002[Bc]	0.0022[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0028	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0038	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	0.0027
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.016	0.012	0.017	0.019	0.019	0.021	0.016	0.02	0.023	0.017	0.02	0.018	0.017	0.018	0.017	0.016
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.0001	0.00013	0.00012	0.00012	0.00015	0.00012	0.00012	0.00012	0.00011	0.00014	0.00014	0.00012	0.00012	0.00012	0.0001
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0057	0.0056	0.006	0.0055	0.0054	0.0054	0.0053	0.0058	0.0053	0.0054	0.0052	0.0052	0.0052	0.0051	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000059	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	18	19	18	18	19	19	18	21	17	19	17	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00063	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00081	0.00091	0.00089	0.001	0.0013	0.00082	0.001	0.00089	0.00086	0.00081	0.00095	0.00076	0.00088	0.00087	0.00088	0.0008
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.2	2.3	2.4	2.1	2.2	2.3	2.0	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.001	0.00085	0.001	0.0014	0.0014	0.0013	0.0012	0.0016	0.0012	0.0012	0.0013	0.0014	0.0014	0.0013	0.001	0.0011
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00091	0.00067	0.00074	0.00065	0.00079	0.00053	0.00075	0.001	0.00055	0.00071	0.0015	0.00054	0.00077	0.00067	0.00072	0.00069
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.48	0.53	0.52	0.49	0.53	0.51	0.5	0.52	0.53	0.51	0.49	0.51	0.51	0.55	0.46	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00028	0.00014	0.00017	0.00022	0.00018	0.00013	0.00017	0.0003	0.00012	0.00021	0.00036	0.00016	0.00018	0.00016	0.00021	0.00018
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.9	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.2	1.1	1.0	1.1	1.1	1.0	1.1	1.2	1.1	1.1	1.2	1.0	1.1	1.1	1.0	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.16	0.14	0.14	0.14	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00016	0.00015	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00016	0.00016	0.00016	0.00017	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-25	2019-08-20	2019-10-30	2020-06-02	2020-06-09	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-04	2021-05-11	2021-05-19	2021-05-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0075	0.0059	0.0079	0.0074	0.0081	0.0072	0.0074	0.011	0.0075	0.008	0.011	0.0096	0.0085	0.009	0.01	0.0088
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.00012	0.00011	0.00011	<0.00010	<0.00010	<0.00010	0.00012	0.00012	0.00011	0.0001	0.0001	0.0001	0.00011
Barium	mg/L	-	-	-	-	-	0.0052	0.005	0.0053	0.0057	0.0056	0.0054	0.0052	0.0057	0.0051	0.0055	0.0058	0.005	0.0055	0.0052	0.0052	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00062[Bc]	0.00061[Bc]	0.00051	0.00074[Bc]	0.00084[Bc]	0.00065	0.00067[Bc]	0.00067	0.00059	0.00063[Bc]	0.0011[Bc]	<0.00050	0.00067	0.00075	0.00086	0.0007
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00015	<0.00010	0.00016	0.00015	0.00014	0.00013	0.00024	0.0003	<0.00010	0.00012	0.00048	0.00044	0.00023	0.00017	0.00014	0.0001
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00088	0.00068	0.00068	0.00067	0.00074	0.00056	0.00076	0.0011	0.00058	0.00075	0.0015	0.00052	0.0007	0.00071	0.00071	0.00063
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00021	0.00017	0.00023	0.00017	0.00017	0.00016	0.00019	0.00027	0.00015	0.00022	0.00038	0.00014	0.00017	0.0002	0.00014	0.00017
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.9	1.8	2.0	1.7	1.7	1.9	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.14	0.15	0.15	0.14	0.15	0.15	0.13	0.15	0.16	0.14	0.15	0.13	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00015	0.00015	0.00016	0.00015	0.00017	0.00017	0.00017	0.00015	0.00017	0.00015	0.00018	0.00017	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-05-25	2023-05-30
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.5	7.4	8.4	7.6	7.6	7.7	7.4	7.7	-	7.8	7.7	7.5	**6.4**[Ba,Bc]	7.4	7.2	7.3
Temperature	°C	**15**[d]	-	-	-	-	4.8	4.8	4.8	5.1	3.9	4.1	4.2	4.5	-	4.6	4.8	4.8	3.8	4.2	3.5	4.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	11	11	12	12	12	12	-	12	11	11	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	95	90	87	87	90	91	90	90	-	91	88	86	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.99	0.11	0.13	0.11	0	0.23	0.33	0.23	-	0.42	0.38	0	0.09	-	0.98	0.62
Conductivity	µS/cm	-	-	-	-	-	117	140	116	114	115	114	136	119	-	116	126	120	119	119	122	124
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	-	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	55	58	58	54	-	49	55	56	54	58	61	55	54	61	58
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	53	48	50	-	52	51	53	51	48	46	50	51	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	70	71	85	69	76	-	64	81	79	70	79	84	86	71	96	88
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	5.6	-	<1.1	1.5	<1.1	<1.0	<1.0	6.8	<1.0	1.7	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	2.2	1.9	1.9	2.3	-	2.3	2.1	2.0	2.4	2.3	2.1	2.7	1.7	2.8	2.4
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.28	<0.10	0.15	<0.10	0.31	-	0.34	0.23	0.17	0.19	0.16	<0.10	0.49	0.23	0.25	<0.10
Conductivity	µS/cm	-	-	-	-	-	112	116	125	115	115	-	113	119	122	113	125	123	118	118	125	125
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	55	61	55	54	-	53	55	60	52	57	57	59	56	58	59
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	19	20	18	-	17	18	19	18	19	20	18	18	20	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.032	0.034	0.037	0.039	0.037	-	0.036	0.041	0.037	0.035	0.043	0.042	0.037	0.04	0.042	0.037
Magnesium	mg/L	-	-	-	-	-	2.2	2.4	2.2	2.1	2.2	-	1.8	2.4	2.3	2.2	2.4	2.5	2.3	2.1	2.3	2.5
Potassium	mg/L	-	-	-	-	-	0.52	0.55	0.53	0.52	0.51	-	0.48	0.52	0.49	0.5	0.56	0.57	0.51	0.54	0.54	0.55
Sodium	mg/L	-	-	-	-	-	1.1	1.2	1.2	1.1	1.1	-	1.0	1.1	1.3	1.0	1.3	1.5	1.2	1.1	1.3	1.3
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	8.4	9.2	9.9	8.4	7.6	-	7.8	9.3	11	7.5	12	12	9.0	9.1	12	11
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.16	0.17	0.16	0.13	-	0.13	0.14	0.16	0.14	0.19	0.2	0.15	0.16	0.17	0.17
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.16	0.17	0.16	0.13	-	0.13	0.14	0.16	0.14	0.19	0.2	0.15	0.16	0.17	0.17
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	0.0084	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.22	0.22	0.2	0.21	-	0.18	0.2	0.22	0.19	0.22	0.25	0.21	0.21	0.23	0.24
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	<0.002[Bc]	0.002[Bc]	<0.002[Bc]	0.0022[Bc]	-	0.0025[Bc]	<0.002[Bc]	0.0021[Bc]	0.0026[Bc]	0.0023[Bc]	<0.002[Bc]	0.0032[Bc]	0.0026[Bc]	0.0024[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	0.007	<0.0020	0.0022	<0.0020	<0.0020	0.0028
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.028	0.016	0.016	0.017	0.023	-	0.022	0.021	0.027	0.012	0.017	0.016	0.032	0.02	0.023	0.019
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	<0.00010	0.00011	0.00011	0.00013	-	0.00013	0.00011	0.00014	0.0001	0.00014	0.00013	0.00015	0.00012	0.00014	0.00016
Barium	mg/L	-	1.0	-	-	-	0.0057	0.0054	0.005	0.0054	0.0057	-	0.0051	0.0056	0.0056	0.0052	0.0055	0.0059	0.0055	0.0057	0.0058	0.0058
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	21	19	18	-	18	18	20	17	19	19	20	19	19	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0015	0.0007	0.00073	0.0008	0.00092	-	0.00095	0.00099	0.001	0.00065	0.00075	0.00075	0.0011	0.00098	0.0012	0.00093
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.034	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	-	<0.0010	<0.0010	0.001	<0.0010	0.0011	<0.0010	0.0014	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.3	2.2	2.2	-	2.2	2.5	2.4	2.2	2.4	2.4	2.3	2.3	2.4	2.6
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0015	0.00094	0.001	0.00097	0.0015	-	0.0014	0.002	0.0026	0.001	0.0016	0.0017	0.002	0.0015	0.0016	0.0019
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00079	0.0012	0.0014	0.00089	0.00074	-	0.00077	0.0011	0.0015	0.00069	0.0021	0.0021	0.0014	0.0013	0.002	0.0022
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.5	0.55	0.53	0.51	-	0.5	0.51	0.5	0.47	0.5	0.55	0.51	0.54	0.53	0.56
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00021	0.00033	0.00035	0.00022	0.00015	-	0.00017	0.00039	0.00048	0.0002	0.00061	0.00059	0.00042	0.0003	0.0006	0.00059
Silicon	mg/L	-	-	-	-	-	2.0	2.0	1.8	2.0	1.9	-	1.9	1.9	1.8	1.9	2.0	1.9	2.0	1.9	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.3	1.1	1.1	-	1.1	1.1	1.3	1.0	1.3	1.3	1.2	1.2	1.3	1.3
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.15	0.15	0.14	0.14	-	0.15	0.15	0.15	0.14	0.15	0.16	0.16	0.15	0.17	0.17
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00017	0.00018	0.00017	-	0.00016	0.00017	0.00019	0.00016	0.00019	0.00018	0.00015	0.00018	0.00017	0.00019

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-05-25	2023-05-30
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0093	0.01	0.012	0.0082	0.01	-	0.009	0.01	0.011	0.0078	0.012	0.011	0.013	0.0095	0.011	0.011
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	0.00011	<0.00010	<0.00010	-	<0.00010	0.00011	0.00011	0.00011	<0.00010	0.00011	0.0001	<0.00010	0.00011	0.00012
Barium	mg/L	-	-	-	-	-	0.0055	0.0056	0.0053	0.0052	0.0052	-	0.005	0.0054	0.0055	0.0055	0.0056	0.0059	0.0056	0.0053	0.0054	0.0056
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00076[Bc]	0.00077[Bc]	0.0007	0.00061[Bc]	0.00071	-	0.00075[Bc]	0.00094[Bc]	0.00076[Bc]	0.00056	0.00074	0.00073[Bc]	**0.00093[Bc,Ba]**	0.00068[Bc]	0.00087[Bc]	0.00078[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.0002	0.00022	0.00037	0.00011	0.00028	-	0.00015	0.00061	0.0014	0.00016	0.00086	0.0006	0.00064	0.00036	0.00043	0.00067
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00081	0.0011	0.0012	0.00082	0.00073	-	0.00076	0.001	0.0014	0.00069	0.0022	0.0021	0.0013	0.0012	0.0019	0.0021
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00022	0.00022	0.0002	0.00018	0.00016	-	0.00018	0.0003	0.00042	0.00018	0.0005	0.00062	0.00033	0.00025	0.0005	0.00051
Silicon	mg/L	-	-	-	-	-	1.7	1.9	1.8	1.7	1.8	-	1.8	1.9	1.8	2.0	2.0	1.9	1.9	1.9	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.15	0.14	-	0.14	0.15	0.15	0.14	0.15	0.16	0.14	0.15	0.15	0.16
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00017	0.00017	0.00017	0.00016	-	0.00017	0.00016	0.00018	0.00016	0.00018	0.00018	0.00016	0.00016	0.00016	0.00018
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-06-05	2025-06-10	2025-06-16	2025-06-18	2025-07-15	2025-09-16
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.2	7.2	7.3	7.6	7.5	7.2	7.7	7.6	7.5	7.5	7.4	7.4	7.2	7.2	7.4	7.0
Temperature	°C	**15**[d]	-	-	-	-	4.2	3.9	4.2	4.4	4.9	4.5	4.4	4.7	5.6	4.7	4.6	5	4	4	4	4.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	-	12	12	11	11	12	12	12	12	12	12	11
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	-	92	94	88	85	93	90	89	91	89	91	88
Turbidity	NTU	**1.0**	-	-	-	-	**117**[DW]	0	0	0.11	-	0.08	0.29	0.41	0.18	**1.02**[DW]	**7.72**[DW]	0.1	0.2	0.1	0.2	**1.41**[DW]
Conductivity	µS/cm	-	-	-	-	-	133	121	119	120	118	112	114	111	112	127	125	131.8	121.9	122.0	120.2	114
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.9	7.9	7.8	7.9	8.0	7.8	7.8	8.0	7.9	7.8	8.0	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	55	55	56	55	54	53	51	53	53	54	55	54	55	55	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	49	50	51	50	49	49	51	50	51	50	50	52	52	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	92	72	86	74	76	74	74	64	76	62	68	74	68	71	80
Total suspended solids	mg/L	-	-	-	-	-	5.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.6	2.0	2.4	2.1	2.1	2.0	1.7	1.8	1.7	1.9	1.9	2.1	1.9	1.7	1.9	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.22	0.55	0.15	0.15	0.11	0.28	0.1	0.22	0.19	0.28	0.12	0.26	0.18	0.26	0.12	<0.1
Conductivity	µS/cm	-	-	-	-	-	121	121	120	119	120	114	110	115	112	118	114	122	116	114	119	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	58	56	58	53	55	-	-	-	-	52	56	56	56	54	56	51
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	19	18	18	17	18	18	18	18	18	18	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.044	0.039	0.038	0.036	0.034	0.034	0.031	0.031	0.039	0.035	0.036	0.040	0.032	0.036	0.034	0.039
Magnesium	mg/L	-	-	-	-	-	2.2	2.4	2.3	2.4	2.1	2.1	2.1	1.9	2.1	2.0	2.2	2.3	2.2	2.1	2.3	2.2
Potassium	mg/L	-	-	-	-	-	0.52	0.58	0.55	0.54	0.51	0.48	0.5	0.49	0.49	0.53	0.53	0.50	0.50	0.47	0.55	0.51
Sodium	mg/L	-	-	-	-	-	1.2	1.4	1.2	1.3	1.1	1.1	0.96	0.93	0.98	1.1	1.1	1.2	1.0	0.93	1.2	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	10	9.9	9.8	10	8.3	6.7	6.9	6.9	6.9	8.5	8.0	9.0	8.9	6.6	7.8	7.7
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.17	0.16	0.16	0.17	0.17	0.13	0.13	0.14	0.15	0.15	0.14	0.15	0.13	0.14	0.15	0.16
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.17	0.16	0.16	0.17	0.17	0.13	0.13	0.14	0.15	0.15	0.14	0.15	0.13	0.14	0.15	0.16
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	0.015
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.22	0.23	0.21	0.22	0.21	0.17	0.2	0.2	0.21	0.2	0.2	0.21	0.17	0.19	0.20	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0032[Bc]	0.0031[Bc]	0.003[Bc]	0.0027[Bc]	0.0026[Bc]	0.0026[Bc]	<0.002[Bc]	0.0026[Bc]	0.0026[Bc]	0.0027[Bc]	0.0026[Bc]	0.0025[Bc]	0.0024[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024	0.0027	<0.002	<0.002	<0.002	<0.002
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.097	0.023	0.018	0.011	0.012	0.012	0.0072	0.007	0.013	0.011	0.012	0.014	0.012	0.0086	0.0093	0.0072
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00019	0.00014	0.00014	0.00011	0.00012	0.00012	0.00011	0.00014	0.00012	0.00012	0.0001	0.00012	<0.0001	0.00010	0.00011	<0.0001
Barium	mg/L	-	1.0	-	-	-	0.0074	0.0057	0.006	0.0055	0.0054	0.0052	0.0053	0.0052	0.0052	0.0049	0.0051	0.0054	0.0053	0.0051	0.0051	0.0052
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Calcium	mg/L	-	-	-	-	-	19	19	19	18	18	19	18	18	18	17	19	19	19	18	19	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0034	0.00096	0.00085	0.00084	0.00071	0.00092	0.00067	0.00057	0.0007	0.0012	0.02	0.0024	0.0014	0.0011	0.00074	0.00064
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.098	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	<0.0010	0.001	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	0.0010	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	-	-	-	2.3	2.3	2.4	2.2	2.3	2.1	2.2	2.1	2.1	2.2	2.3	2.2	2.3	2.1	2.1	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0045	0.0016	0.0015	0.00094	0.00087	0.0011	0.00084	0.00072	0.001	0.001	0.0011	0.0011	0.0021	0.0010	0.00083	0.00078
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000005	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0015	0.0016	0.0016	0.0015	0.00097	0.0005	0.0005	0.00042	0.00048	0.00086	0.00077	0.0012	0.00059	0.00058	0.00079	0.00054
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	-	-	-	0.57	0.56	0.55	0.54	0.53	0.49	0.51	0.52	0.52	0.51	0.51	0.53	0.51	0.50	0.51	0.47
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00033	0.00044	0.00038	0.00035	0.00027	0.00015	0.000094	0.00011	0.00015	0.00019	0.00018	0.00030	0.00011	0.00011	0.00019	0.00012
Silicon	mg/L	-	-	-	-	-	2.2	2.0	1.9	1.8	1.9	1.5	1.6	1.6	1.8	1.7	1.7	1.8	1.8	1.7	1.9	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	-	-	-	1.3	1.2	1.3	1.3	1.1	1.0	1.0	0.94	0.96	1.1	1.1	1.2	1.1	0.98	1.1	0.97
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.16	0.16	0.16	0.16	0.14	0.15	0.14	0.15	0.14	0.14	0.14	0.16	0.15	0.15	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00019	0.00017	0.00018	0.00018	0.00019	0.00017	0.00017	0.00016	0.00016	0.00018	0.00019	0.00018	0.00018	0.00018	0.00018	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B	QUL-58-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-06-05	2025-06-10	2025-06-16	2025-06-18	2025-07-15	2025-09-16
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.003	<0.003	<0.003
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.015	0.013	0.0089	0.007	0.006	0.007	0.0049	0.0044	0.005	0.0069	0.009	0.0083	0.0061	0.0052	0.0071	0.014
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	-	-	-	-	0.00011	0.0001	0.00012	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00011	0.00010	<0.0001	0.00010	<0.0001
Barium	mg/L	-	-	-	-	-	0.0059	0.0056	0.0057	0.0058	0.0049	0.005	0.0052	0.0047	0.0052	0.0049	0.0052	0.0053	0.0051	0.0052	0.0054	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000013	<0.0000050	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0009[Bc]	0.00092[Bc]	0.00075[Bc]	0.00063	0.00057	0.00073[Bc]	0.00061[Bc]	0.00052	0.0006[Bc]	0.00067[Bc]	**0.0077[Bc,Ba]**	**0.0071[Bc,Ba]**	0.00092[Bc]	0.00073[Bc]	0.00065[Bc]	0.00109[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.0011	0.0010	<0.001
Manganese	mg/L	-	-	-	-	-	0.00034	0.00043	0.00028	0.00035	0.00024	0.00026	0.00018	0.00016	0.00019	0.0003	0.0004	0.00033	0.0017	0.00042	0.00017	0.00061
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0015	0.0015	0.0015	0.0014	0.00091	0.00046	0.00046	0.00042	0.00042	0.00091	0.00076	0.0011	0.00068	0.00053	0.00077	0.00057
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium	mg/L	-	-	-	-	-	0.00041	0.00031	0.00039	0.00034	0.00021	0.00014	0.00012	0.000094	0.0001	0.0002	0.0002	0.00027	0.000082	0.00012	0.00021	0.00013
Silicon	mg/L	-	-	-	-	-	1.8	2.1	1.8	1.9	1.8	1.5	1.5	1.5	1.6	1.8	1.7	1.8	1.8	1.8	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.15	0.16	0.16	0.16	0.14	0.14	0.14	0.13	0.13	0.15	0.14	0.15	0.15	0.14	0.15	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00017	0.00018	0.00017	0.00016	0.00017	0.00015	0.00018	0.00016	0.0018	0.00017	0.00018	0.00017	0.00017	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.003	<0.003	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-BP	QUL-58-BP	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT
Depth							BP	BP	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-11-16	2019-10-30	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2017-03-06	2017-04-10	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22	2017-10-01
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.7	7.7	7.7	7.8	7.7	-	-	7.8	7.4	7.7	7.8	7.7	7.8	8.2	-
Temperature	°C	**15**[d]	-	-	-	-	6.1	5.6	5.7	5.4	5.6	5.2	5.8	6.4	3.0	2.8	5.8	5.1	5.0	4.8	5.6	1.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	10	11	11	11	11	11	11	10	11	11	11	11	11	11	11	-
Dissolved oxygen	%	-	-	-	-	-	82	87	88	86	84	84	84	83	83	83	89	89	88	85	85	-
Turbidity	NTU	**1.0**	-	-	-	-	**1.19**[(DW)]	0	0	0	0	0.27	0	0.55	0.62	0.94	0.44	0.34	0.73	0	0	0.26
Conductivity	µS/cm	-	-	-	-	-	112	115	109	110	105	109	116	107	111	110	118	117	110	111	109	131
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.8	7.8	7.9	7.7	7.9	7.8	7.8	7.9	7.9	7.9	8.0	7.9	7.9	7.8	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	53	55	54	53	53	59	53	57	53	53	50	56	59	52	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	47	49	48	51	52	50	51	49	52	48	49	51	45	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	75	67	76	89	67	71	85	62	79	64	78	71	79	84	71	68
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	4.0	1.1	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	1.8	1.6	1.6	2.2	1.8	1.8	1.8	1.7	2.1	2.3	1.7	1.7	1.8	2.2	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.63	0.17	0.35	0.28	0.18	0.29	0.26	0.38	0.62	0.69	0.47	0.39	0.31	0.3	0.21	0.19
Conductivity	µS/cm	-	-	-	-	-	112	116	112	114	109	112	121	112	126	117	113	107	108	123	104	105
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	18	18	18	18	18	20	18	19	18	18	17	19	20	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.035	0.033	0.038	0.036	0.033	0.039	0.038	0.034	0.04	0.032	0.034	0.034	0.033	0.039	0.031	0.033
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.2	2.1	2.0	2.2	2.3	2.1	2.2	2.3	2.2	2.2	2.3	2.4	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.5	0.52	0.58	0.56	0.55	0.6	0.72	0.56	0.58	0.52	0.52	0.5	0.55	0.57	0.49	0.49
Sodium	mg/L	-	-	-	-	-	1.0	1.0	1.2	1.1	1.1	1.1	1.7	1.1	1.7	1.1	1.1	1.1	1.1	1.5	1.0	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	8.3	8.0	8.6	8.0	6.6	8.2	13	8.5	13	7.4	7.3	6.8	6.9	11	6.8	6.9
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.16	0.16	0.16	0.14	0.17	0.24	0.16	0.22	0.14	0.13	0.13	0.14	0.2	0.14	0.15
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.16	0.16	0.16	0.14	0.17	0.24	0.16	0.22	0.14	0.13	0.13	0.14	0.2	0.14	0.15
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.24	0.23	0.19	0.21	0.21	0.27	0.19	0.26	0.2	0.2	0.18	0.19	0.26	0.25	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0042[Bc]	0.0022[Bc]	<0.002[Bc]	0.0041[Bc]	<0.002[Bc]	0.0035[Bc]	0.0037[Bc]	0.049[Bc, DW]	0.0024[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.007	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	0.002	0.0025	<0.0020	0.047	0.0028	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.038	0.02	0.017	0.015	0.065	0.012	0.022	0.041	0.02	0.04	0.023	0.023	0.017	0.022	0.0075	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00013	0.00011	0.00013	0.00014	0.00011	0.00012	<0.00010	0.00013	0.00014	0.00011	0.00012	0.00013	0.00012	<0.00010	0.00012
Barium	mg/L	-	1.0	-	-	-	0.006	0.0051	0.0056	0.0054	0.0066	0.0055	0.0064	0.0061	0.0057	0.0057	0.0053	0.0058	0.0054	0.0062	0.0055	0.0052
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000066	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	18	18	18	18	21	16	20	19	17	19	17	20	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0018	0.00085	0.001	0.00095	0.0055	0.00081	0.0015	0.0018	0.0016	0.0012	0.00099	0.0008	0.0008	0.00098	0.00065	0.00073
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.063	<0.030	<0.030	<0.030	<0.030	0.043	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00034	<0.000050	0.000087	0.0001	0.00044	<0.000050	0.00038	0.00071	<0.000050	0.00012	0.00014	0.000066	<0.000050	0.00016	0.000055	0.00013
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.0012	0.0012	0.001	0.0013	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0012	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.1	2.5	2.2	2.0	2.1	2.1	2.4	2.3	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0017	0.0012	0.0014	0.0014	0.0025	0.00096	0.0019	0.0018	0.0022	0.0024	0.0019	0.0018	0.0013	0.0021	0.00081	0.0011
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00096	0.00072	0.00094	0.00085	0.0006	0.0009	0.0027	0.00086	0.0025	0.00065	0.00061	0.00051	0.00053	0.0017	0.0005	0.00046
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.58	0.51	0.58	0.56	0.54	0.55	0.71	0.57	0.65	0.53	0.48	0.5	0.53	0.59	0.49	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00023	0.00016	0.00019	0.00018	0.00012	0.0002	0.00048	0.00021	0.00046	0.00016	0.00014	0.00011	0.000097	0.00042	0.00012	0.00013
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.7	1.8	1.8	1.9	1.8	1.7	1.9	1.6	1.7	1.8	1.9	1.8	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.2	1.0	1.2	1.1	1.1	1.2	1.7	1.2	1.9	1.2	1.1	1.0	1.1	1.5	1.0	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.13	0.14	0.14	0.14	0.14	0.17	0.13	0.18	0.14	0.14	0.14	0.13	0.16	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00015	0.00017	0.00016	0.00016	0.00016	0.00019	0.00016	0.00017	0.00017	0.00015	0.00015	0.00016	0.00018	0.00017	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-BP	QUL-58-BP	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT
Depth							BP	BP	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-11-16	2019-10-30	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09	2017-03-06	2017-04-10	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22	2017-10-01
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0039	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0056	0.007	0.0066	0.0067	0.011	0.0059	0.0065	0.01	0.009	0.0071	0.01	0.0069	0.0071	0.0088	0.0059	0.0054
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.0001	<0.00010	0.0001	<0.00010	0.0001	0.00012	<0.00010	<0.00010	0.00011	<0.00010	0.00011	<0.00010	0.0001	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0053	0.0055	0.0054	0.0055	0.0055	0.0062	0.0056	0.0053	0.0053	0.0055	0.005	0.0057	0.0058	0.0054	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000059	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000095	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00079[Bc]	<0.00050	0.0009[Bc]	0.00083[Bc]	0.0036[Bc]	0.0026[Bc]	0.00094[Bc]	0.0011[Bc]	0.00099[Bc]	0.00082[Bc]	0.00081[Bc]	0.00066[Bc]	0.00075[Bc]	0.00085[Bc]	0.00065	0.00062[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	0.00048	<0.000050	0.00016	0.00016	0.00053	0.00009	0.00025	0.00031	0.00011	0.00022	0.00029	0.0001	<0.000050	0.00024	0.00013	0.000098
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	0.0011	<0.0010	0.0011	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	<0.00010	0.00019	0.00041	0.00044	0.00075	0.00025	0.00083	0.00038	0.0012	0.00086	0.00064	0.0002	0.00021	0.0012	0.00019	0.00037
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00072	0.0007	0.00096	0.00079	0.00058	0.00084	0.0024	0.0009	0.0022	0.00062	0.00059	0.0005	0.00045	0.0016	0.00042	0.00045
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0002	0.00019	0.00022	0.00021	0.00011	0.0002	0.0005	0.00019	0.00052	0.00011	0.00011	0.0001	0.00012	0.00038	0.000098	0.00011
Silicon	mg/L	-	-	-	-	-	1.6	1.8	1.7	1.7	1.7	1.7	1.8	1.6	2.0	1.7	1.7	1.8	1.8	1.7	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.14	0.14	0.14	0.17	0.14	0.17	0.14	0.13	0.14	0.11	0.15	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00015	0.00016	0.00016	0.00016	0.00015	0.00017	0.00014	0.00016	0.00015	0.00016	0.00017	0.00016	0.00016	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0046	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT
Depth							BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-10-26	2018-05-13	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-08-23	2018-09-04	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-05-08	2019-06-18	2019-07-11
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.7	7.3	7.6	7.5	7.8	7.4	7.8	7.7	7.6	7.0	7.6	7.6	7.9	7.7	8.0
Temperature	°C	**15**[d]	-	-	-	-	8.7	4.3	4.6	4.8	4.6	4.8	4.7	7.3	4.6	4.9	5.3	8.3	6.2	4.0	4.4	8.3
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	12	12	12	11	12	11	11	11	10	12	11	12	12	12
Dissolved oxygen	%	-	-	-	-	-	94	90	90	89	90	88	92	85	85	82	82	98	90	88	93	94
Turbidity	NTU	**1.0**	-	-	-	-	0.07	-	0	0	0	0.13	0.35	**2.54**[DW]	0	0	0	**1.03**[DW]	0	0.27	0.45	**1.13**[DW]
Conductivity	µS/cm	-	-	-	-	-	113	107	111	108	108	108	108	108	104	112	109	102	107	114	110	110
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	8.0	7.9	8.0	7.9	8.0	7.9	7.9	7.9	8.0	7.8	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	45	53	52	54	52	55	51	51	52	54	52	55	55	52	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	49	48	49	49	49	50	48	50	50	52	51	51	52	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	66	62	74	60	76	78	73	71	67	72	72	65	68	98	67	62
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	2.3	2.4	2.1	1.3	2.0	2.0	1.7	1.7	1.7	3.0	1.7	2.1	2.1	1.7	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.3	0.65	0.35	0.36	0.32	0.33	0.3	0.17	0.3	0.2	0.19	0.3	0.28	0.29	<0.10	0.16
Conductivity	µS/cm	-	-	-	-	-	102	112	104	108	106	108	109	106	112	111	114	110	113	117	110	108
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	15	18	17	18	17	18	17	17	18	18	17	18	18	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.034	0.035	0.035	0.036	0.034	0.032	0.033	0.034	0.035	0.036	0.032	0.033	0.036	0.041	0.039
Magnesium	mg/L	-	-	-	-	-	1.9	1.8	2.1	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.3	2.0	2.2	2.2	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.46	0.43	0.54	0.53	0.53	0.53	0.53	0.51	0.48	0.55	0.55	0.49	0.52	0.53	0.46	0.49
Sodium	mg/L	-	-	-	-	-	0.87	0.91	1.0	1.0	0.99	1.0	1.1	0.99	1.0	1.1	1.2	0.94	1.1	1.2	0.97	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	7.4	6.7	6.4	6.5	6.4	6.4	6.7	6.8	7.3	7.1	6.2	7.5	7.6	6.7	7.0
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.081	0.14	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.16	0.15	0.082	0.096	0.14	0.14	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.081	0.14	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.16	0.15	0.082	0.096	0.14	0.14	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.15	0.21	0.2	0.2	0.16	0.19	0.2	0.2	0.19	0.21	0.2	0.15	0.17	0.27	0.2	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0023[Bc]	0.0041[Bc]	0.0049[Bc]	0.0042[Bc]	0.0025[Bc]	0.0033[Bc]	0.005	0.0035[Bc]	0.0061	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.003[Bc]	0.0061	0.0071	0.0056
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0018	<0.0010	0.0012	0.0013	<0.0010	0.0012	0.0012	0.0013	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0022	<0.0020	0.0029	<0.0020	<0.0020	0.0027	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	0.0033	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.013	0.033	0.022	0.017	0.018	0.016	0.016	0.015	0.014	0.0092	0.012	0.018	0.02	0.021	0.016	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.0001	0.00016	0.00011	0.00012	0.00013	0.00013	0.00011	0.00013	0.00013	0.00011	0.0001	0.00011	0.00014	0.00017	0.00011	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0061	0.0054	0.0057	0.0059	0.0057	0.0054	0.0056	0.0054	0.0054	0.0052	0.0054	0.0053	0.0051	0.0053	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	16	17	17	17	16	18	17	17	17	17	18	17	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00099	0.0011	0.00074	0.0014	0.00087	0.00089	0.00089	0.0012	0.0012	0.00062	0.0007	0.00079	0.00086	0.00098	0.001	0.00092
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.0002	<0.000050	0.00027	0.00062	0.00026	0.00043	0.00098	0.00038	0.00038	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.0	1.9	2.1	1.9	2.1	2.3	2.0	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0017	0.0017	0.0014	0.0017	0.0013	0.0012	0.00084	0.00087	0.0008	0.00081	0.0012	0.0019	0.0012	0.0013	0.00091
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	<0.0000050	-	-	<0.0000050	<0.0000050	-	-	-	<0.0000050	<0.0000050	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00033	0.00059	0.00037	0.00042	0.00045	0.00038	0.00037	0.00043	0.00047	0.00062	0.00057	0.00038	0.0005	0.00074	0.00038	0.0004
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00067	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.54	0.5	0.53	0.51	0.54	0.53	0.47	0.46	0.5	0.49	0.49	0.51	0.5	0.49	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000091	0.00016	0.00012	0.00012	0.00014	0.00013	0.00011	0.00013	0.0001	0.00011	0.00014	0.00011	0.00019	0.00023	0.000097	0.00013
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.8	1.8	1.9	1.9	1.9	1.8	1.7	1.8	1.8	1.5	1.5	1.7	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.93	1.1	1.0	1.0	1.0	1.1	1.0	0.95	0.93	1.1	0.98	0.94	1.1	1.1	0.98	0.99
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.13	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.13	0.15	0.13	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00013	0.00017	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00015	0.00015	0.00016	0.00016	0.00016	0.00017	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT
Depth							BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-10-26	2018-05-13	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-08-23	2018-09-04	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-05-08	2019-06-18	2019-07-11
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.006	0.0069	0.0072	0.0061	0.0073	0.0068	0.0075	0.0072	0.006	0.006	0.0061	0.0061	0.0081	0.0074	0.0054	0.0049
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	0.0001	0.0001	0.00016	0.00012	0.0001	<0.00010	0.00011	<0.00010	<0.00010	0.00011	0.00011	0.0001	<0.00010
Barium	mg/L	-	-	-	-	-	0.0058	0.0049	0.0057	0.0056	0.0056	0.0057	0.0061	0.0051	0.0053	0.0051	0.0056	0.0053	0.0055	0.0057	0.0052	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00072[Bc]	0.00063	0.00068[Bc]	0.00059	0.00065[Bc]	0.00067	0.00073[Bc]	0.00098[Bc]	0.00075[Bc]	0.00057	0.0017[Bc]	0.00058	0.00081[Bc]	0.00062	<0.00050	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	0.00012	<0.000050	0.00029	0.00059	0.0003	0.00035	0.0011	0.00032	0.00034	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00019	0.00042	0.00028	0.0001	0.00016	0.00013	0.00021	0.00024	0.00034	0.00018	0.00036	0.00017	0.00088	0.00024	0.00013	0.00012
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00031	0.00048	0.0004	0.00044	0.00041	0.00038	0.00041	0.00042	0.00048	0.00057	0.00061	0.00037	0.00053	0.00069	0.00039	0.00039
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000082	0.00011	0.00012	0.00013	0.000086	0.000092	0.0001	0.0001	0.00011	0.00012	0.0001	0.000081	0.00012	0.00015	0.00016	0.000097
Silicon	mg/L	-	-	-	-	-	1.5	1.5	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.6	1.7	1.5	1.5	1.7	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.12	0.13	0.14	0.14	0.13	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00013	0.00013	0.00016	0.00015	0.00017	0.00015	0.00017	0.00016	0.00016	0.00016	0.00016	0.00015	0.00017	0.00017	0.00018	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID	Unit	BC ENV Drinking WQG					QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-25	2019-08-20	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-11-30	2015-12-02	2015-12-09	2015-12-14	2015-12-30
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.6	7.7	7.4	7.6	-	7.4	7.8	7.6	7.3	7.7	7.7	7.7	7.7	7.3	7.7
Temperature	°C	**15**[d]	-	-	-	-	5.0	4.7	4.9	5.0	5.0	-	4.7	5.7	6.4	5	5.5	5.4	5.2	5.0	4.8	3.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	12	12	11	-	12	11	11	12	11	11	11	11	11	11
Dissolved oxygen	%	-	-	-	-	-	86	85	94	95	89	-	89	89	86	93	89	84	84	84	85	85
Turbidity	NTU	**1.0**	-	-	-	-	0.29	0	0.18	0.43	0.23	-	0	0.24	0.12	0.3	**1.26**[DW]	0.68	0.73	0.82	0.55	0.42
Conductivity	µS/cm	-	-	-	-	-	110	111	119	112	109	-	111	110	112	116.0	112	149	146	150	144	151
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	8.0	7.8	7.8	7.9	7.4	7.9	7.8	7.8	7.9	7.9	7.8	7.5	7.8	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	53	54	54	53	48	52	52	53	53	57	54	52	54	56	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	49	50	47	44	47	48	50	51	51	50	49	48	51	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	63	79	67	70	74	71	72	74	61	74	76	65	71	66	66	66
Total suspended solids	mg/L	-	-	-	-	-	1.1	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	2.0	2.2	2.4	2.2	2.8	2.3	1.8	1.6	1.8	1.8	1.5	1.4	1.5	1.6	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.29	0.1	0.31	0.34	0.29	**1.39**[DW]	0.19	0.19	0.14	0.11	0.14	0.77	0.83	0.51	0.53	0.77
Conductivity	µS/cm	-	-	-	-	-	108	110	111	107	109	102	110	114	112	115	112	112	111	111	113	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	52	53	52	52	54	-	-	55	55	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	18	18	18	16	18	18	18	18	19	18	18	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.038	0.035	0.036	0.04	0.038	0.036	0.035	0.031	0.034	0.033	0.038	0.034	0.035	0.033	0.035	0.037
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.2	2.2	2.1	2.0	2.0	1.9	2.1	2.2	2.3	2.0	2.0	2.0	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.51	0.48	0.51	0.47	0.51	0.54	0.49	0.47	0.48	0.51	0.51	0.51	0.49	0.5	0.5	0.51
Sodium	mg/L	-	-	-	-	-	1.0	1.1	1.0	1.0	1.0	0.94	1.0	0.89	0.94	1.0	1.0	0.95	0.96	0.99	0.95	0.98
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	6.7	6.9	6.9	6.7	5.7	6.7	6.8	6.7	6.9	7.3	6.7	6.6	6.7	6.6	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.14	0.13	0.13	0.12	0.10	0.14	0.14	0.14	0.14	0.15	0.1	0.11	0.11	0.12	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.14	0.13	0.13	0.12	0.1	0.14	0.14	0.14	0.14	0.15	0.1	0.11	0.11	0.12	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0055	<0.0050	0.007	0.0093	0.021	0.0085	<0.0050	<0.0050	<0.0050	<0.005	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.21	0.2	0.2	0.2	0.2	0.19	0.21	0.19	0.19	0.19	0.20	0.14	0.14	0.16	0.17	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0076	<0.002[Bc]	0.008	0.003[Bc]	0.0096	0.0063	0.0039[Bc]	0.003[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]	0.0028[Bc]	0.0027[Bc]	0.0026[Bc]	0.0023[Bc]	0.0027[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.0084	0.0084	0.022	0.019	0.019	0.1	0.017	0.007	0.0084	0.0082	0.0076	0.036	0.047	0.037	0.043	0.025
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	<0.00010	0.00012	0.00011	0.00013	0.00014	<0.00010	0.00013	0.00011	0.00012	0.00011	0.00012	0.00013	0.00015	0.00013	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0049	0.0054	0.0053	0.0053	0.0069	0.0053	0.0052	0.0053	0.0052	0.0053	0.0058	0.0058	0.0057	0.0061	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	18	18	17	18	18	17	19	19	19	18	18	18	19	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00064	0.00066	0.00082	0.0008	0.00071	0.00091	0.00092	0.00055	0.00056	0.00070	0.00057	0.0013	0.0015	0.0015	0.0014	0.0015
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.093	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.0025	0.00018	0.00023	0.00023	0.000081
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.1	2.0	2.0	2.2	2.1	2.0	2.0	2.1	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00083	0.00065	0.0014	0.0013	0.0013	0.0032	0.0012	0.00084	0.00082	0.00085	0.00080	0.0017	0.0016	0.0013	0.0013	0.001
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	<0.0000050	-	-	-	0.000011[Bc]	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	-	-	<0.0000050	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00043	0.00045	0.00047	0.00045	0.00043	0.00036	0.00042	0.00041	0.00042	0.00052	0.00045	0.0004	0.00041	0.00044	0.00043	0.00047
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00058	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.48	0.5	0.5	0.49	0.51	0.55	0.51	0.51	0.51	0.50	0.48	0.51	0.5	0.51	0.53	0.54
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.00015	0.00014	0.00014	0.00011	0.00013	0.00016	0.000095	0.00012	0.00014	0.00014	0.00013	0.000096	0.000089	0.00011	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.9	1.8	1.9	2.0	1.9	1.6	1.7	1.9	1.8	1.6	1.7	1.7	1.7	1.6
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.99	1.0	0.98	1.0	0.99	1.0	0.93	0.95	0.96	1.0	0.97	0.95	0.99	0.97	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.13	0.14	0.14	0.13	0.12	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00016	0.00015	0.00015	0.00015	0.00016	0.00016	0.00016	0.00017	0.00018	0.00017	0.00017	0.00017	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-BT	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-25	2019-08-20	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-11-30	2015-12-02	2015-12-09	2015-12-14	2015-12-30
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0053	0.0052	0.0081	0.0068	0.0078	0.014	0.0065	0.0054	0.0047	0.0056	0.0067	0.0046	0.022	0.006	0.0054	0.0064
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.0001	0.00012	0.00011	<0.00010	0.00012	0.00011	<0.00010	<0.00010	0.00011	<0.0001	<0.00010	0.00011	0.00011	<0.00010	0.00011
Barium	mg/L	-	-	-	-	-	0.0053	0.005	0.0055	0.0051	0.0055	0.0053	0.0054	0.0048	0.005	0.0052	0.0049	0.0054	0.0053	0.0051	0.0055	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00051	0.0005	0.00064	0.00056	0.00052	0.00059	0.00064[Bc]	<0.00050	0.00051[Bc]	0.00068[Bc]	0.00064[Bc]	0.00066[Bc]	0.0014[Bc]	0.00095[Bc]	0.00083[Bc]	0.00084[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.00018	0.00031	0.00027	0.00018	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	<0.00010	0.00013	0.00014	<0.00010	0.00014	0.00028	0.00011	0.0002	0.00019	0.00029	0.00038	0.0003	0.00055	0.0019	0.00023	0.00024
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	<0.0000050	-
Molybdenum	mg/L	-	-	-	-	-	0.00041	0.00048	0.00046	0.00044	0.00044	0.00036	0.00042	0.00038	0.00037	0.00051	0.00046	0.00038	0.00038	0.00038	0.00042	0.00043
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	0.00011	0.00013	0.000091	0.00013	0.00012	0.0001	0.000092	0.000083	0.00013	0.00012	0.00012	0.000098	0.000094	0.000097	0.00012
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.4	1.5	1.7	1.7	1.6	1.6	1.6	1.7	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.14	0.14	0.14	0.12	0.14	0.13	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00015	0.00016	0.00015	0.00015	0.00014	0.00016	0.00018	0.00016	0.00017	0.00016	0.00016	0.00016	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-01-25	2016-02-23	2016-03-28	2016-04-11	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2017-02-02	2017-05-09	2017-05-15	2017-05-22	2017-05-29
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.7	7.9	7.8	8.0	7.9	7.5	7.6	7.5	7.7	7.8	7.6	7.4	7.5	7.5	7.4
Temperature	°C	**15**[d]	-	-	-	-	3.1	2.7	3.1	3.7	4.6	5.2	4.9	4.8	4.6	5.1	5.2	2.9	3.9	4.3	4.6	4.6
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	12	12	12	12	11	11	11	9.7	11	11	12	12	11	12
Dissolved oxygen	%	-	-	-	-	-	86	86	92	88	91	91	86	88	87	76	87	85	89	93	87	89
Turbidity	NTU	**1.0**	-	-	-	-	0.45	0.53	0.43	0.6	0.48	0.51	0.88	0.46	0.44	0.8	0	0.69	0.54	0	0	0.55
Conductivity	µS/cm	-	-	-	-	-	109	109	110	114	106	108	107	107	105	113	104	123	112	116	111	111
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	7.8	8.0	7.9	7.9	7.9	8.0	7.4	7.8	7.8	7.9	7.8	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	53	54	55	54	54	54	54	55	54	57	54	54	55	52
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	48	49	51	50	48	48	51	47	51	48	51	50	49	50	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	74	67	62	49	60	59	71	73	71	66	76	84	81	73	72	81
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<1.0	1.0	<1.0	<1.0	<1.0	1.1	3.6	1.2	<1.0	<1.0	<1.0	<1.0	4.2	<1.0	1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.5	1.5	1.8	1.9	1.8	1.6	1.6	1.6	1.7	1.8	1.9	2.0	1.7	2.1	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.45	0.44	0.58	0.54	0.38	0.3	0.31	**2.28**[DW]	0.39	0.37	0.71	0.66	0.63	0.64	0.43	0.34
Conductivity	µS/cm	-	-	-	-	-	111	115	115	115	116	110	112	114	111	113	107	117	113	113	114	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	18	18	18	18	18	18	18	19	18	19	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.035	0.036	0.037	0.038	0.039	0.036	0.035	0.035	0.035	0.035	0.038	0.033	0.035	0.034	0.035
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.3	2.0	2.3	2.0
Potassium	mg/L	-	-	-	-	-	0.49	0.48	0.54	0.5	0.51	0.49	0.49	0.53	0.5	0.53	0.5	0.6	0.56	0.5	0.52	0.48
Sodium	mg/L	-	-	-	-	-	1.0	0.99	1.1	1.0	1.1	1.0	1.0	0.98	1.0	1.1	1.0	1.4	1.1	1.1	1.2	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.9	7.0	7.3	7.3	7.6	7.1	7.1	6.9	6.8	7.6	6.9	11	7.5	7.5	7.6	7.0
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.14	0.13	0.18	0.14	0.14	0.13	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.13	0.13	0.14	0.13	0.18	0.14	0.14	0.13	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.17	0.18	0.18	0.19	0.18	0.18	0.19	0.2	0.19	0.2	0.23	0.19	0.18	0.19	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0026[Bc]	0.0024[Bc]	0.0042[Bc]	0.0032[Bc]	0.0025[Bc]	0.0046[Bc]	0.0058	**0.011** [DW]	<0.002[Bc]	0.0021[Bc]	0.003[Bc]	<0.002[Bc]	0.0025[Bc]	0.0027[Bc]	<0.01	<0.01
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.027	0.034	0.039	0.035	0.031	0.025	<0.024	**0.18**[Bc]	0.024	0.025	0.019	0.032	0.044	0.034	0.026	0.02
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	0.00012	0.00014	0.00014	0.00011	<0.00010	0.00023	0.0001	0.00013	0.0001	0.00022	0.00011	0.00012	0.0001	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0053	0.0057	0.006	0.0057	0.0054	0.0053	0.0089	0.0056	0.0057	0.0056	0.006	0.0059	0.0056	0.0055	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	18	18	18	18	18	18	18	18	19	19	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0014	0.0013	0.0019	0.0017	0.0015	0.0016	0.0011	0.0055	0.0012	0.0012	0.0011	0.0018	0.0012	0.0013	0.0011	0.00097
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.12	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00029	0.0011	0.00012	0.00084	0.00021	0.00033	0.00021	0.00031	0.000065	0.00011	0.00065	0.00026	0.00012	0.00014	0.00028	0.00019
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	0.0011	0.0013	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.4	2.2	2.3	2.3	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0014	0.0017	0.0017	0.0024	0.0015	0.0014	0.004	0.0013	0.0014	0.001	0.0019	0.0016	0.0018	0.0023	0.0018
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00049	0.00054	0.00063	0.00077	0.00058	0.00042	0.0005	0.00048	0.00047	0.00072	0.0005	0.0017	0.00068	0.0007	0.00065	0.00055
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.48	0.51	0.53	0.51	0.52	0.5	0.5	0.62	0.51	0.55	0.5	0.62	0.54	0.54	0.52	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	0.00013	0.0001	0.00012	0.00014	0.000086	0.00013	0.00014	0.00012	0.0002	0.00012	0.00035	0.00014	0.00016	0.00015	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.8	1.8	1.7	1.8	2.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.0	1.1	1.1	1.0	1.5	1.1	1.1	1.2	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.14	0.12	0.14	0.13	0.14	0.14	0.14	0.16	0.15	0.15	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00018	0.00018	0.00018	0.00017	0.00015	0.00016	0.00017	0.00017	0.00017	0.00017	0.0002	0.00017	0.00016	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-01-25	2016-02-23	2016-03-28	2016-04-11	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2017-02-02	2017-05-09	2017-05-15	2017-05-22	2017-05-29
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0011	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0052	0.0056	0.0066	0.005	0.0066	0.0062	0.0075	0.0069	0.005	0.0066	0.0074	0.0049	0.007	0.0077	0.0074	0.006
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	0.0001	0.0001	<0.00010	<0.00010	<0.00010	0.00011	0.0001	0.0001	0.0001	<0.00010	0.0001	<0.00010	0.00011	0.00011
Barium	mg/L	-	-	-	-	-	0.005	0.005	0.0055	0.0054	0.0054	0.0052	0.0052	0.0054	0.0053	0.0054	0.0055	0.0055	0.0058	0.0053	0.0056	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[g]**	-	-	0.00088[Bc]	0.00086[Bc]	0.00099[Bc]	0.0011[Bc]	0.001[Bc]	0.0013[Bc]	0.00085[Bc]	0.0011[Bc]	0.00092[Bc]	0.00092[Bc]	0.00093[Bc]	0.00076[Bc]	0.00088[Bc]	0.00092[Bc]	0.001[Bc]	0.00065[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	0.00064	0.00087	0.00015	0.00086	0.00014	0.00079	0.00011	0.00023	0.00011	0.00017	0.00095	0.00021	0.00023	0.00017	0.00067	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	0.0011	<0.0010	0.0011	<0.0010	0.0011	0.0011	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00025	0.00031	0.00069	0.00059	0.001	0.00045	0.00038	0.00045	0.00014	0.00029	0.00023	0.00067	0.00029	0.00022	0.00085	0.00037
Mercury	mg/L	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00043	0.00047	0.00055	0.00049	0.00057	0.00041	0.00046	0.00051	0.00041	0.00071	0.00049	0.0016	0.00062	0.00058	0.00066	0.00052
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[g]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.000093	0.00013	0.00014	0.00014	0.00012	0.00012	0.00014	0.00011	0.00019	0.00013	0.00031	0.00018	0.00013	0.00014	0.00012
Silicon	mg/L	-	-	-	-	-	1.7	1.6	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.8	1.6	1.7	1.6	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.16	0.14	0.14	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00016	0.00017	0.00016	0.00016	0.00016	0.00016	0.00015	0.00016	0.00016	0.00016	0.00014	0.00015	0.00017	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-11-20	2017-12-07	2018-01-04	2018-01-18	2018-05-03	2018-05-22	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-21	2020-06-02	2020-06-09	2020-11-04	2021-05-04
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.8	7.8	7.6	7.0	7.1	7.8	7.8	7.8	7.7	7.8	7.6	7.8	7.5	8.2	7.7
Temperature	°C	**15**[d]	-	-	-	-	6.0	5.3	3.6	3.0	3.3	3.9	4.6	2.9	2.9	3.5	3.8	4.1	4.3	4.4	6.2	3.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	11	11	12	12	12	12	12	12	12	12	12	12	13	11	12
Dissolved oxygen	%	-	-	-	-	-	95	88	85	86	88	88	89	85	87	87	88	89	92	97	88	92
Turbidity	NTU	**1.0**	-	-	-	-	0.24	0.43	0	0.67	0	0.86	0	0.36	0	0.88	0.25	0	0.48	0.55	0.21	**1.07**[DW]
Conductivity	µS/cm	-	-	-	-	-	107	111	110	110	114	115	114	111	109	112	115	116	118	112	109	113
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	-	7.9	7.7	7.9	7.8	7.8	7.9	7.8	7.9	7.9	8.0	7.8	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	-	53	57	52	55	56	53	54	58	53	56	56	54	54	57
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	-	50	49	49	51	49	49	47	49	51	49	49	48	49	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	-	68	64	72	67	65	67	90	70	73	66	70	73	71	71
Total suspended solids	mg/L	-	-	-	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	1.8	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	-	1.6	1.6	2.0	2.0	1.7	1.6	1.7	2.1	1.9	2.2	2.1	2.4	13	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.31	-	0.33	0.31	0.6	0.31	0.38	0.21	0.12	0.32	0.27	0.2	0.26	0.2	0.24	0.21
Conductivity	µS/cm	-	-	-	-	-	103	-	107	106	114	111	110	112	112	112	113	117	114	114	109	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	53
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	-	18	19	17	18	19	18	18	20	18	19	19	18	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.034	-	0.033	0.035	0.035	0.037	0.034	0.039	0.036	0.032	0.034	0.038	0.037	0.034	0.031	0.038
Magnesium	mg/L	-	-	-	-	-	2.3	-	2.0	2.0	2.1	2.3	2.3	1.9	2.0	2.1	2.1	2.3	2.3	2.1	2.1	2.2
Potassium	mg/L	-	-	-	-	-	0.51	-	0.42	0.48	0.49	0.55	0.55	0.49	0.52	0.5	0.53	0.54	0.54	0.52	0.5	0.49
Sodium	mg/L	-	-	-	-	-	0.99	-	0.94	0.91	1.0	1.2	1.2	0.98	1.1	1.2	1.1	1.1	1.1	1.1	0.97	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	-	6.8	6.6	7.4	7.4	7.6	7.8	7.0	7.5	7.8	7.4	7.1	7.5	7.0	7.8
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	-	0.12	0.12	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.11	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	-	0.12	0.12	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.11	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	-	<0.0050	<0.0050	0.0077	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.015	<0.0050	0.0078	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	-	0.16	0.17	0.2	0.18	0.2	0.19	0.17	0.19	0.2	0.2	0.2	0.22	0.18	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	-	<0.002[Bc]	0.0028[Bc]	0.004[Bc]	0.0045[Bc]	0.0025[Bc]	**0.0109** [DW]	0.0056	0.0038[Bc]	0.0029[Bc]	0.0087	0.0027[Bc]	0.0064	0.0025[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	-	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.022	-	0.02	0.021	0.03	0.023	0.02	0.014	0.013	0.024	0.029	0.014	0.015	0.017	0.015	0.016
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	-	0.00012	0.00014	0.00014	0.00012	0.00012	<0.00010	0.00013	<0.00010	0.00016	0.00012	0.00013	0.00011	0.00011	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0055	-	0.0059	0.0052	0.0054	0.0057	0.0054	0.0054	0.0054	0.0056	0.0054	0.0053	0.0053	0.0054	0.0049	0.0052
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	-	19	19	18	17	18	18	18	19	19	18	19	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00087	-	0.001	0.0012	0.0014	0.0013	0.0011	0.00077	0.00087	0.0011	0.0014	0.00079	0.00071	0.00088	0.00068	0.00081
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000053	-	0.00094	0.00034	0.00026	0.00044	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.0011	<0.0010	0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	1.9	-	2.1	2.0	2.2	2.2	2.1	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	-	0.00091	0.00097	0.0018	0.0017	0.0015	0.00079	0.00075	0.0015	0.0016	0.0011	0.0013	0.0013	0.0014	0.0012
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	<0.0000050	<0.0000050	-	-	-	-	-	-	-	<0.0000050	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00041	-	0.00044	0.00047	0.00055	0.00059	0.00071	0.00065	0.00069	0.00076	0.00075	0.00068	0.00052	0.0006	0.00042	0.00074
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.43	-	0.44	0.49	0.49	0.49	0.55	0.5	0.52	0.54	0.48	0.48	0.48	0.52	0.49	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	-	0.00011	0.00013	0.00014	0.00016	0.00016	0.00012	0.00018	0.00022	0.00018	0.00018	0.00019	0.00016	0.00013	0.00016
Silicon	mg/L	-	-	-	-	-	1.6	-	1.6	1.7	1.8	1.8	1.8	1.6	1.6	1.7	1.8	1.7	1.7	1.8	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.87	-	1.0	0.91	1.1	1.1	1.2	0.98	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	-	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.15	0.14	0.14	0.13	0.14	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00018	-	0.00016	0.00015	0.00017	0.00016	0.00017	0.00017	0.00015	0.00017	0.00016	0.00016	0.00015	0.00016	0.00015	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-11-20	2017-12-07	2018-01-04	2018-01-18	2018-05-03	2018-05-22	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-21	2020-06-02	2020-06-09	2020-11-04	2021-05-04
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0057	-	0.0045	0.0055	0.0067	0.0087	0.0069	0.0057	0.0055	0.0081	0.0062	0.0063	0.0071	0.0073	0.0072	0.0082
Antimony	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	0.00011	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	0.00011	0.00013	0.00012	<0.00010	0.0001	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	-	0.0053	0.0052	0.0051	0.0056	0.0054	0.0052	0.0052	0.0057	0.0052	0.006	0.0056	0.0055	0.0051	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0006	-	0.00071[Bc]	0.00069[Bc]	0.00072[Bc]	0.00087[Bc]	0.00066	0.00054	0.00055	0.00063	0.00065	0.00061	0.00067	0.00074[Bc]	0.00056	0.00066
Iron	mg/L	-	-	**0.35**	-	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	0.00009	-	0.00041	0.00024	0.00018	0.00036	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00015	-	0.00011	<0.00015	0.00038	0.00019	0.0002	<0.00010	<0.00010	0.00028	0.00028	0.00013	0.00015	0.00014	0.00043	0.00015
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00038	-	0.00038	0.0004	0.00055	0.00062	0.00068	0.00063	0.00065	0.00083	0.00075	0.00066	0.00052	0.00058	0.00045	0.00083
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	-	0.00013	0.00011	0.00021	0.00016	0.00017	0.00018	0.00019	0.0002	0.00022	0.00013	0.00013	0.00012	0.00012	0.00022
Silicon	mg/L	-	-	-	-	-	1.6	-	1.6	1.6	1.6	1.7	1.6	1.5	1.6	1.6	1.7	1.7	1.8	1.7	1.6	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	-	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.15	0.14	0.15	0.15	0.14	0.15	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	-	0.00015	0.00016	0.00016	0.00017	0.00016	0.00015	0.00016	0.00018	0.00016	0.00016	0.00015	0.00016	0.00016	0.00018
Vanadium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MP	MP	MP	MP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-11	2021-05-25	2021-06-02	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2023-05-10	2024-05-30	2024-07-04	2025-06-10	2015-12-21	2016-04-11	2016-11-16	2016-11-21
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.7	7.6	7.7	7.8	7.4	7.8	-	**6.4**[Ba,Bc]	7.3	7.7	7.6	7.7	-	7.7	7.7
Temperature	°C	**15**[d]	-	-	-	-	4.3	4.3	5.0	3.9	4.3	4.3	4.6	-	3.8	5.1	4.8	4	4.5	-	8.0	7.6
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	12	12	12	12	12	-	-	12	12	12	11	-	10	10
Dissolved oxygen	%	-	-	-	-	-	95	92	95	90	92	90	91	-	-	94	94	89	82	-	87	85
Turbidity	NTU	**1.0**	-	-	-	-	0	0.18	0.97	0	0.29	0.24	0.25	-	0.06	0.05	0.21	0.1	0.85	-	0.47	0.38
Conductivity	µS/cm	-	-	-	-	-	114	114	111	114	114	130	114	-	115	111	114	117.7	152	-	112	114
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.7	7.9	7.8	7.9	7.8	7.9	8.0	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	54	50	59	51	53	48	53	53	52	54	55	55	51	56
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	49	48	51	52	52	51	53	51	50	49	50	48	51	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	65	111	67	80	67	53	81	72	90	72	76	73	64	75	79	73
Total suspended solids	mg/L	-	-	-	-	-	1.2	<1.0	1.7	1.4	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.1	<1.1	<3.0	1.1	2.4	1.2
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	2.0	2.2	2.2	2.1	1.9	2.1	2.1	2.7	2.1	1.6	2.0	1.7	1.8	1.7	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.16	0.14	0.22	0.25	0.23	0.33	0.28	0.24	0.26	0.15	0.12	0.13	0.58	0.61	0.42	0.44
Conductivity	µS/cm	-	-	-	-	-	116	114	109	114	116	114	115	113	115	113	110	116	114	118	112	116
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	56	51	52	55	55	53	54	56	58	-	-	53	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	17	20	17	18	16	18	18	17	18	19	18	17	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.035	0.036	0.031	0.037	0.039	0.036	0.039	0.034	0.036	0.027	0.031	0.037	0.036	0.037	0.035	0.038
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.2	2.0	2.1	1.9	2.3	2.0	2.2	2.1	2.1	2.2	2.0	2.1	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.53	0.52	0.54	0.43	0.47	0.52	0.5	0.44	0.51	0.49	0.48	0.49	0.49	0.5	0.52	0.59
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.1	0.93	1.1	1.1	1.1	1.0	1.1	1.1	0.92	1.0	0.97	1.0	1.1	1.3
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.7	7.1	7.3	7.6	7.8	7.8	7.8	7.5	7.9	6.4	6.7	7.0	6.9	7.7	8.7	10.0
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.12	0.13	0.14	0.12	0.13	0.12	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.12	0.13	0.14	0.12	0.13	0.12	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.19	0.2	0.21	0.18	0.18	0.19	0.19	0.19	0.18	0.21	0.19	0.15	0.18	0.19	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.003[Bc]	<0.002[Bc]	0.0032[Bc]	0.0024[Bc]	0.003[Bc]	0.0023[Bc]	<0.002[Bc]	0.0023[Bc]	0.0024[Bc]	0.0031[Bc]	<0.002[Bc]	0.0035[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0039	<0.0020	<0.0020	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.02	0.013	0.024	0.021	0.039	0.023	0.02	0.018	0.029	0.0082	0.0076	0.011	0.038	0.042	0.028	0.033
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	0.00013	0.00011	0.00013	0.00011	0.00012	0.00015	0.00015	0.00012	0.00011	0.00010	0.00015	0.00013	0.00013	0.00016
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0053	0.0054	0.0056	0.0059	0.0054	0.0053	0.0055	0.0055	0.0051	0.0053	0.0053	0.0058	0.0063	0.0058	0.0063
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	17	17	18	18	18	18	19	19	18	17	18	18	19	19	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00086	0.00069	0.0012	0.0009	0.0013	0.00097	0.00091	0.00084	0.0012	0.00062	0.00058	0.00094	0.0018	0.0017	0.0012	0.0015
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.038	<0.030	<0.030	<0.030	0.03	<0.030	<0.030	<0.03	<0.030	<0.030	<0.030	0.031
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	0.00016	0.00021	0.00074	0.00049
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	0.001	0.0011	<0.0010	<0.0010	<0.0010	0.0015	0.001	0.001	0.0011	0.0011	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.2	2.2	2.3	2.2	2.4	2.2	2.3	2.1	2.1	2.0	2.0	2.2	2.2	2.3
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0013	0.00084	0.0015	0.0014	0.0021	0.0015	0.0014	0.0014	0.0017	0.00096	0.00098	0.0012	0.0015	0.0022	0.002	0.0026
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	<0.0000050	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.000005	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00068	0.00055	0.00057	0.00074	0.0008	0.00074	0.00071	0.00062	0.001	0.00047	0.00046	0.00046	0.00045	0.0009	0.001	0.0014
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.52	0.51	0.55	0.5	0.51	0.48	0.51	0.5	0.51	0.51	0.5	0.53	0.57	0.64
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00017	0.00014	0.00017	0.00021	0.0002	0.00019	0.00019	0.00017	0.00028	0.00014	0.00015	0.000094	0.00011	0.00017	0.00022	0.00027
Silicon	mg/L	-	-	-	-	-	1.8	1.9	2.0	1.8	2.0	1.9	1.9	1.9	1.9	1.6	1.7	1.7	1.7	1.8	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.0	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.0	0.99	1.0	1.0	1.1	1.2	1.4
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.14	0.14	0.15	0.15	0.14	0.15	0.14	0.15	0.14	0.15	0.14	0.13	0.14	0.15	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00017	0.00017	0.00018	0.00017	0.00016	0.00017	0.00015	0.00017	0.00017	0.00017	0.00016	0.00018	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MID	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID	MP	MP	MP	MP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-11	2021-05-25	2021-06-02	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2023-05-10	2024-05-30	2024-07-04	2025-06-10	2015-12-21	2016-04-11	2016-11-16	2016-11-21
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0082	0.0083	0.008	0.0096	0.011	0.0084	0.0081	0.0077	0.012	0.006	0.0042	0.0058	0.0056	0.0056	0.0077	0.0092
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00011	<0.00010	0.00011	0.00011	0.00011	0.0001	0.00011	<0.00010	0.00011	<0.0001	0.00011	0.00012	0.0001	0.0001
Barium	mg/L	-	-	-	-	-	0.0052	0.0052	0.0055	0.0049	0.0052	0.0053	0.0053	0.0048	0.0056	0.0048	0.0052	0.0051	0.0053	0.0055	0.0053	0.006
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.0000050	<0.0000050	<0.0000050	0.0000085
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00067	0.00066	0.00073[Bc]	0.00064	0.00095[Bc]	0.00081[Bc]	0.00068	0.00062	**0.00091[Bc,Ba]**	0.00064[Bc]	0.00055	0.00056	0.00096[Bc]	0.0012[Bc]	0.00067[Bc]	0.0019[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	0.000084	0.00038	0.00072	0.00042
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.001	0.0012	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00013	0.00016	0.00016	0.00024	0.00049	0.00021	0.00018	0.00012	0.00058	0.0002	0.00023	0.00019	0.00035	0.001	0.00045	0.00096
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00064	0.00051	0.0006	0.0007	0.0008	0.00074	0.00067	0.00061	0.00096	0.00045	0.00043	0.00047	0.00042	0.00064	0.00089	0.0013
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00019	0.00016	0.00015	0.00021	0.00017	0.00016	0.00016	0.00019	0.00025	0.00011	0.0001	0.00013	0.00011	0.00018	0.00025	0.00032
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.7	1.9	1.8	1.9	1.7	1.9	1.5	1.5	1.8	1.6	1.7	1.5	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.14	0.14	0.15	0.14	0.15	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00016	0.00016	0.00016	0.00016	0.00018	0.00015	0.00017	0.00016	0.00016	0.00016	0.00017	0.00015	0.00017	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP
Depth							MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-01-10	2018-01-31	2018-10-11	2019-05-15	2019-10-30	2020-09-16	2021-05-19	2021-07-21	2021-09-16	2021-10-27	2022-06-27	2022-08-16	2022-10-19	2023-05-17	2023-05-25	2023-05-30
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	-	7.4	7.7	7.8	7.9	8.5	7.6	8.6	7.6	7.8	7.7	7.6	7.4	7.3	7.3
Temperature	°C	**15**[d]	-	-	-	-	-	-	5.6	3.9	5.8	4.8	4.1	4.8	5.2	5.6	4.5	4.6	4.8	4.0	3.6	3.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	12	12	11	11	12	12	11	11	12	11	11	-	-	-
Dissolved oxygen	%	-	-	-	-	-	-	-	88	87	87	88	92	90	87	86	91	87	86	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	-	-	0.02	0.6	0.05	0.11	0	0.14	0.07	0.12	0.32	0.41	0	-	0.93	0.56
Conductivity	µS/cm	-	-	-	-	-	-	-	110	119	114	112	113	132	113	114	114	117	113	116	120	120
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	8.0	7.9	8.0	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	58	52	54	53	57	54	53	54	59	56	56	56	54	58	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	45	50	50	50	49	50	52	48	51	47	46	51	49	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	67	61	77	75	70	69	74	78	82	79	70	69	94	87	94	95
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	1.6	1.2	1.8	1.9	2.1	2.2	2.1	1.9	1.8	2.4	2.1	2.1	2.0	2.2	2.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.41	0.35	0.14	0.3	0.11	<0.10	0.14	<0.10	<0.10	0.13	0.17	0.14	<0.10	0.22	0.32	0.18
Conductivity	µS/cm	-	-	-	-	-	126	113	108	117	116	111	114	109	118	121	113	115	114	119	122	118
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	57	53	55	57	55	52	55	52	56	56	57
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	20	17	18	18	19	18	18	18	20	19	19	19	18	20	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.039	0.036	0.034	0.041	0.033	0.034	0.038	0.032	0.038	0.04	0.035	0.04	0.042	0.042	0.037	0.033
Magnesium	mg/L	-	-	-	-	-	2.2	2.3	2.2	2.3	2.1	2.3	2.1	2.0	2.0	2.2	2.2	2.2	2.3	2.1	2.3	2.4
Potassium	mg/L	-	-	-	-	-	0.5	0.52	0.49	0.49	0.51	0.53	0.51	0.52	0.49	0.52	0.5	0.53	0.53	0.53	0.54	0.54
Sodium	mg/L	-	-	-	-	-	1.1	1.2	1.1	1.2	1.0	1.1	1.1	1.0	1.0	1.2	1.0	1.0	1.1	1.2	1.3	1.3
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	9.8	8.3	7.1	9.1	7.8	6.6	7.9	7.0	7.1	11	7.2	7.7	8.1	10	11	8.4
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.18	0.15	0.16	0.15	0.15	0.15	0.14	0.14	0.15	0.17	0.13	0.15	0.16	0.17	0.17	0.16
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.18	0.15	0.16	0.15	0.15	0.15	0.14	0.14	0.15	0.17	0.13	0.15	0.16	0.17	0.17	0.16
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.22	0.19	0.2	0.22	0.23	0.19	0.18	0.18	0.2	0.2	0.17	0.18	0.21	0.22	0.21	0.23
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0028[Bc]	<0.002[Bc]	0.0027[Bc]	0.0049[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.002[Bc]	<0.002[Bc]	0.0028[Bc]	<0.002[Bc]	0.0025[Bc]	0.0031[Bc]	0.0027[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	0.0028
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.032	0.019	0.01	0.03	0.014	0.011	0.016	0.013	0.013	0.017	0.012	0.012	0.011	0.022	0.028	0.071
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00014	0.00012	0.00013	0.00011	0.00013	0.00012	0.0001	<0.00010	0.00012	0.00011	0.00012	0.00012	0.00012	0.00016	0.00019
Barium	mg/L	-	1.0	-	-	-	0.0057	0.006	0.0054	0.0056	0.0055	0.005	0.0053	0.0053	0.0047	0.0055	0.0052	0.0053	0.0054	0.0059	0.0058	0.0073
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	20	17	17	18	19	18	19	19	18	17	19	17	18	19	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.0013	0.00094	0.0012	0.00072	0.00088	0.00084	0.0006	0.00065	0.00092	0.00062	0.00069	0.00062	0.001	0.0014	0.0032
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.072
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00066	0.00042	0.00048	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.3	2.4	2.1	2.2	2.0	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.4
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0015	0.0012	0.00086	0.0016	0.00093	0.00086	0.0011	0.00093	0.00079	0.0012	0.00096	0.001	0.0012	0.0014	0.0016	0.0028
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.001	0.0009	0.00055	0.0011	0.00071	0.0005	0.00066	0.00049	0.00055	0.0016	0.00061	0.00073	0.00082	0.0016	0.0017	0.0014
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.54	0.52	0.49	0.46	0.45	0.51	0.5	0.51	0.53	0.46	0.51	0.52	0.56	0.53	0.56
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00036	0.00023	0.00013	0.00023	0.00021	0.00013	0.00017	0.00015	0.00015	0.00042	0.0002	0.00017	0.00025	0.00036	0.00041	0.00041
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.8	1.7	1.9	1.9	2.0	1.8	1.9	1.9	2.0	1.9	1.9	2.0	2.0
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.2	1.2	1.2	1.3	1.1	0.99	1.1	1.0	1.0	1.2	0.98	1.1	1.1	1.3	1.3	1.3
Strontium	mg/L	**7.0**	-	-	-	-	0.16	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.15	0.16	0.16	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00016	0.00016	0.00015	0.00014	0.00017	0.00016	0.00016	0.00019	0.00016	0.00017	0.00017	0.00018	0.00017	0.00018

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP
Depth							MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-01-10	2018-01-31	2018-10-11	2019-05-15	2019-10-30	2020-09-16	2021-05-19	2021-07-21	2021-09-16	2021-10-27	2022-06-27	2022-08-16	2022-10-19	2023-05-17	2023-05-25	2023-05-30
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0076	0.0048	0.006	0.0084	0.0079	0.007	0.0087	0.0065	0.0096	0.012	0.0078	0.0086	0.0067	0.01	0.01	0.012
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00015	<0.00010	<0.00010	0.00012	0.00011	<0.00010	0.0001	<0.00010	<0.00010	0.00011	0.00011	0.0001	<0.00010	<0.00010	0.00012	0.00012
Barium	mg/L	-	-	-	-	-	0.0055	0.0056	0.005	0.0055	0.0053	0.0056	0.0051	0.0053	0.0052	0.0053	0.0054	0.0052	0.0054	0.0053	0.0049	0.0054
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00094[Bc]	0.0009[Bc]	0.00071[Bc]	0.00066[Bc]	0.00051	0.00077	0.00078	0.0006	0.00063	0.00076[Bc]	0.00058	0.00071[Bc]	0.00062	0.00074[Bc]	0.00074[Bc]	0.00077[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	0.00026	0.00031	0.00027	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00044	0.0003	0.00024	0.0002	0.00019	<0.00010	0.00011	0.00011	0.00016	0.00036	0.00011	0.00018	0.00014	0.0003	0.00021	0.00021
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0008	0.00073	0.00059	0.0011	0.00068	0.00046	0.00066	0.00047	0.00046	0.0016	0.00061	0.00076	0.00083	0.0014	0.0017	0.0014
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	0.00055	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00032	0.00021	0.00013	0.00026	0.00019	0.00012	0.00016	0.00015	0.00016	0.00037	0.00015	0.0002	0.00023	0.00035	0.0004	0.00035
Silicon	mg/L	-	-	-	-	-	1.5	1.6	1.7	1.7	1.7	1.9	1.8	1.8	1.6	1.6	1.9	1.9	1.8	1.8	1.8	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.15	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.13	0.15	0.14	0.14	0.14	0.15	0.15	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00015	0.00017	0.00015	0.00017	0.00015	0.00015	0.00015	0.00018	0.00016	0.00016	0.00018	0.00017	0.00015	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							MP	MP	MP	MP	MP	MP	MP	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2025-06-05	2015-11-05	2015-11-30	2015-12-02	2015-12-07	2015-12-09	2015-12-14	2015-12-21	2015-12-30	2016-01-25
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.2	7.3	7.5	7.8	7.6	7.5	7.5	-	7.8	7.7	7.8	7.7	7.0	7.7	7.4	7.9
Temperature	°C	**15**[d]	-	-	-	-	3.8	4.1	4.2	5.0	5.1	4.6	4.5	-	5.4	5.2	5.1	5.1	4.8	4.5	3.7	2.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	-	12	12	-	11	11	11	11	12	12	13	12
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	-	93	90	-	86	85	87	85	90	91	96	91
Turbidity	NTU	**1.0**	-	-	-	-	0.22	0	0	0.04	-	**1.03**[DW]	**2.17**[DW]	-	0.65	0.73	0.65	0.76	0.64	0.79	0.53	**1.26**[DW]
Conductivity	µS/cm	-	-	-	-	-	116	109	113	111	112	124	116	-	149	146	116	150	143	151	151	109
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.9	7.9	7.8	8.0	7.9	8.0	7.8	7.5	-	7.8	7.9	7.9	7.8	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	52	53	54	54	53	59	53	54	53	-	54	57	55	53	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	49	50	50	50	52	51	51	54	-	49	51	49	50	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	68	87	86	81	62	76	71	61	68	70	-	66	72	64	72	65
Total suspended solids	mg/L	-	-	-	-	-	13	<1.0	<1.0	1.4	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.5	2.4	2.3	2.0	2.1	2.0	1.8	1.7	1.8	1.6	-	1.5	1.6	1.7	1.7	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.51	0.41	0.18	0.14	0.12	0.26	0.12	0.24	0.73	0.74	-	0.43	0.66	0.48	0.71	0.44
Conductivity	µS/cm	-	-	-	-	-	121	114	115	113	114	116	114	110	112	111	-	113	113	113	112	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	59	52	54	50	54	51	56	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	18	18	18	18	20	18	18	18	-	18	19	19	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.042	0.036	0.038	0.033	0.034	0.032	0.034	0.032	0.033	0.036	-	0.033	0.035	0.036	0.037	0.033
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.2	2.2	2.1	2.0	2.2	2.0	2.0	2.0	-	2.0	2.1	2.0	2.0	2.1
Potassium	mg/L	-	-	-	-	-	0.51	0.56	0.54	0.5	0.5	0.51	0.53	0.51	0.51	0.49	-	0.49	0.5	0.5	0.51	0.49
Sodium	mg/L	-	-	-	-	-	1.2	1.1	1.1	1.0	1.0	1.0	1.1	0.9	0.95	0.95	-	0.98	0.94	0.97	0.99	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	9.9	7.0	7.6	6.8	6.9	7.6	7.8	6.7	6.6	6.7	-	6.7	6.7	6.8	6.8	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.16	0.15	0.15	0.14	0.15	0.14	0.14	0.067	0.1	0.11	-	0.11	0.12	0.12	0.12	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.16	0.15	0.15	0.14	0.15	0.14	0.14	0.067	0.1	0.11	-	0.11	0.12	0.12	0.12	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.23	0.21	0.19	0.2	0.19	0.2	0.19	0.13	0.14	0.14	-	0.16	0.17	0.17	0.17	0.17
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	**0.0126** [DW]	0.0029[Bc]	<0.002[Bc]	0.0029[Bc]	0.0024[Bc]	0.0026[Bc]	0.0028[Bc]	<0.002[Bc]	0.0024[Bc]	0.0022[Bc]	-	0.003[Bc]	0.0023[Bc]	0.0025[Bc]	0.0033[Bc]	0.0028[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0023	0.0024	0.0029	0.0021	<0.0020	<0.0020	0.002	0.0022	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	**0.26**[Bc]	0.019	0.021	0.0096	0.0098	0.0099	0.01	0.011	0.036	0.044	-	0.036	0.041	0.033	0.03	0.024
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00024	0.00013	0.00012	0.0001	0.00013	0.00011	0.00013	0.00011	0.00013	0.00016	-	0.00014	0.00014	0.00016	0.00013	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0083	0.0055	0.0056	0.0053	0.0053	0.0049	0.0051	0.0054	0.0058	0.0059	-	0.0058	0.0062	0.0057	0.0059	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	0.0000061	<0.0000050	<0.0000050	<0.0000050	0.000006	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	20	17	18	16	18	17	19	17	19	18	-	18	19	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0054	0.00087	0.001	0.00053	0.00061	0.00074	0.0067	0.00061	0.0013	0.0016	-	0.0014	0.0013	0.0014	0.0014	0.0012
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.26	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.0001	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	0.00033	<0.000050
Lithium	mg/L	-	-	-	-	-	0.0012	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.4	2.1	2.1	2.1	2.2	2.1	2.3	1.9	2.1	2.1	-	2.0	2.1	2.0	2.1	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.013	0.0016	0.0015	0.00071	0.00068	0.00093	0.0011	0.0011	0.0018	0.0018	-	0.0012	0.0013	0.0012	0.0012	0.0012
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	-	-	-	<0.0000050	-	-	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0014	0.00062	0.00085	0.00055	0.00063	0.00071	0.0007	0.00031	0.00043	0.00045	-	0.00046	0.00047	0.00044	0.0005	0.00046
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	0.00064	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.59	0.55	0.52	0.53	0.53	0.48	0.51	0.5	0.52	0.52	-	0.51	0.52	0.5	0.54	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00037	0.0002	0.00025	0.00017	0.00019	0.00018	0.00021	0.00009	0.00025	0.00011	-	0.000099	0.00011	0.00012	0.00012	0.000096
Silicon	mg/L	-	-	-	-	-	2.4	1.9	1.8	1.8	1.9	1.6	1.8	1.5	1.7	1.7	-	1.7	1.8	1.6	1.6	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.3	1.0	1.1	1.0	1.1	1.0	1.1	0.85	0.98	0.98	-	1.0	0.98	0.99	1.1	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.15	0.15	0.14	0.15	0.13	0.14	0.14	-	0.14	0.13	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00019	0.00016	0.00017	0.00017	0.00019	0.00019	0.00018	0.00017	0.00017	0.00017	-	0.00017	0.00016	0.00016	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-MP	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							MP	MP	MP	MP	MP	MP	MP	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2025-06-05	2015-11-05	2015-11-30	2015-12-02	2015-12-07	2015-12-09	2015-12-14	2015-12-21	2015-12-30	2016-01-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.014	0.0076	0.0079	0.0053	0.0064	0.0069	0.012	0.0063	0.0061	0.0051	-	0.0052	0.0072	0.0053	0.006	0.005
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00012	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	0.00012	0.00011	0.00011	0.00011	-	0.00012	0.00011	0.00012	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0054	0.0052	0.0054	0.0056	0.0051	0.005	0.0055	0.0054	0.0053	0.0052	-	0.0052	0.0056	0.0053	0.0052	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000092	<0.0000050	<0.0000050	<0.0000050	0.0000053	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00095[Bc]	0.00061[Bc]	0.00061[Bc]	<0.00050	0.00057	0.00064[Bc]	0.0028[Bc]	<0.00050	0.00067	0.00073[Bc]	-	0.00077[Bc]	0.00079[Bc]	0.00078[Bc]	0.00082[Bc]	0.00077[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	0.000055	0.000082
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00035	0.00016	0.00017	<0.00010	0.00015	0.00029	0.0004	0.00034	0.00035	0.00026	-	0.00016	0.00018	0.0002	0.0002	0.00028
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	<0.0000050	-	-	<0.0000050
Molybdenum	mg/L	-	-	-	-	-	0.0014	0.00059	0.00083	0.00052	0.00058	0.00074	0.00076	0.00028	0.00036	0.00039	-	0.00036	0.00041	0.00042	0.00043	0.00042
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	0.0007
Selenium	mg/L	-	-	-	-	-	0.00037	0.00018	0.00025	0.00014	0.00014	0.00016	0.00019	0.000076	0.00015	0.00012	-	0.000083	0.000096	0.0001	0.00011	0.00012
Silicon	mg/L	-	-	-	-	-	1.8	2.1	1.8	1.8	1.8	1.8	1.7	1.5	1.6	1.6	-	1.6	1.7	1.6	1.6	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.15	0.14	0.15	0.14	0.14	0.15	0.15	0.12	0.14	0.13	-	0.13	0.13	0.13	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00016	0.00017	0.00016	0.00016	0.00019	0.00015	0.00016	0.00017	-	0.00015	0.00015	0.00015	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-02-23	2016-03-28	2016-04-11	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	8.0	7.8	8.1	8.0	7.6	7.5	7.4	7.9	8.1	7.8	8.1	7.8	8.0	-	-
Temperature	°C	**15**[d]	-	-	-	-	2.7	3.3	3.7	9.9	7.7	6.9	12	11	15	**15.5**[DW]	**18.8**[DW]	**18**[DW]	**17.2**[DW]	**16.2**[DW]	12	8.6
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	13	11	11	11	11	11	11	8.9	9.5	9.7	8.8	8.6	9.4	11	11
Dissolved oxygen	%	-	-	-	-	-	90	96	85	97	88	89	101	94	87	95	104	93	90	95	101	91
Turbidity	NTU	**1.0**	-	-	-	-	0.63	0.87	0.54	0.23	0.54	0.77	0.55	0.82	0.01	0.11	0	0.63	**2.23**[DW]	0.23	**1.57**[DW]	0.21
Conductivity	µS/cm	-	-	-	-	-	109	111	113	102	106	105	97	98	95	92	98	94	96	100	102	101
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	8.0	7.9	8.0	7.8	7.9	7.4	7.8	7.9	7.9	7.8	7.7	8.0	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	53	54	54	54	55	51	52	51	48	48	47	49	50	51	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	50	50	50	49	48	45	47	44	43	44	45	49	50	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	63	60	61	62	77	68	68	58	74	71	87	74	65	73	60
Total suspended solids	mg/L	-	-	-	-	-	9.2	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.5	1.5	1.9	1.9	2.0	1.8	2.0	2.1	1.9	2.0	2.2	2.0	2.3	1.8	1.9	1.9
Colour	TCU	**15**[d]	-	-	-	-	<5.0	<5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.48	0.49	0.37	0.33	0.34	0.38	0.52	0.36	0.31	0.35	0.3	0.3	0.25	0.32	0.25	0.28
Conductivity	µS/cm	-	-	-	-	-	116	113	115	114	110	111	107	105	102	96	97	98	99	103	103	108
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	18	18	17	17	17	16	16	16	16	17	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.036	0.037	0.037	0.039	0.036	0.034	0.034	0.033	0.032	0.034	0.032	0.03	0.033	0.03	0.032
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	2.0	1.9	1.9	2.0	1.9	2.0
Potassium	mg/L	-	-	-	-	-	0.47	0.49	0.48	0.48	0.48	0.49	0.53	0.49	0.49	0.48	0.51	0.52	0.47	0.49	0.49	0.49
Sodium	mg/L	-	-	-	-	-	1.0	0.96	1.0	0.97	1.0	1.0	0.94	0.98	0.9	0.9	0.93	0.91	0.91	0.9	0.89	0.96
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.0	7.2	7.3	6.8	7.0	6.9	6.2	6.1	5.9	5.8	5.8	5.5	5.6	6.4	6.3	6.9
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.12	0.13	0.13	0.11	0.12	0.12	0.096	0.09	0.083	0.07	0.061	0.055	0.064	0.053	0.054	0.087
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.12	0.13	0.13	0.11	0.12	0.12	0.096	0.09	0.083	0.07	0.061	0.055	0.064	0.053	0.054	0.087
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.18	0.18	0.18	0.2	0.18	0.17	0.18	0.16	0.15	0.15	0.15	0.12	0.12	0.16	0.16
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0031[Bc]	0.0021[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0045[Bc]	<0.002[Bc]	<0.002[Bc]	0.0036[Bc]	0.0026[Bc]	0.0024[Bc]	<0.002[Bc]	<0.002[Bc]	0.0023[Bc]	0.0057	0.0022[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.72	0.44	-	0.6	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0029	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.027	0.042	0.031	0.018	0.021	<0.027	0.024	0.018	0.022	0.018	0.017	0.018	0.014	0.015	0.029	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00014	0.00013	<0.00010	0.00012	0.00017	0.00013	0.00011	0.00013	0.00012	0.00014	0.00013	0.00012	0.00017	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0051	0.0056	0.0059	0.0055	0.0051	0.0055	0.0057	0.0055	0.0054	0.0058	0.0057	0.0056	0.0054	0.0052	0.0053	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	18	18	18	17	17	17	17	15	16	17	17	18	15
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.0014	0.0014	0.001	0.0011	0.0011	0.0016	0.00082	0.001	0.0007	0.0008	0.00072	0.0008	0.00076	0.0012	0.00068
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.0012	0.0011	0.0012	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0016	0.0015	0.0012	0.0015	0.0015	0.0019	0.0018	0.0017	0.0017	0.002	0.0019	0.0012	0.0013	0.0012	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00055	0.00069	0.00062	0.00042	0.00041	0.00047	0.00038	0.00037	0.00034	0.00036	0.00036	0.00036	0.00034	0.00031	0.00039	0.00042
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0006	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.5	0.51	0.51	0.47	0.5	0.56	0.51	0.48	0.48	0.53	0.54	0.48	0.47	0.51	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.0001	0.00011	0.00011	0.000066	0.00011	0.00013	0.00013	0.000099	0.0001	0.00011	0.00011	0.0001	0.000086	0.000097	0.00012
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.6	1.7	1.5
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	0.97	1.0	0.98	0.97	1.0	0.97	1.0	0.87	0.93	0.99	0.93	0.93	0.92	0.92	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.13	0.12	0.14	0.12	0.13	0.12	0.12	0.12	0.11	0.12	0.13	0.14	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00018	0.00017	0.00015	0.00017	0.00016	0.00017	0.00015	0.00015	0.00014	0.00013	0.00015	0.00016	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled							2016-02-23	2016-03-28	2016-04-11	2016-04-27	2016-05-05	2016-05-10	2016-05-17	2016-05-25	2016-06-07	2016-06-20	2016-06-28	2016-07-06	2016-08-01	2016-09-05	2016-10-05	2016-11-09
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0054
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.005	0.0083	0.0051	0.0062	0.0071	0.0063	0.0091	0.0089	0.0098	0.0098	0.012	0.012	0.011	0.0084	0.0067	0.0075
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.00013	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0049	0.005	0.0055	0.0053	0.0051	0.0052	0.0053	0.0052	0.0053	0.0055	0.0055	0.0055	0.0053	0.0051	0.005	0.0049
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00076[Bc]	0.0008[Bc]	0.00091[Bc]	0.00076	0.00076	0.00081[Bc]	0.00083[Bc]	0.00066[Bc]	0.00066	0.00057	0.00067	0.00061	0.00052	<0.00050	<0.00050	0.0005
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00033	0.0007	0.00055	0.00074	0.00062	0.00061	0.001	0.00078	0.00096	0.00091	0.0011	0.00087	0.00061	0.0003	0.00016	0.00012
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00047	0.00055	0.0005	0.00041	0.0004	0.00043	0.00034	0.00034	0.00032	0.00036	0.00034	0.00033	0.00031	0.0003	0.00033	0.00043
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0001	0.00011	0.0001	0.00012	0.00012	0.0001	0.00011	0.00011	0.000093	0.0001	0.00012	0.00008	0.00009	0.000077	0.000073	0.00011
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.7	1.8	1.7	1.8	1.8	1.8	1.8	1.7	1.8	1.8	1.6	1.5	1.5	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.11	0.11	0.12	0.13	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00015	0.00015	0.00014	0.00014	0.00014	0.00013	0.00014	0.00014	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-11-16	2016-11-30	2017-02-02	2017-03-06	2017-04-10	2017-05-09	2017-05-15	2017-05-22	2017-05-29	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22	2017-10-01	2017-10-26
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.4	7.5	7.7	7.8	7.3	7.4	7.5	7.3	7.4	7.7	7.8	7.8	7.8	8.1	-	8.1
Temperature	°C	**15**[d]	-	-	-	-	8.1	6.8	0.5	0.9	2.8	4.0	4.7	12	12	13	13	11	14	**19**[DW]	8.7	8.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	13	14	12	12	12	9.5	11	9.5	9.7	9.9	9.5	8.5	-	12
Dissolved oxygen	%	-	-	-	-	-	96	94	89	96	88	91	95	89	103	91	91	90	92	91	-	99
Turbidity	NTU	**1.0**	-	-	-	-	0.45	0.72	0.56	0.45	0.74	0.68	0	0.75	0.63	0.49	0.52	0.81	0.01	0	0.19	0.18
Conductivity	µS/cm	-	-	-	-	-	106	102	118	126	110	115	114	104	105	108	102	101	101	105	118	113
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	8.0	7.8	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	48	53	59	70	55	54	54	51	51	48	48	48	50	50	51	48
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	54	58	51	50	52	50	49	48	45	44	47	48	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	74	72	87	78	75	82	76	75	72	76	65	71	72	68	65	74
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	1.6	1.8	7.3	<1.0	<1.0	4.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	2.1	1.9	2.0	2.4	2.0	2.3	2.0	1.9	2.6	2.0	1.9	2.0	2.1	1.6	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.21	0.41	0.26	0.27	0.92	0.7	0.55	0.28	0.34	0.49	0.56	0.37	0.41	0.31	0.28	0.26
Conductivity	µS/cm	-	-	-	-	-	110	110	120	125	114	116	116	112	111	103	104	100	100	106	100	102
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	16	18	20	24	18	18	18	17	17	16	16	16	17	17	17	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.037	0.036	0.036	0.032	0.033	0.033	0.034	0.035	0.034	0.032	0.031	0.032	0.029	0.031	0.033
Magnesium	mg/L	-	-	-	-	-	2.0	2.2	2.2	2.8	2.2	2.2	2.1	2.3	2.1	2.0	2.1	2.0	2.0	1.9	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.5	0.54	0.58	0.67	0.56	0.55	0.51	0.51	0.5	0.5	0.51	0.53	0.49	0.48	0.49	0.47
Sodium	mg/L	-	-	-	-	-	0.98	1.1	1.1	1.3	1.1	1.2	1.1	1.1	1.0	0.94	1.0	0.99	0.92	0.88	0.92	0.89
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.2	7.9	7.7	7.4	7.6	8.1	7.5	6.9	6.6	6.0	6.1	6.1	5.9	6.2	6.4	6.6
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.094	0.11	0.16	<0.0050	0.14	0.14	0.14	0.13	0.12	0.11	0.11	0.11	0.098	0.046	0.051	0.077
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.094	0.11	0.16	<0.0051	0.14	0.14	0.14	0.13	0.12	0.11	0.11	0.11	0.098	0.048	0.051	0.077
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.012	<0.0050	<0.0050	<0.0050	0.006	<0.0050	<0.0050	0.01	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.17	0.22	0.22	0.23	0.2	0.19	0.18	0.19	0.19	0.17	0.19	0.15	1.4	0.13	0.14
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0021[Bc]	<0.002[Bc]	0.0026[Bc]	0.0035[Bc]	0.0034[Bc]	<0.002[Bc]	<0.002[Bc]	<0.01	0.0036[Bc]	<0.004[Bc]	<0.002[Bc]	<0.002[Bc]	0.0034[Bc]	<0.002[Bc]	0.0024[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	0.34	-	0.35	-	-	0.85	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0037	0.0021	<0.0020	0.0024	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.019	0.039	0.013	0.012	0.087	0.04	0.038	0.015	0.023	0.026	0.037	0.022	0.033	0.0092	0.012	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00013	0.00021	0.00016	0.00019	0.0002	0.00013	0.00012	0.00014	0.00014	0.00016	0.00015	0.00014	0.00011	0.00011	0.0001
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0058	0.0057	0.0059	0.0066	0.0062	0.0058	0.0053	0.0057	0.0055	0.0069	0.0057	0.0059	0.0055	0.0053	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	16	19	21	18	18	19	19	17	16	17	16	17	17	17	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00074	0.0013	0.001	0.0013	0.0017	0.0014	0.0014	0.00083	0.00093	0.00077	0.00098	0.00078	0.001	0.00052	0.00058	0.0006
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.095	<0.030	0.032	<0.030	<0.030	0.032	0.034	0.041	0.032	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	0.000058	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0012	<0.0010	0.001	0.0011	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	0.0012	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	1.8	2.4	2.5	2.4	2.3	2.3	2.3	2.2	2.0	2.4	1.9	2.0	2.0	1.9	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0013	0.0019	0.00098	0.001	0.0043	0.0034	0.0025	0.0012	0.0017	0.0021	0.0026	0.0017	0.0017	0.0014	0.00092	0.001
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00062	0.0008	0.00058	0.00043	0.00065	0.00076	0.00071	0.00054	0.00048	0.00044	0.00041	0.00046	0.00042	0.00035	0.0003	0.00034
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.5	0.56	0.59	0.56	0.55	0.53	0.52	0.51	0.5	0.6	0.53	0.5	0.45	0.47	0.46
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00016	0.00016	0.00014	0.00011	0.00021	0.00018	0.00013	0.00011	0.00012	0.00011	0.00012	0.00011	0.00012	0.00011	0.000084	0.000083
Silicon	mg/L	-	-	-	-	-	1.6	1.6	1.9	2.0	2.1	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.9	1.5	1.4	1.6
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.97	1.2	1.3	1.3	1.2	1.2	1.1	1.1	0.96	1.1	0.97	0.93	0.84	0.9	0.89
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.15	0.17	0.13	0.14	0.15	0.14	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00017	0.0002	0.00017	0.00016	0.00017	0.00016	0.00016	0.00015	0.00014	0.00013	0.00015	0.00016	0.00015	0.00016	0.00014

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-11-16	2016-11-30	2017-02-02	2017-03-06	2017-04-10	2017-05-09	2017-05-15	2017-05-22	2017-05-29	2017-06-05	2017-06-12	2017-06-19	2017-06-27	2017-08-22	2017-10-01	2017-10-26
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	0.0032	<0.0030	0.0053	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0077	0.0081	0.0056	0.0067	0.0095	0.0071	0.0063	0.0067	0.0078	0.01	0.012	0.0089	0.01	0.0087	0.0073	0.006
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.00011	0.00012	0.00011	0.00011	0.00011	0.00012	0.00011	0.00012	0.00012	0.00013	0.0003	0.0001	0.0001
Barium	mg/L	-	-	-	-	-	0.0053	0.0053	0.0057	0.0066	0.0054	0.0056	0.0053	0.0055	0.0053	0.0055	0.0054	0.0056	0.0053	0.0055	0.0056	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00051[Bc]	0.0014[Bc]	0.00066	0.00085[Bc]	0.00092[Bc]	0.00091[Bc]	0.00078[Bc]	0.00069[Bc]	0.00067[Bc]	0.00072	0.00071	0.00059	0.00069	0.00084	<0.00050	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.001	0.0012	<0.0010	<0.0010	0.0011	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00012	0.00024	0.00042	0.00053	0.0012	0.001	0.0003	0.00076	0.00074	0.001	0.00076	0.00037	0.0006	0.00047	0.00014	0.00019
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00048	0.00072	0.00057	0.00047	0.00064	0.00066	0.00056	0.00052	0.00046	0.0004	0.00044	0.00035	0.00034	0.0003	0.00029	0.0003
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00014	0.00017	0.00012	0.00011	0.00013	0.00014	0.00014	0.00012	0.00014	0.0001	0.00011	0.00014	0.00011	0.00012	0.00009	0.000095
Silicon	mg/L	-	-	-	-	-	1.5	1.8	1.7	2.3	1.8	1.7	1.7	1.7	1.8	1.8	1.9	1.8	1.6	1.5	1.4	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.15	0.19	0.14	0.14	0.14	0.13	0.13	0.12	0.12	0.12	0.12	0.12	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00017	0.00017	0.00015	0.00014	0.00014	0.00016	0.00015	0.00014	0.00016	0.00014	0.00013	0.00015	0.00014	0.00013
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-11-20	2017-12-07	2018-01-04	2018-01-10	2018-01-18	2018-01-31	2018-05-03	2018-05-13	2018-05-22	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-07-16	2018-08-23
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	8.2	7.8	-	7.5	-	6.8	7.7	7.2	7.5	7.7	7.6	7.9	7.5	7.8	7.9
Temperature	°C	**15**[d]	-	-	-	-	6.0	5.3	1.6	-	2.7	-	3.3	6.2	14	11	9.6	15	15	15	**17.5**[DW]	**17.4**[DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	13	12	12	-	11	-	12	11	9.2	11	11	10	10	10	8.7	9.3
Dissolved oxygen	%	-	-	-	-	-	101	93	86	-	84	-	88	89	89	99	96	101	99	102	91	91
Turbidity	NTU	**1.0**	-	-	-	-	0.09	0.48	**1.06**[DW]	-	0.09	-	0.04	-	0.24	0	0	0	0	0.29	0	0.57
Conductivity	µS/cm	-	-	-	-	-	107	113	111	-	110	-	114	107	110	100	100	102	100	101	100	100
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	-	7.9	7.8	7.6	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	-	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	-	54	51	54	54	52	43	52	48	49	50	49	51	-	49
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	-	50	49	50	51	50	48	50	43	47	46	45	47	-	47
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	54	-	62	67	64	61	71	72	65	68	66	59	67	69	-	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.8	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	-	1.6	1.7	1.7	1.7	2.0	8.6	2.4	2.4	2.3	2.5	2.2	2.2	-	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.27	-	0.26	0.26	0.29	0.28	0.64	**1.59**[DW]	0.49	0.55	0.35	0.3	0.38	0.25	-	0.27
Conductivity	µS/cm	-	-	-	-	-	103	-	110	122	106	109	115	101	107	100	102	101	100	101	-	99
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	-	18	17	18	18	17	14	17	16	16	17	16	17	-	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.034	-	0.033	0.037	0.034	0.035	0.035	0.037	0.041	0.035	0.034	0.035	0.032	0.031	-	0.032
Magnesium	mg/L	-	-	-	-	-	2.1	-	2.1	1.9	2.0	2.2	2.1	2.1	2.2	2.0	2.1	2.0	2.1	2.1	-	1.8
Potassium	mg/L	-	-	-	-	-	0.48	-	0.45	0.46	0.48	0.51	0.5	0.39	0.54	0.55	0.54	0.52	0.53	0.52	-	0.5
Sodium	mg/L	-	-	-	-	-	0.93	-	1.0	0.98	0.91	1.1	1.0	1.2	1.1	1.0	1.0	0.98	0.97	0.98	-	0.91
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.7	-	6.8	6.8	6.6	6.9	7.5	5.2	6.5	6.0	5.9	6.1	5.9	6.0	-	6.3
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	-	0.12	0.12	0.12	0.13	0.14	0.077	0.1	0.084	0.092	0.091	0.081	0.078	-	0.037
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	-	0.12	0.12	0.12	0.13	0.14	0.077	0.1	0.084	0.092	0.091	0.081	0.078	-	0.037
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	0.0074
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	-	0.17	0.16	0.16	0.19	0.21	0.35	0.17	0.17	0.17	0.14	0.16	0.15	-	0.15
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0022[Bc]	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0043[Bc]	**0.0129** [DW]	0.0041[Bc]	0.0025[Bc]	0.0049[Bc]	0.0027[Bc]	0.0076	0.0055	-	0.0039[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0015	<0.0010	0.0023	<0.0010	-	0.0019
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	-	<0.0020	<0.0020	0.0022	0.0023	0.0021	0.0046	<0.0020	0.0025	0.0022	<0.0020	0.0029	<0.0020	-	0.0023
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.018	-	0.016	0.021	0.017	0.017	0.033	0.13	0.022	0.033	0.026	0.017	0.018	0.019	-	0.014
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	-	0.00011	0.00075	0.00014	0.00013	0.00016	0.00032	0.00013	0.00025	0.00019	0.00014	0.00016	0.00014	-	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0056	-	0.0066	0.0055	0.0054	0.0056	0.0054	0.0082	0.0059	0.0059	0.0054	0.0061	0.0059	0.0061	0.0057	-	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000088	<0.0000050	<0.0000050	0.0000072	0.0000057	<0.0000050	<0.0000050	-	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	-	19	18	19	19	18	16	17	14	16	16	16	15	-	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00083	-	0.00093	0.003	0.001	0.00093	0.0013	0.0028	0.00077	0.00079	0.0012	0.00095	0.00079	0.0013	-	0.0007
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.14	0.03	0.045	<0.030	<0.030	<0.030	<0.030	-	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	0.001	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	-	2.2	2.2	2.0	2.2	2.2	2.8	2.2	1.9	2.1	2.1	2.0	1.9	-	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	-	0.00067	0.001	0.00089	0.00087	0.0017	0.0054	0.0024	0.0026	0.0021	0.0015	0.0015	0.0015	-	0.0018
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00046	-	0.00046	0.0004	0.00066	0.00042	0.0006	0.00055	0.00041	0.00035	0.00048	0.00039	0.00037	0.00047	-	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	-	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	0.00088	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	-	<0.00050
Potassium	mg/L	-	-	-	-	-	0.46	-	0.45	0.47	0.47	0.51	0.49	0.59	0.5	0.52	0.53	0.54	0.54	0.52	-	0.46
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00013	-	0.00013	0.0001	0.00014	0.00011	0.00019	0.00015	0.000084	0.00015	0.00011	0.00013	0.00013	0.00012	-	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	-	1.6	1.6	1.7	1.6	1.8	2.6	2.0	1.8	1.9	2.0	1.9	1.8	-	1.6
Silver	mg/L	-	0.00012	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	-	1.0	1.1	0.91	1.0	1.1	1.6	1.0	0.95	1.0	1.0	1.0	0.98	-	0.85
Strontium	mg/L	**7.0**	-	-	-	-	0.15	-	0.14	0.14	0.14	0.14	0.14	0.12	0.14	0.11	0.12	0.12	0.12	0.11	-	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00019	-	0.00016	0.00016	0.00015	0.00016	0.00017	0.00012	0.00015	0.00015	0.00014	0.00015	0.00014	0.00015	-	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2017-11-20	2017-12-07	2018-01-04	2018-01-10	2018-01-18	2018-01-31	2018-05-03	2018-05-13	2018-05-22	2018-06-04	2018-06-13	2018-06-18	2018-06-27	2018-07-02	2018-07-16	2018-08-23
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00068	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0032	<0.0030	<0.0030	<0.0030	-	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0051	-	0.0051	0.0043	0.0059	0.0041	0.0068	0.031	0.0086	0.012	0.016	0.011	0.0093	0.0091	-	0.0075
Antimony	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00017	0.0001	0.00011	0.00016	0.00012	0.00019	0.00012	-	0.0001
Barium	mg/L	-	-	-	-	-	0.0053	-	0.0054	0.0052	0.0053	0.0055	0.0052	0.0055	0.0054	0.006	0.006	0.0057	0.0059	0.0059	-	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00057[Bc]	-	0.00064[Bc]	0.00067[Bc]	0.00057[Bc]	0.00067[Bc]	0.00077[Bc]	0.0018	0.00085[Bc]	0.00072[Bc]	0.00085[Bc]	0.0007	0.00056	0.00064	-	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.037	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00011	-	0.00016	<0.00010	<0.00015	<0.00010	0.00048	0.0021	0.0011	0.0012	0.0008	0.00098	0.0006	0.0007	-	0.00038
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00038	-	0.0004	0.00032	0.00041	0.00037	0.00056	0.00045	0.00041	<0.00045	0.00074	0.0004	0.00037	0.00038	-	0.00033
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0001	-	0.00011	0.00011	0.00011	0.000088	0.00016	0.00013	0.00014	0.00012	0.00012	0.000098	0.00012	0.000092	-	0.000098
Silicon	mg/L	-	-	-	-	-	1.6	-	1.6	1.5	1.6	1.5	1.6	2.1	1.8	1.8	1.8	1.7	1.7	1.7	-	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	-	0.14	0.14	0.14	0.13	0.13	0.1	0.13	0.12	0.12	0.13	0.12	0.13	-	0.12
Thallium	mg/L	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	-	0.00015	0.00016	0.00015	0.00015	0.00016	0.00011	0.00016	0.00015	0.00014	0.00016	0.00014	0.00014	-	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-06-19
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.6	7.9	7.6	7.6	7.7	7.8	8.0	7.8	7.8	7.8	7.9	7.8	7.5	8.0	7.9
Temperature	°C	**15**[d]	-	-	-	-	**15.1**[DW]	9.8	8.9	9.0	8.4	6.4	4.5	0.3	1.4	3.5	3.9	6.1	8.8	13	15	10
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	9.6	10	11	10	12	11	12	13	13	11	12	12	11	**7.8**[Bc]	11	11
Dissolved oxygen	%	-	-	-	-	-	96	91	91	90	101	91	91	87	93	85	91	93	97	75	107	96
Turbidity	NTU	**1.0**	-	-	-	-	0.08	0.8	0	0	**1.55**[DW]	0.4	0	0.16	0.53	0.85	0.99	0.14	0.52	0.32	0.53	**2.16**[DW]
Conductivity	µS/cm	-	-	-	-	-	100	104	107	105	101	104	112	111	181	112	115	112	110	113	99	109
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	8.0	7.9	8.0	7.8	8.0	7.9	8.0	7.9	7.8	7.9	7.9	7.9	8.0	8.0	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	50	52	53	51	58	55	55	58	57	55	56	54	55	49	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	47	49	50	50	50	49	50	48	50	52	52	50	50	45	46
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	83	86	70	70	69	59	74	65	73	68	80	100	65	77	63	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.2	1.7	1.9	1.9	1.6	1.7	1.6	1.8	2.0	1.8	2.1	2.6	6.3	1.9	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.23	0.28	0.25	0.23	0.23	0.19	0.39	0.25	0.18	0.35	0.26	0.25	0.24	0.66	0.25	0.23
Conductivity	µS/cm	-	-	-	-	-	106	110	106	109	110	109	110	113	122	112	113	117	111	114	100	104
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	18	18	17	20	18	19	19	20	19	19	18	17	16	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.031	0.032	0.033	0.034	0.032	0.033	0.033	0.039	0.037	0.032	0.034	0.037	0.039	0.04	0.038	0.038
Magnesium	mg/L	-	-	-	-	-	1.9	1.9	1.9	2.2	1.9	2.3	2.3	2.0	2.3	2.1	2.1	2.2	2.3	2.8	1.9	2.1
Potassium	mg/L	-	-	-	-	-	0.48	0.46	0.52	0.52	0.47	0.55	0.54	0.51	0.8	0.5	0.52	0.53	0.48	0.55	0.52	0.53
Sodium	mg/L	-	-	-	-	-	0.89	0.93	0.94	1.0	0.97	1.0	1.1	0.98	1.2	1.2	1.1	1.1	1.1	1.5	0.92	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.4	6.5	6.6	6.6	6.0	6.5	7.6	7.2	7.1	7.4	7.8	7.0	7.0	6.0	6.0	6.4
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.049	0.067	0.078	0.077	0.084	0.09	0.13	0.14	0.15	0.14	0.14	0.13	0.12	0.086	0.082	0.096
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.049	0.067	0.078	0.077	0.084	0.09	0.13	0.14	0.15	0.14	0.14	0.13	0.12	0.086	0.082	0.096
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0093	<0.0050	<0.0050	<0.0050	<0.0050	0.039	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0067	0.0051	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.13	0.16	0.15	0.14	0.16	0.21	0.19	0.21	0.22	0.19	0.2	0.19	0.2	0.29	0.19	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0057	0.0043[Bc]	0.0032[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]	0.0091	0.0083	0.0156[Bc, DW]	0.0029[Bc]	0.0031[Bc]	0.0022[Bc]	0.0058	0.0071	**0.0107** [DW]	0.0061
Orthophosphate	mg-P/L	-	-	-	-	-	0.0012	0.0026	<0.0010	0.0017	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	0.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0023	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0037	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.011	0.015	0.0071	0.016	0.0096	0.012	0.03	0.016	0.015	0.026	0.027	0.016	0.016	0.049	0.015	0.019
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00012	0.0001	0.00014	0.00013	0.00011	0.00013	0.00011	0.00013	0.00012	0.00014	0.00018	0.00013	0.00023	0.00012	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0054	0.0053	0.0052	0.0054	0.0052	0.0055	0.0053	0.0059	0.0056	0.0056	0.0049	0.0053	0.0067	0.005	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	18	17	17	19	17	18	19	19	19	17	16	17	16	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00065	0.0012	<0.00050	0.001	0.00056	0.00093	0.0014	0.0014	0.001	0.0011	0.0012	0.0007	0.00072	0.0015	0.00056	0.0022
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.068	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000051	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	1.9	2.0	2.0	1.8	2.0	2.3	2.2	2.0	2.3	2.1	2.1	2.0	2.0	2.7	1.9	1.8
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0012	0.00083	0.00096	0.00026	0.00099	0.0017	0.0012	0.00093	0.0013	0.0016	0.0012	0.0015	0.004	0.0017	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00032	0.00033	0.00036	0.00036	0.00038	0.00036	0.00068	0.00043	0.00052	0.00079	0.00076	0.00057	0.00053	0.0005	0.00035	0.00038
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	0.00065	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00058	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.44	0.49	0.47	0.46	0.5	0.5	0.54	0.5	0.71	0.54	0.49	0.49	0.46	0.48	0.47	0.43
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000096	0.0001	0.00009	0.00012	0.00009	0.00014	0.00019	0.00012	0.00011	0.00013	0.0002	0.00016	0.00014	0.00016	0.0001	0.00012
Silicon	mg/L	-	-	-	-	-	1.6	1.5	1.5	1.4	1.5	1.5	1.9	1.7	1.9	1.7	1.8	1.7	1.8	2.3	1.6	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.85	0.98	0.87	0.86	0.94	0.97	1.2	0.95	1.1	1.2	1.1	1.1	1.0	1.4	0.9	0.84
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.13	0.14	0.13	0.14	0.13	0.14	0.13	0.16	0.15	0.13	0.15	0.13	0.12	0.12	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00015	0.00014	0.00014	0.00017	0.00016	0.00017	0.00017	0.00019	0.00017	0.00015	0.00016	0.00015	0.00014	0.00014	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2018-12-18	2019-02-26	2019-03-05	2019-04-25	2019-05-02	2019-05-08	2019-05-15	2019-05-21	2019-06-18	2019-06-19
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0045	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0041	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0072	0.0057	0.0056	0.0057	0.025	0.01	0.013	0.0049	0.0062	0.0073	0.007	0.0063	0.0073	0.023	0.011	0.0085
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.0001	0.00012	<0.00010	0.00011	<0.00010	0.00011	<0.00010	<0.00010	0.0001	0.00011	0.0002	<0.00010	0.00011
Barium	mg/L	-	-	-	-	-	0.0056	0.0052	0.0053	0.0054	0.0057	0.0056	0.0055	0.0052	0.0059	0.0057	0.0051	0.0057	0.0056	0.0074	0.0056	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00051	<0.0005	<0.00050	0.00053	0.0016[Bc]	0.00074[Bc]	0.00066[Bc]	0.00056	0.00066	0.00064	0.00061	0.00053	0.00056	0.0014	<0.00050	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.031	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00067	0.0004	0.00024	0.00024	0.0017	0.00028	0.00027	0.00035	0.00022	0.00034	0.00028	0.00033	0.00047	0.0021	0.00083	0.00039
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00035	0.00035	0.00034	0.00036	0.00033	0.00036	0.00068	0.00044	0.00048	0.00081	0.00073	0.00053	0.00053	0.00049	0.00036	0.00036
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00053	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000076	0.000095	0.00011	0.000064	0.000089	0.000098	0.00015	0.000098	0.00015	0.0002	0.0002	0.00012	0.00012	0.00015	0.00013	0.0001
Silicon	mg/L	-	-	-	-	-	1.5	1.4	1.3	1.4	1.4	1.5	1.6	1.6	1.8	1.6	1.7	1.7	1.8	2.2	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.14	0.14	0.12	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.14	0.13	0.12	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00016	0.00015	0.00015	0.00017	0.00016	0.00016	0.00016	0.00018	0.00016	0.00018	0.00017	0.00014	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-07-11	2019-07-25	2019-08-20	2019-10-30	2020-06-02	2020-06-09	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-04	2021-05-11	2021-05-25
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	8.1	8.0	7.8	7.8	7.4	7.7	7.5	7.7	-	7.8	8.2	7.9	7.8	7.8	7.9
Temperature	°C	**15**[d]	-	-	-	-	4.9	**18.5**[DW]	**17.4**[DW]	7.6	9.3	9.4	11	14	10	-	**16.2**[DW]	**15.2**[DW]	6.2	5.0	5.8	9.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	9.3	9.4	11	11	11	11	11	9.9	-	9.6	9.8	11	12	12	11
Dissolved oxygen	%	-	-	-	-	-	86	99	98	94	95	97	99	104	91	-	97	98	88	95	98	99
Turbidity	NTU	**1.0**	-	-	-	-	0.92	0.35	0	0.25	**1.24**[DW]	**7.69**[DW]	0.53	0.59	0.32	-	0	0.08	0.26	**1.12**[DW]	0	0.23
Conductivity	µS/cm	-	-	-	-	-	110	102	101	108	94	108	120	100	108	-	99	105	109	112	113	112
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	7.9	7.9	7.8	7.8	7.7	7.8	7.4	7.9	7.9	7.8	7.9	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	50	46	50	56	52	54	47	52	47	45	52	53	55	52	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	46	45	46	48	49	47	51	46	45	42	43	47	48	48	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	57	50	70	63	74	80	71	55	78	76	66	61	70	71	70	75
Total suspended solids	mg/L	-	-	-	-	-	<1.0	1.1	1.0	<1.0	1.4	1.8	<1.1	<1.0	<1.0	1.0	1.3	2.1	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	2.5	2.0	2.0	4.7	4.5	3.9	2.7	3.0	4.1	3.2	2.4	13	2.4	2.2	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.19	0.3	0.23	0.21	0.98	0.76	0.8	0.46	0.28	0.98	0.4	0.24	0.17	0.26	0.15	0.24
Conductivity	µS/cm	-	-	-	-	-	99	98	102	110	112	106	112	97	104	98	99	104	109	111	117	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	53	48	50	50	48	53	51	56	56	53
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	15	17	18	17	18	16	17	15	15	18	18	19	17	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.038	0.038	0.034	0.036	0.039	0.037	0.039	0.038	0.037	0.038	0.035	0.027	0.04	0.038	0.035	0.036
Magnesium	mg/L	-	-	-	-	-	1.9	2.0	2.1	2.0	2.7	2.3	2.4	1.9	2.0	2.1	2.0	2.1	2.2	2.1	2.1	2.2
Potassium	mg/L	-	-	-	-	-	0.47	0.51	0.47	0.5	0.6	0.56	0.56	0.47	0.52	0.55	0.51	0.49	0.52	0.46	0.49	0.51
Sodium	mg/L	-	-	-	-	-	0.95	0.97	0.96	0.91	1.4	1.2	1.3	0.93	1.0	0.99	0.97	0.97	1.0	0.99	1.0	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.3	6.0	5.8	7.1	6.2	6.0	7.1	5.8	6.1	5.2	5.5	5.7	7.0	7.4	7.5	7.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.077	0.055	0.045	0.091	0.092	0.1	0.091	0.086	0.12	0.014	0.029	0.031	0.11	0.13	0.13	0.11
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.077	0.055	0.045	0.091	0.092	0.1	0.091	0.087	0.12	<0.050	0.03	0.031	0.11	0.13	0.13	0.11
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	0.0067	<0.0050	0.0077	0.0062	<0.0050	0.0068	<0.0050	0.005	0.0065	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.16	0.17	0.2	0.25	0.24	0.22	0.18	0.19	0.16	0.15	0.12	0.18	0.19	0.18	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0058	0.0027[Bc]	0.0022[Bc]	0.0071	0.0065	**0.0107** [DW]	0.0073	0.0032[Bc]	0.0098	0.008	0.004[Bc]	0.0095	0.0025[Bc]	<0.002[Bc]	<0.002[Bc]	0.0024[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	0.0024	<0.0020	<0.0020	0.0022	0.0026
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.014	0.069	0.013	0.014	0.046	0.058	0.045	0.025	0.023	0.07	0.023	0.028	0.015	0.015	0.014	0.018
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00015	0.00012	0.00012	0.00023	0.00016	0.00021	0.00014	0.00014	0.00022	0.00017	0.00017	0.00013	0.00014	0.00012	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0055	0.0069	0.0053	0.0053	0.0065	0.0064	0.0067	0.0055	0.0056	0.0071	0.0056	0.0055	0.0052	0.0054	0.0051	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	0.0000061	<0.0000050	<0.0000050	<0.0000050	0.0000066	0.0000054	0.000016	<0.0000050	0.000011	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000054
Calcium	mg/L	-	-	-	-	-	16	16	16	17	18	17	17	16	17	17	16	18	17	19	19	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00066	0.0058	0.00068	0.00063	0.0011	0.0013	0.0013	0.00076	0.0011	0.0014	0.00081	0.001	0.0007	0.00072	0.00076	0.00071
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	0.065	<0.030	<0.030	0.061	0.08	0.062	<0.030	<0.030	0.079	0.05	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	1.9	1.9	1.9	1.9	2.3	2.3	2.4	2.0	2.1	2.2	2.1	2.0	2.1	2.2	2.2	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0013	0.0034	0.0011	0.00098	0.0041	0.0037	0.0047	0.0017	0.0019	0.0031	0.0021	0.0015	0.0014	0.0012	0.0011	0.0015
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00038	0.00033	0.0004	0.00045	0.00044	0.00062	0.00036	0.0004	0.00047	0.00039	0.00032	0.00044	0.00061	0.00065	0.00051
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	0.00062	0.00076	0.00051	<0.00050	0.00069	0.00082	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.49	0.47	0.45	0.54	0.55	0.56	0.5	0.53	0.58	0.5	0.43	0.49	0.52	0.51	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	0.000098	0.000085	0.00011	0.00012	0.00012	0.00015	0.00013	0.00014	0.00014	0.00011	0.000097	0.00013	0.00014	0.00016	0.00014
Silicon	mg/L	-	-	-	-	-	1.6	1.8	1.6	1.6	2.1	2.2	2.3	1.8	2.0	2.2	2.0	1.7	1.7	1.9	1.9	2.0
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.89	1.0	0.92	0.95	1.2	1.2	1.3	0.91	1.0	1.1	0.96	0.88	0.99	1.1	1.1	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.12	0.12	0.1	0.11	0.13	0.14	0.14	0.15	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00015	0.00013	0.00015	0.00014	0.00014	0.00015	0.00013	0.00014	0.00014	0.00013	0.00013	0.00016	0.00016	0.00018	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled							2019-07-11	2019-07-25	2019-08-20	2019-10-30	2020-06-02	2020-06-09	2020-06-16	2020-06-24	2020-06-29	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-04	2021-05-11	2021-05-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.028	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0091	0.0097	0.0093	0.009	0.019	0.019	0.015	0.012	0.011	0.017	0.013	0.011	0.0083	0.0079	0.0081	0.0095
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00012	0.00011	0.00013	0.00019	0.00015	0.00016	0.00011	0.00012	0.0002	0.00016	0.00011	<0.00010	0.0001	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0051	0.0057	0.005	0.0052	0.0066	0.0062	0.0066	0.0051	0.0057	0.0058	0.0059	0.0057	0.005	0.0054	0.0049	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000049	0.0000082	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	<0.00050	0.00055	<0.00050	<0.00050	0.0011	0.00091	0.0011	<0.00050	0.00064	0.00084	0.0007	0.00069	0.00051	0.00058	0.00068	0.00063
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00035	0.00029	0.00013	0.00021	0.002	0.00044	0.002	0.00014	0.0003	0.00022	<0.00010	0.00022	0.00047	0.00033	0.00034	0.00057
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00036	0.00037	0.00034	0.00039	0.00051	0.00046	0.00062	0.00033	0.00041	0.00042	0.0004	0.00034	0.00041	0.00075	0.00066	0.00046
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	0.000096	0.00013	0.00015	0.00011	0.00012	0.00019	0.0001	0.00012	0.00016	0.00013	0.000074	0.000096	0.00016	0.0002	0.00014
Silicon	mg/L	-	-	-	-	-	1.5	1.7	1.7	1.6	2.2	2.1	2.1	1.8	1.9	2.2	1.9	1.8	1.6	1.6	1.8	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.11	0.12	0.13	0.14	0.13	0.13	0.12	0.13	0.1	0.11	0.13	0.14	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00013	0.00014	0.00014	0.00013	0.00014	0.00014	0.00014	0.00013	0.00012	0.00015	0.00015	0.00017	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-05-25	2023-05-30
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	8.5	7.9	7.8	8.2	7.4	8.0	-	7.9	8.1	8.1	**6.4**[Ba,Bc]	7.7	7.1	7.7
Temperature	°C	**15**[d]	-	-	-	-	13	**19.6**[DW]	**15.4**[DW]	9.0	4.1	4.4	4.6	9.1	-	15	**21**[DW]	14	5.4	10	9.4	9.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	9.2	9.4	10	12	11	11	11	-	9.8	8.9	9.9	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	101	101	94	91	90	88	86	97	-	101	99	95	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	**1.3**[DW]	0.14	0.13	0.06	0	0.17	0.42	0.31	-	0.63	0.27	0	**1.91**[DW]	**7.81**[DW]	**7.34**[DW]	0.51
Conductivity	µS/cm	-	-	-	-	-	109	119	108	108	114	114	130	116	-	108	98	104	1.4	116	91	112
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	8.0	7.9	7.9	7.9	8.0	7.7	7.8	7.9	7.9	7.9	7.9	7.8	7.7
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	46	52	54	54	57	52	57	49	51	47	52	55	52	55	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	45	51	48	50	51	52	53	53	48	42	44	51	51	49	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	69	59	72	70	82	74	64	114	67	66	60	85	71	103	88	75
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	1.0	<1.0	<1.0	1.0	<1.0	<1.0	1.3	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	4.4	2.3	1.8	1.7	2.2	2.2	2.4	7.4	2.6	3.7	2.2	2.1	2.4	2.0	2.9	2.3
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.52	0.22	0.13	0.14	0.35	0.22	0.41	0.6	0.36	0.67	0.26	0.44	0.25	0.26	0.41	0.19
Conductivity	µS/cm	-	-	-	-	-	106	98	115	108	114	116	112	118	112	101	100	104	115	113	115	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	54	49	53	53	54	54	54	57	53	48	48	49	58	54	54	55
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	16	18	19	18	20	18	18	16	17	16	18	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.032	0.03	0.032	0.036	0.036	0.036	0.036	0.042	0.034	0.034	0.035	0.035	0.036	0.04	0.042	0.032
Magnesium	mg/L	-	-	-	-	-	2.4	1.8	1.9	1.9	2.1	2.1	1.8	2.7	2.0	2.3	1.9	2.1	2.2	2.1	2.1	2.3
Potassium	mg/L	-	-	-	-	-	0.59	0.48	0.47	0.49	0.47	0.48	0.51	0.53	0.44	0.55	0.5	0.5	0.53	0.53	0.5	0.53
Sodium	mg/L	-	-	-	-	-	1.4	0.87	0.87	0.87	0.98	1.1	1.1	1.6	1.0	1.1	0.82	0.95	1.2	1.0	1.0	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.0	6.0	6.4	7.0	7.7	7.7	7.9	8.1	6.9	5.7	5.6	6.3	8.0	7.5	7.2	6.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.098	0.057	0.043	0.084	0.13	0.13	0.13	0.098	0.11	0.062	0.02	0.027	0.14	0.13	0.13	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.098	0.057	0.043	0.084	0.13	0.13	0.13	0.098	0.11	0.062	0.02	0.027	0.14	0.13	0.13	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	0.0086	<0.0050	<0.0050	0.0051	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.12	0.12	0.13	0.22	0.18	0.19	0.22	0.2	0.16	0.088	0.11	0.2	0.21	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	0.002[Bc]	0.0035[Bc]	0.0024[Bc]	0.0051	<0.002[Bc]	0.0022[Bc]	0.0036[Bc]	0.0036[Bc]	0.0027[Bc]	0.0028[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	0.0034	<0.0020	0.0021	0.0031	0.0025	<0.0020	0.0026
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.034	0.016	0.0099	0.011	0.022	0.034	0.024	0.039	0.028	0.033	0.018	0.014	0.044	0.023	0.048	0.014
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00019	0.00014	0.00011	0.00013	0.00013	0.00015	0.00013	0.00018	0.00017	0.00018	0.00015	0.00013	0.00016	0.00013	0.00017	0.00016
Barium	mg/L	-	1.0	-	-	-	0.0067	0.0055	0.0045	0.0051	0.0057	0.006	0.0058	0.0061	0.0056	0.0062	0.0055	0.0053	0.0059	0.0057	0.0066	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	0.0000064	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000062	<0.0000050	<0.0000050	<0.0000050	0.000006	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	16	18	18	18	18	18	18	18	16	16	16	19	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.00063	<0.00050	0.00057	0.00097	0.0013	0.001	0.0016	0.00092	0.00097	0.0006	0.00063	0.0017	0.0011	0.002	0.00073
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.052	<0.030	<0.030	<0.030	<0.030	0.043	<0.030	0.045	<0.030	0.045	<0.030	<0.030	0.039	<0.030	0.043	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0017	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.4	1.9	1.8	2.0	2.2	2.3	2.3	2.7	2.2	2.2	2.0	2.0	2.3	2.2	2.2	2.3
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0045	0.0018	0.00068	0.00089	0.0015	0.0024	0.0017	0.0039	0.0021	0.0029	0.0014	0.0012	0.0025	0.002	0.0029	0.0012
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00067	0.00038	0.00033	0.00041	0.00075	0.00089	0.00076	0.0008	0.00055	0.00046	0.00035	0.00032	0.001	0.00071	0.00057	0.00057
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.57	0.48	0.44	0.5	0.51	0.53	0.52	0.53	0.49	0.52	0.5	0.49	0.53	0.53	0.5	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00016	0.00012	0.00011	0.00012	0.00023	0.00024	0.0002	0.00015	0.00017	0.00016	0.00012	0.00011	0.00033	0.0002	0.00019	0.00012
Silicon	mg/L	-	-	-	-	-	2.4	1.8	1.5	1.6	1.8	2.0	1.9	2.2	1.9	2.2	1.7	1.3	2.0	1.9	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.4	0.89	0.84	0.92	1.1	1.1	1.1	1.5	1.1	1.1	0.88	0.86	1.2	1.1	1.0	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.11	0.13	0.14	0.15	0.15	0.15	0.15	0.14	0.12	0.11	0.13	0.15	0.14	0.15	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00014	0.00015	0.00017	0.00017	0.00018	0.00016	0.00016	0.00017	0.00013	0.00014	0.00014	0.00016	0.00017	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-09	2022-05-18	2022-05-25	2022-05-31	2022-06-06	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-05-25	2023-05-30
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.016	0.012	0.0079	0.011	0.012	0.012	0.013	0.023	0.01	0.018	0.012	0.0076	0.01	0.011	0.0081	0.016
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00017	0.0001	<0.00010	<0.00010	0.0001	0.00011	0.00012	0.0002	0.00012	0.00017	<0.00010	0.0001	0.00011	<0.00010	0.00011	0.00012
Barium	mg/L	-	-	-	-	-	0.0065	0.0054	0.005	0.0048	0.0052	0.0051	0.0055	0.0065	0.0049	0.0063	0.0051	0.0053	0.0056	0.0054	0.0048	0.0054
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	0.000024	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000074	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.0012	0.00057	<0.00050	<0.00050	0.00087[Bc]	0.00094	0.00092[Bc]	0.0016	0.00072	0.00095	0.00053	0.00053	**0.00087[Bc,Ba]**	0.0008[Bc]	0.00065[Bc]	0.0009[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.003	0.00074	0.00032	0.00028	0.00039	0.00058	0.00054	0.0032	0.0008	0.0014	0.00036	0.00026	0.00076	0.001	0.0007	0.00073
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00071	0.00036	0.00029	0.00039	0.00078	0.00099	0.00075	0.00086	0.00052	0.00045	0.00035	0.00031	0.00096	0.00069	0.00049	0.00059
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00013	0.00014	0.00014	0.000097	0.00014	0.00016	0.00019	0.0002	0.00013	0.00012	0.00011	0.0001	0.00028	0.00023	0.00015	0.00015
Silicon	mg/L	-	-	-	-	-	2.1	1.6	1.3	1.4	1.7	1.8	1.9	2.3	1.9	2.1	1.6	1.3	1.9	1.9	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.11	0.12	0.14	0.15	0.15	0.14	0.14	0.12	0.11	0.11	0.13	0.14	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00022	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00014	0.00013	0.00015	0.00017	0.00017	0.00016	0.00017	0.00014	0.00016	0.00013	0.00014	0.00016	0.00016	0.00016	0.00014	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-06-05	2025-06-10	2025-06-16	2025-06-18	2025-07-15	2025-09-16
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.2	7.7	7.8	8.4	8.0	7.4	7.8	8.1	7.8	7.5	7.7	7.8	7.1	7.1	7.3	6.7
Temperature	°C	**15**[d]	-	-	-	-	8.4	7.1	**17.1**[DW]	**16.6**[DW]	6.9	7.4	**15.3**[DW]	**18.1**[DW]	9.0	8.9	11	7	12	13	**16.3**[DW]	**17.9** [DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	-	12	10	9.1	11	12	11	11	11	11	11	9.1
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	-	98	104	96	90	101	95	93	104	104	108	96
Turbidity	NTU	**1.0**	-	-	-	-	**7.01**[DW]	0	0	0.27	-	0.12	0.46	0.27	0.11	**1.12**[DW]	**9.13**[DW]	0.1	0.4	0.2	0.5	**1.27**[DW]
Conductivity	µS/cm	-	-	-	-	-	1.2	103	106	109	111	110	105	107	110	111	7.3	112.8	113.3	109.4	104.4	109
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	8.0	7.9	7.9	8.0	7.9	7.9	8.0	7.9	8.0	8.0	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	52	49	51	53	53	49	49	52	53	53	54	53	50	49	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	49	46	51	51	50	46	47	49	49	50	51	49	48	47	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	90	66	73	71	88	81	68	66	74	57	71	74	61	68	70
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	2.4	1.7	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.6	2.1	2.2	2.1	2.1	2.1	2.8	1.9	1.7	2.2	2.0	2.1	1.9	2.0	2.2	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.23	0.59	0.26	0.66	0.44	0.47	0.41	0.2	0.24	0.41	0.19	0.23	0.19	0.40	0.39	0.19
Conductivity	µS/cm	-	-	-	-	-	111	113	106	110	115	112	100	108	110	115	107	117	106	106	103	106
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	55	52	50	51	54	-	-	-	-	54	51	53	55	50	48	54
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	17	17	18	18	16	17	17	18	18	18	18	17	16	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.034	0.037	0.035	0.034	0.033	0.029	0.031	0.03	0.034	0.034	0.036	0.037	0.032	0.031	0.031	0.038
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	1.9	2.1	2.1	2.1	2.0	1.9	2.1	2.0	2.1	2.2	2.1	2.0	2.0	2.1
Potassium	mg/L	-	-	-	-	-	0.51	0.54	0.48	0.5	0.5	0.5	0.51	0.5	0.47	0.52	0.52	0.50	0.50	0.50	0.52	0.51
Sodium	mg/L	-	-	-	-	-	0.98	1.1	0.86	0.93	0.97	1.1	0.93	0.87	0.92	0.98	1.0	1.1	0.99	0.89	0.97	0.92
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.8	6.4	5.9	6.5	6.4	6.7	6.0	6.5	6.6	8.3	6.7	7.1	6.5	6.0	6.1	7.1
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.13	0.095	0.0082	0.075	0.11	0.055	0.046	0.089	0.12	0.11	0.13	0.12	0.10	0.056	0.032
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.13	0.095	0.0082	0.075	0.11	0.055	0.046	0.089	0.12	0.11	0.13	0.12	0.10	0.056	0.032
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	0.0064	<0.0050	<0.0050	0.0069	<0.0050	0.013	0.0058	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	0.0052	0.011
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.19	0.15	0.11	0.15	0.18	0.18	0.13	0.15	0.19	0.18	0.19	0.16	0.16	0.14	0.11
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.003[Bc]	0.003[Bc]	0.0028[Bc]	0.004[Bc]	0.003[Bc]	0.0022[Bc]	0.0034[Bc]	0.0021[Bc]	<0.002[Bc]	0.0044[Bc]	0.0026[Bc]	0.0022[Bc]	0.0025[Bc]	0.0023[Bc]	0.0025[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0022	<0.0020	<0.0020	0.0033	<0.0020	0.0024	<0.0020	<0.0020	0.0029	0.0023	0.0021	<0.002	0.0042	<0.002	<0.002	<0.002
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.028	0.018	0.018	0.015	0.015	0.0097	0.018	0.012	0.013	0.019	0.012	0.021	0.012	0.017	0.017	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	0.00012	0.00013	0.00013	0.00012	0.00013	0.00014	0.00011	0.00013	0.00012	0.00012	0.00010	0.00011	0.00013	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0055	0.0055	0.0055	0.0056	0.0052	0.0052	0.0058	0.0053	0.0052	0.005	0.0052	0.0056	0.0055	0.0053	0.0055	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Calcium	mg/L	-	-	-	-	-	19	17	17	17	18	18	16	17	18	18	17	18	18	17	16	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0014	0.00072	0.00078	0.00073	0.00099	0.00067	0.00079	0.00061	0.00076	0.00095	0.0041	0.00097	0.00067	0.00073	0.00071	0.00064
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.036	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00007	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	0.0010	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.1	2.3	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.2	2.0	1.8	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.002	0.0014	0.0014	0.0011	0.00094	0.0012	0.0021	0.00087	0.00097	0.0021	0.0016	0.0013	0.0012	0.0016	0.0018	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00042	0.00038	0.00037	0.00038	0.00043	0.00043	0.00047	0.00035	0.00038	0.00046	0.00043	0.00051	0.00047	0.00040	0.00038	0.00035
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	-	-	-	0.52	0.54	0.51	0.52	0.52	0.48	0.52	0.51	0.5	0.5	0.52	0.50	0.51	0.50	0.50	0.47
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.0001	0.00012	0.00011	0.00014	0.00013	0.00018	0.000096	0.00009	0.00013	0.00013	0.00013	0.00014	0.00014	0.00011	0.00013
Silicon	mg/L	-	-	-	-	-	2.0	1.9	1.7	0.8	1.3	1.5	1.7	1.4	1.6	1.8	1.8	1.8	1.8	1.7	1.6	1.3
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	-	-	-	1.0	0.99	0.91	1.0	1.0	1.0	1.0	0.89	0.93	0.99	1.0	1.0	1.0	0.95	0.89	0.91
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.13	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.13	0.13	0.16	0.12	0.12	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00015	0.00015	0.00017	0.00019	0.00016	0.00015	0.00015	0.00016	0.00018	0.00017	0.00016	0.00018	0.00016	0.00015	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58	QUL-58
Station ID							QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S	QUL-58-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-06-06	2023-06-19	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-06-05	2025-06-10	2025-06-16	2025-06-18	2025-07-15	2025-09-16
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.003	<0.003	<0.003
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0073	0.0072	0.011	0.0059	0.0049	0.0091	0.0094	0.0074	0.0062	0.0073	0.0075	0.0090	0.0068	0.0094	0.0093	0.0085
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	0.0001	0.0001	0.00011	0.00011	<0.00010	<0.00010	<0.00010	0.00011	0.00010	0.00010	0.00010	0.00012	<0.0001
Barium	mg/L	-	-	-	-	-	0.0052	0.005	0.0051	0.0056	0.005	0.005	0.0057	0.0052	0.0051	0.005	0.0053	0.0053	0.0053	0.0053	0.0057	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000029	<0.0000050	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00072[Bc]	0.00087[Bc]	0.0011[Bc]	0.00055	0.00052	0.00073[Bc]	0.00069	<0.00050	0.0005	0.00067[Bc]	**0.0063[Bc,Ba]**	0.00064	0.00055[Bc]	0.00057[Bc]	0.00056[Bc]	0.00071[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.0010	<0.001	<0.001
Manganese	mg/L	-	-	-	-	-	0.0007	0.00029	0.00058	0.0002	0.00022	0.00092	0.0006	0.00027	0.00027	0.0011	0.00083	0.00053	0.00088	0.00097	0.00055	0.00082
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00043	0.00039	0.00033	0.00036	0.00041	0.00046	0.00041	0.00034	0.00032	0.00057	0.00042	0.00051	0.00044	0.00037	0.00038	0.00035
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium	mg/L	-	-	-	-	-	0.00009	0.00012	0.000094	0.00011	0.00012	0.00015	0.00013	0.000088	0.000072	0.00014	0.000089	0.00016	0.000097	0.000090	0.00015	0.00012
Silicon	mg/L	-	-	-	-	-	1.8	2.0	1.6	0.78	1.2	1.5	1.5	1.3	1.4	1.8	1.8	1.8	1.7	1.7	1.5	1.3
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.13	0.13	0.14	0.14	0.12	0.13	0.12	0.16	0.13	0.14	0.13	0.13	0.12	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00015	0.00017	0.00016	0.00016	0.00014	0.00014	0.00018	0.00016	0.00016	0.00016	0.00016	0.00016	0.00014	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.003	<0.003	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT
Depth							AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AT	AT	AT	AT	AT	AT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2020-09-16	2021-07-21	2021-09-16	2021-10-27	2022-08-16	2022-10-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2020-06-24	2020-08-11
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.2	7.8	8.3	7.8	7.7	7.9	7.6	8.4	7.7	7.7	7.9	7.7	8.0	7.9	7.6	8.0
Temperature	°C	**15**[d]	-	-	-	-	11	8.8	**15.4**[DW]	8.8	4.6	11	4.8	**16.6**[DW]	5.9	4.7	5.1	4.4	11	**16.7**[DW]	13	10
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	10	11	9.4	10	11	9.9	-	-	-	12	12	12	11	9.4	11	10
Dissolved oxygen	%	-	-	-	-	-	90	94	94	90	87	89	-	-	-	93	92	90	101	97	102	91
Turbidity	NTU	**1.0**	-	-	-	-	0.05	0	0.07	0.2	0.33	0.13	0.31	0.29	-	**1.35**[DW]	0.47	0.77	0.79	0	0.7	0
Conductivity	µS/cm	-	-	-	-	-	106	125	107	107	111	105	109	109	111	117	114	113	103	102	101	100
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	7.8	8.0	7.8	8.0	7.9	8.0	8.0	8.0	7.8	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	49	53	55	54	53	52	53	53	52	58	54	50	47	47	48
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	48	52	48	47	45	50	50	51	50	50	50	45	46	46	43
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	68	73	68	67	82	59	76	70	68	76	67	74	64	61	69	67
Total suspended solids	mg/L	-	-	-	-	-	<1.1	<1.0	<1.2	<1.0	<1.1	<1.1	<1.0	2.8	<1.1	<1.0	<1.0	1.2	<1.0	<1.0	1.6	<1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	2.1	1.9	1.8	1.6	2.1	2.1	2.3	2.1	2.0	1.9	2.0	2.0	1.8	2.2	2.8	3.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.18	0.15	0.16	0.14	0.14	0.21	0.13	0.55	0.22	0.17	0.26	0.22	0.24	0.28	0.58	0.33
Conductivity	µS/cm	-	-	-	-	-	106	102	112	110	113	109	109	109	115	116	117	113	101	101	97	99
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	56	49	54	51	55	49	54	49	54	53	-	-	-	-	47	47
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	16	18	19	18	18	18	18	18	18	20	18	17	16	16	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.03	0.03	0.031	0.036	0.04	0.035	0.034	0.032	0.034	0.033	0.036	0.033	0.04	0.033	0.038	0.034
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	1.9	2.0	2.2	2.1	2.0	2.1	2.0	2.0	2.3	2.3	2.0	2.0	2.0	1.9
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.49	0.5	0.55	0.5	0.51	0.5	0.5	0.52	0.55	0.48	0.52	0.47	0.47	0.51
Sodium	mg/L	-	-	-	-	-	1.0	0.86	0.9	0.89	1.0	0.95	0.95	0.98	1.0	1.0	1.2	1.1	1.0	0.91	0.95	0.92
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	5.9	6.1	6.4	7.0	7.2	6.2	6.7	6.2	6.6	7.6	7.4	6.7	6.1	5.8	5.8	5.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.066	0.11	0.043	0.086	0.15	0.027	0.14	0.0072	0.13	0.14	0.13	0.12	0.086	0.048	0.083	0.067
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.066	0.11	0.043	0.086	0.15	0.027	0.14	0.0072	0.13	0.14	0.13	0.12	0.086	0.048	0.084	0.068
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	0.02	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0061
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.14	0.28	0.12	0.13	0.18	0.15	0.19	0.11	0.17	0.2	0.18	0.2	0.19	0.13	0.17	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0028[Bc]	0.0038[Bc]	0.0033[Bc]	<0.002[Bc]	<0.002[Bc]	0.0024[Bc]	0.0027[Bc]	0.003[Bc]	<0.002[Bc]	0.0031[Bc]	0.0078	0.0024[Bc]	0.0085	0.003[Bc]	0.0033[Bc]	0.0047[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0034	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0038	<0.0020	<0.0020	<0.0020	<0.0020	0.0042
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.015	0.014	0.011	0.013	0.013	0.012	0.016	0.018	0.01	0.0094	0.017	0.02	0.016	0.013	0.028	0.027
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00016	<0.00010	0.00011	0.00012	0.00011	0.00013	0.0001	0.00013	0.00013	0.00011	0.00016	0.00013	0.00011	0.00011	0.00012	0.00014
Barium	mg/L	-	1.0	-	-	-	0.005	0.0051	0.0047	0.005	0.0055	0.0049	0.0054	0.0059	0.0052	0.0049	0.0052	0.0055	0.0053	0.0056	0.0056	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	17	19	17	19	17	18	16	18	18	17	18	16	16	16	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00066	<0.00050	0.00055	0.00056	0.00074	<0.00050	0.00078	0.00078	0.00057	0.00061	0.00096	0.0009	0.00058	0.00064	0.00075	0.00088
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.043	0.042
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.0	2.0	2.1	1.9	2.2	2.1	2.2	2.1	2.1	2.0	1.9	1.9	1.9	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0015	0.0011	0.00082	0.00096	0.00096	0.0011	0.0013	0.0014	0.00097	0.001	0.0011	0.0013	0.0017	0.0012	0.0023	0.003
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00033	0.00031	0.00042	0.00059	0.00039	0.00046	0.00036	0.00053	0.00064	0.00064	0.00067	0.00035	0.00037	0.0004	0.00037
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	<0.00050
Potassium	mg/L	-	-	-	-	-	0.44	0.48	0.48	0.49	0.5	0.48	0.52	0.53	0.52	0.49	0.5	0.47	0.48	0.49	0.51	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00011	0.00011	0.00013	0.00013	0.000078	0.00013	0.00012	0.00017	0.00015	0.00018	0.00017	0.00012	0.000075	0.00015	0.000095
Silicon	mg/L	-	-	-	-	-	1.7	1.8	1.4	1.7	2.0	1.3	2.0	0.79	1.7	1.7	1.8	1.7	1.6	1.7	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.89	0.89	0.9	0.91	1.0	0.93	1.0	1.0	1.0	1.0	1.1	1.0	0.91	0.92	0.92	0.94
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.13	0.13	0.14	0.14	0.13	0.15	0.14	0.15	0.14	0.14	0.13	0.11	0.12	0.11	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00015	0.00015	0.00017	0.00017	0.00017	0.00016	0.00017	0.00019	0.00018	0.00016	0.00016	0.00015	0.00014	0.00013	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AP	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT
Depth							AP	AP	AP	AP	AP	AP	AP	AP	AP	AP	AT	AT	AT	AT	AT	AT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2020-09-16	2021-07-21	2021-09-16	2021-10-27	2022-08-16	2022-10-19	2023-06-27	2023-09-14	2023-10-31	2025-05-27	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2020-06-24	2020-08-11
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.011
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.011	0.0087	0.0084	0.0065	0.0079	0.0068	0.0063	0.0056	0.0054	0.0064	0.007	0.007	0.011	0.0088	0.012	0.012
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	0.0001	<0.00010	<0.00010	0.00012	0.0001	0.0001	<0.00010	<0.00010	0.0001	0.0001	0.0001	<0.00010	0.0001	0.00012
Barium	mg/L	-	-	-	-	-	0.0057	0.0051	0.0053	0.005	0.0051	0.0052	0.0052	0.0056	0.0048	0.0049	0.0058	0.0054	0.0055	0.0052	0.0054	0.0056
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000065	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00064	<0.00050	<0.00050	<0.00050	0.00077[Bc]	<0.00050	0.00057	0.00053	<0.00050	0.00061[Bc]	0.00082[Bc]	0.0006	0.0005	<0.00050	0.00054	0.00059
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00048	0.00011	0.0003	0.00025	0.00016	0.00026	0.00015	0.00028	0.00033	0.00023	0.00038	0.00016	0.00075	<0.00010	0.00014	0.00012
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00038	0.00031	0.0003	0.00039	0.00056	0.00035	0.00042	0.00035	0.00048	0.00074	0.00065	0.0007	0.00034	0.00036	0.00044	0.00033
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00013	0.000069	0.000099	0.000094	0.00014	0.000079	0.00016	0.00011	0.00011	0.00015	0.00019	0.00015	0.00011	0.00012	0.00011	0.00008
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.4	1.4	1.9	1.3	1.8	0.76	1.5	1.8	1.7	1.7	1.7	1.6	2.0	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.12	0.13	0.14	0.14	0.13	0.14	0.13	0.13	0.14	0.15	0.14	0.12	0.12	0.13	0.11
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00015	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00017	0.00019	0.00017	0.00014	0.00013	0.00014	0.00013
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID	Unit	BC ENV Drinking WQG					QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	AT	AT	AT	AT	AT	B	B	B	B	B	B	B	B	B	B
Date Sampled							2022-06-27	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2016-05-17	2018-06-04	2019-04-25	2019-05-02	2019-05-08	2019-05-15
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.1	8.1	7.9	7.6	8.1	7.9	7.8	7.7	7.9	8.0	7.7	7.5	7.8	7.8	7.9	7.6
Temperature	°C	**15**[d]	-	-	-	-	8.4	11	7.2	10	**17.7** [DW]	5.0	4.8	4.5	3.0	3.2	4.7	4.3	3.5	3.8	4.3	4.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	9.9	11	13	9.0	11	11	11	12	12	11	12	12	12	12	12
Dissolved oxygen	%	-	-	-	-	-	94	90	88	111	94	83	84	82	86	88	87	91	87	89	88	88
Turbidity	NTU	**1.0**	-	-	-	-	0.42	0.06	-	0.4	**1.48**[DW]	0.9	0.54	0.82	0.37	0.52	0.53	0	0.94	0.91	0.64	0.81
Conductivity	µS/cm	-	-	-	-	-	107	107	113	107.3	111	151	145	153	112	110	108	115	113	118	115	114
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.8	8.0	8.0	7.8	7.9	7.9	7.9	7.9	8.0	7.9	8.0	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	50	53	49	52	53	57	55	57	53	56	54	58	56	61	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	48	51	47	50	50	50	48	48	49	50	49	49	52	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	77	61	64	69	63	67	65	85	76	73	72	64	77	86	64
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.9	2.1	1.6	2.0	1.9	1.5	1.3	1.6	1.7	1.6	1.6	2.0	2.0	6.1	2.0	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.6	0.19	0.16	0.42	0.20	0.48	0.57	0.59	0.46	0.56	**1.07**[DW]	0.33	0.38	0.42	0.29	0.2
Conductivity	µS/cm	-	-	-	-	-	106	109	112	104	108	112	113	114	116	114	121	109	121	114	118	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	50	-	-	50	55	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	18	16	18	18	19	19	19	18	19	18	20	19	21	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.031	0.03	0.038	0.031	0.038	0.033	0.035	0.037	0.034	0.036	0.035	0.036	0.034	0.034	0.037	0.035
Magnesium	mg/L	-	-	-	-	-	2.2	1.9	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.2	2.2	2.0	2.3	2.4	2.3
Potassium	mg/L	-	-	-	-	-	0.53	0.48	0.49	0.55	0.49	0.5	0.48	0.49	0.49	0.51	0.57	0.55	0.48	0.53	0.58	0.49
Sodium	mg/L	-	-	-	-	-	1.0	0.87	0.94	1.0	0.92	0.99	0.93	1.0	1.1	1.0	1.2	1.1	1.2	1.2	1.3	1.2
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	5.8	6.5	6.8	6.2	7.2	6.7	6.6	7.3	8.0	7.3	9.6	7.3	7.7	8.3	7.9	7.4
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.091	0.078	0.12	0.059	0.033	0.11	0.12	0.12	0.14	0.13	0.17	0.14	0.14	0.14	0.14	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.091	0.078	0.12	0.059	0.033	0.11	0.12	0.12	0.14	0.13	0.17	0.14	0.14	0.14	0.14	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	0.0079	<0.0050	<0.005	0.011	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.038	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.15	0.15	0.18	0.13	0.19	0.16	0.17	0.17	0.19	0.17	0.22	0.19	0.19	0.2	0.19	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0048[Bc]	0.0022[Bc]	0.01	0.0023[Bc]	<0.002[Bc]	<0.002[Bc]	0.0031[Bc]	0.0021[Bc]	0.0035[Bc]	0.003[Bc]	0.0091	0.0031[Bc]	0.0049[Bc]	0.0032[Bc]	0.0072	0.0043[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0022	<0.0020	<0.0020	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	0.0033	<0.0020	0.0037	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.029	0.0096	0.01	0.017	0.010	0.042	0.038	0.042	0.028	0.041	0.13	0.02	0.025	0.029	0.022	0.019
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00015	0.00014	0.00013	0.00012	0.00012	0.0001	0.00011	0.00015	0.00011	0.00012	0.00021	0.00011	0.00011	0.00014	0.00017	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0059	0.0053	0.0054	0.0054	0.0055	0.0058	0.0061	0.0061	0.0055	0.0062	0.0079	0.0054	0.0056	0.0053	0.0051	0.0058
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	16	17	18	17	19	18	19	19	19	18	19	16	19	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00074	0.00055	0.00083	0.00077	0.00056	0.0015	0.0014	0.0018	0.0012	0.0018	0.0043	0.0008	0.0012	0.0011	0.00084	0.00093
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.041	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	0.081	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000098	<0.000050	0.000054	0.00061	0.000062	0.00016	0.00023	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0013	<0.0010	0.001	<0.0010	0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.1	1.9	2.1	2.0	2.1	2.1	2.1	2.2	2.4	2.2	2.1	2.2	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0023	0.00077	0.00088	0.0019	0.0020	0.0015	0.0014	0.0019	0.0015	0.002	0.0038	0.0016	0.002	0.0023	0.0015	0.0014
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00041	0.00034	0.00039	0.00038	0.00035	0.00044	0.00043	0.00059	0.00079	0.00063	0.0014	0.0005	0.00087	0.00085	0.0008	0.00072
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.51	0.52	0.49	0.48	0.51	0.52	0.53	0.51	0.53	0.66	0.5	0.55	0.5	0.5	0.47
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.000088	0.00011	0.00012	0.00015	0.000099	0.0001	0.00014	0.00019	0.00011	0.00029	0.00012	0.00013	0.00019	0.00018	0.00015
Silicon	mg/L	-	-	-	-	-	2.1	1.5	1.7	1.6	1.4	1.7	1.8	1.7	1.7	1.8	2.0	1.7	1.8	1.9	1.7	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.99	0.89	0.96	0.90	0.95	1.0	0.98	1.1	1.1	1.1	1.3	1.1	1.2	1.2	1.2	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.12	0.14	0.14	0.12	0.13	0.14	0.13	0.14	0.14	0.14	0.15	0.13	0.15	0.14	0.15	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00015	0.00016	0.00015	0.00016	0.00018	0.00016	0.00017	0.00017	0.00018	0.00018	0.00017	0.00017	0.00015	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-AT	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B
Depth							AT	AT	AT	AT	AT	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2022-06-27	2024-09-05	2024-10-30	2025-07-15	2025-09-16	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2016-05-17	2018-06-04	2019-04-25	2019-05-02	2019-05-08	2019-05-15
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00085	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.014	0.0067	0.0053	0.011	0.0083	0.0063	0.0047	0.005	0.006	0.0055	0.0073	0.0074	0.0082	0.0087	0.0076	0.0067
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00013	<0.00010	<0.00010	0.00014	0.00010	0.00012	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	<0.00010	0.00012
Barium	mg/L	-	-	-	-	-	0.006	0.005	0.0051	0.0059	0.0052	0.0052	0.0053	0.0054	0.005	0.0053	0.0055	0.0057	0.0053	0.0052	0.0059	0.0054
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00060
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00074	<0.00050	<0.00050	0.00062[Bc]	0.00053	0.00082[Bc]	0.00077[Bc]	0.00088[Bc]	0.00077[Bc]	0.001[Bc]	0.00092[Bc]	0.00073[Bc]	0.00067	0.00075	0.0006	0.00063[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000087	<0.000050	<0.000050	0.0002	0.000087	0.000096	0.00016	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00044	0.00022	0.00012	0.00060	0.0013	0.00017	0.0002	0.00045	0.00052	0.00074	0.00088	0.00027	0.00068	0.00067	0.00035	0.00022
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00043	0.00033	0.00034	0.00041	0.00034	0.00038	0.0004	0.00052	0.00072	0.00054	0.0012	0.00051	0.00089	0.00084	0.0008	0.00075
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00021	0.0001	0.0001	0.00012	0.000080	0.0001	0.00009	0.000091	0.00017	0.00013	0.00029	0.00014	0.00019	0.0002	0.00018	0.00018
Silicon	mg/L	-	-	-	-	-	2.1	1.3	1.5	1.5	1.3	1.6	1.7	1.6	1.7	1.7	1.7	1.7	1.5	1.7	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.12	0.13	0.13	0.12	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00014	0.00015	0.00018	0.00015	0.00015	0.00016	0.00015	0.00016	0.00016	0.00016	0.00017	0.00017	0.00017	0.00016	0.00018	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2020-09-16	2020-11-10	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.4	7.5	7.7	7.8	7.3	8.1	7.7	7.5	8.4	7.7	7.7	7.8	7.7	7.6	**6.4**[Ba,Bc]
Temperature	°C	**15**[d]	-	-	-	-	4.2	4.5	4.7	4.6	4.7	5.7	4.7	4.9	4.8	4.9	6.1	4.0	4.7	4.6	4.9	3.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	11	12	12	11	11	12	12	12	11	11	12	12	11	11	-
Dissolved oxygen	%	-	-	-	-	-	93	86	95	90	88	89	93	95	90	87	87	91	91	87	87	-
Turbidity	NTU	**1.0**	-	-	-	-	0.96	0	0.49	0	0.15	**1.47**[DW]	0.11	0.94	0	0.05	0.16	0	0.41	0.38	0.06	-
Conductivity	µS/cm	-	-	-	-	-	112	112	112	115	112	111	114	114	133	114	125	113	111	114	111	116
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	8.0	7.8	7.8	7.9	-	7.7	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	57	52	53	54	54	-	56	52	54	55	56	54	55	53	56	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	50	51	48	49	-	49	48	50	45	48	47	53	47	46	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	69	77	75	79	-	76	70	74	73	72	62	70	77	78	81
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	1.0	<1.1	<1.1	-	<1.0	<1.0	<1.0	<1.2	<1.0	<1.1	<1.0	<1.1	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.8	2.4	2.3	1.9	-	2.5	2.2	2.0	2.0	1.6	2.2	2.4	2.1	2.0	2.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.13	0.12	0.28	0.15	<0.10	-	0.21	0.18	<0.10	<0.10	<0.10	0.15	0.22	0.2	<0.10	0.22
Conductivity	µS/cm	-	-	-	-	-	116	111	108	112	111	-	110	112	111	111	126	116	112	113	113	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	53	53	57	-	54	53	55	55	57	56	53	54	51	54
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	17	18	18	18	-	19	17	18	19	19	18	18	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.041	0.035	0.037	0.036	0.033	-	0.03	0.031	0.032	0.036	0.042	0.04	0.036	0.041	0.038	0.036
Magnesium	mg/L	-	-	-	-	-	2.2	2.3	2.1	2.1	2.1	-	2.2	2.1	2.0	2.0	2.2	2.1	2.2	2.2	2.2	2.2
Potassium	mg/L	-	-	-	-	-	0.52	0.49	0.47	0.53	0.51	-	0.54	0.52	0.48	0.51	0.5	0.47	0.52	0.54	0.53	0.5
Sodium	mg/L	-	-	-	-	-	1.2	1.1	1.0	1.1	1.1	-	1.1	1.1	0.98	1.0	1.1	0.98	1.0	1.0	1.1	1.1
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.4	6.9	7.0	7.3	6.6	-	7.6	7.4	7.2	7.7	11	7.6	6.4	7.2	7.3	7.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.13	0.14	0.14	-	0.13	0.13	0.14	0.15	0.15	0.13	0.13	0.15	0.15	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.13	0.14	0.14	-	0.13	0.13	0.14	0.15	0.15	0.13	0.13	0.15	0.15	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0075	<0.0050	0.0057	<0.0050	0.008	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.22	0.21	0.19	0.22	0.2	-	0.18	0.19	0.18	0.2	0.18	0.21	0.17	0.18	0.22	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0053	<0.002[Bc]	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	-	<0.002[Bc]	0.0021[Bc]	<0.002[Bc]	0.0024[Bc]	<0.002[Bc]	<0.002[Bc]	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	0.0031	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.013	0.0096	0.016	0.018	0.014	-	0.019	0.021	0.013	0.011	0.017	0.019	0.015	0.012	0.012	0.028
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.0001	0.0001	<0.00010	0.00013	-	0.00014	0.00012	<0.00010	0.00011	0.00014	<0.00010	0.00011	0.00013	<0.00010	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0056	0.0052	0.0054	0.0051	-	0.0056	0.0054	0.0054	0.0055	0.0054	0.0056	0.0055	0.0053	0.005	0.0058
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	0.0000071	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	17	18	18	19	-	18	18	18	18	19	19	18	18	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00075	0.00069	0.00075	0.00081	0.00094	-	0.001	0.00083	0.00062	0.00063	0.00088	0.00081	0.00055	0.00068	0.00057	0.00093
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	0.001	0.001	0.001	<0.0010	<0.0010	<0.0010	0.001
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.0	2.1	-	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.3
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.00095	0.00083	0.0012	0.0011	0.00086	-	0.0017	0.0014	0.0011	0.00085	0.0011	0.0014	0.0013	0.001	0.0014	0.0017
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00059	0.0005	0.00047	0.00051	0.00051	-	0.00065	0.0006	0.00053	0.00062	0.0016	0.00077	0.00043	0.00061	0.00064	0.00092
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.51	0.5	0.51	0.45	-	0.51	0.51	0.51	0.53	0.54	0.52	0.5	0.51	0.48	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00014	0.00014	0.00013	0.00013	0.00014	-	0.00016	0.00019	0.0002	0.00017	0.00038	0.00019	0.00014	0.00018	0.00019	0.00031
Silicon	mg/L	-	-	-	-	-	1.7	1.8	1.8	2.0	1.9	-	2.0	1.9	2.1	1.9	1.7	1.9	2.0	2.0	1.8	2.0
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	0.99	1.0	0.98	-	1.1	1.1	1.1	1.0	1.2	1.1	0.99	1.0	0.97	1.2
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	0.15	-	0.14	0.14	0.14	0.14	0.16	0.15	0.14	0.14	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00015	0.00016	0.00015	-	0.00017	0.00017	0.00016	0.00017	0.00018	0.00018	0.00016	0.00017	0.00017	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B
Depth							B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-06-18	2019-08-20	2020-06-24	2020-08-11	2020-09-16	2020-11-10	2021-05-19	2021-06-02	2021-07-21	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0068	0.0053	0.0064	0.0066	0.0071	-	0.011	0.0084	0.0064	0.007	0.01	0.008	0.012	0.0093	0.0069	0.0092
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.00012	<0.00010	<0.00010	0.0001	-	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0001	0.0001
Barium	mg/L	-	-	-	-	-	0.0055	0.0054	0.005	0.0054	0.0052	-	0.0054	0.0053	0.0049	0.0052	0.0051	0.005	0.0056	0.0053	0.0053	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00057	0.00066[Bc]	0.00052	0.00056	0.00064	-	0.0008	0.00078[Bc]	0.00057	0.00053	0.0007[Bc]	0.00062	0.0009	0.00063	0.00059	0.00069[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00011	0.00017	<0.00010	0.00012	0.00012	-	0.00043	0.0002	0.00012	0.00011	0.00042	0.00021	0.00035	0.00022	0.00015	0.00041
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00061	0.00051	0.00047	0.00052	0.00046	-	0.00065	0.00065	0.00054	0.00056	0.0016	0.00077	0.00044	0.00059	0.00062	0.00092
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00017	0.00015	0.00013	0.00016	0.00017	-	0.00016	0.00018	0.00019	0.00013	0.00032	0.00016	0.00011	0.00017	0.00018	0.00023
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.9	1.9	-	1.8	1.8	1.8	1.8	1.6	1.7	2.0	1.9	1.9	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.15	0.14	0.14	-	0.14	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00015	0.00016	0.00015	0.00016	-	0.00015	0.00015	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT
Depth							B	B	B	B	B	B	B	B	B	B	B	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2020-06-24
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.5	7.6	7.7	7.5	7.5	7.7	7.7	7.7	7.7	7.7	7.7	7.9	7.7	7.7	7.4	7.5
Temperature	°C	**15**[d]	-	-	-	-	4.2	4.6	4.6	5.2	4.9	4.6	5.1	6.6	4.7	5	5.0	4.4	4.1	4.4	4.6	5.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	12	12	11	11	12	12	11	12	12	12	11	12
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	93	93	89	86	93	91	88	89	89	93	86	95
Turbidity	NTU	**1.0**	-	-	-	-	0.05	0.34	0.08	-	0.34	0.27	0.07	-	**1.33**[(DW)]	0.3	**1.6**[(DW)]	0.57	0.75	0.93	0	0.48
Conductivity	µS/cm	-	-	-	-	-	121	110	112	112	112	115	111	112	117	117.1	113	115	113	110	112	111
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.8	7.9	7.9	7.8	7.8	8.0	7.9	7.9	7.9	8.0	8.0	8.0	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	53	53	54	54	53	54	54	54	55	56	54	57	52	57
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	50	51	51	50	49	49	51	51	51	51	51	51	49	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	81	87	77	68	71	73	71	64	79	71	83	79	73	70	74	68
Total suspended solids	mg/L	-	-	-	-	-	1.3	<1.0	1.3	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	2.3	2.3	2.1	1.9	1.8	1.9	1.6	1.9	1.8	1.7	2.0	2.1	10	1.7	2.4
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.18	0.19	0.22	0.19	0.14	0.13	0.14	0.17	0.14	<0.1	<0.1	0.23	0.18	0.1	0.13	0.32
Conductivity	µS/cm	-	-	-	-	-	118	106	112	115	114	110	114	112	116	115	113	117	113	112	111	107
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	58	56	51	54	-	-	-	-	52	55	56	-	-	-	-	51
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	18	18	18	18	18	18	18	19	18	19	17	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.037	0.034	0.033	0.032	0.028	0.031	0.031	0.038	0.033	0.033	0.039	0.038	0.035	0.042	0.034	0.037
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.2	2.1	2.0	2.1	2.0	2.1	1.9	2.2	2.4	2.2	2.2	2.2	2.2	2.2
Potassium	mg/L	-	-	-	-	-	0.55	0.52	0.51	0.5	0.48	0.49	0.5	0.47	0.52	0.53	0.51	0.53	0.47	0.53	0.48	0.47
Sodium	mg/L	-	-	-	-	-	1.2	0.96	1.1	0.99	1.1	0.95	0.94	0.94	1.0	1.1	0.99	1.1	1.2	1.1	1.1	1.0
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	9.5	6.8	7.0	6.7	6.8	6.8	6.9	7.1	7.6	7.1	7.5	7.4	7.2	7.2	6.7	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.16	0.14	0.15	0.15	0.13	0.13	0.14	0.13	0.14	0.14	0.15	0.13	0.13	0.14	0.14	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.16	0.14	0.15	0.15	0.13	0.13	0.14	0.13	0.14	0.14	0.15	0.13	0.13	0.14	0.14	0.13
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	0.031	<0.0050	<0.0050	0.0052	<0.0050	0.0084
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.22	0.19	0.2	0.18	0.18	0.2	0.19	0.18	0.2	0.19	0.18	0.19	0.21	0.22	0.21	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0026[Bc]	0.0027[Bc]	0.0028[Bc]	0.0023[Bc]	<0.002[Bc]	<0.002[Bc]	0.0026[Bc]	<0.002[Bc]	0.0028[Bc]	0.003[Bc]	0.0049[Bc]	0.0038[Bc]	0.0031[Bc]	0.0066	<0.002[Bc]	0.0028[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	<0.002	0.0033	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.016	0.051	0.0096	0.012	0.0084	0.0076	0.01	0.01	0.01	0.0076	0.0080	0.014	0.017	0.01	0.0093	0.02
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00015	0.00012	0.00013	0.00011	0.00012	0.00012	0.00012	0.00011	0.00010	<0.0001	0.00015	0.00012	<0.00010	0.0001	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0065	0.0055	0.0054	0.005	0.005	0.0053	0.0052	0.005	0.0052	0.0051	0.0051	0.0056	0.005	0.0054	0.0052
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	19	17	18	18	18	17	18	18	19	19	17	18	18	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00087	0.0035	0.00059	0.00067	0.00059	0.00057	0.00067	0.00062	0.00066	0.00068	0.00058	0.00081	0.00097	0.00064	0.00065	0.00073
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	0.052	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.001	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.3	2.3	2.1	2.3	2.0	2.1	2.2	2.0	2.1	2.1	2.2	2.0	2.0	2.0	2.1	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0014	0.0024	0.0007	0.0008	0.00089	0.00094	0.00084	0.00083	0.00095	0.00082	0.00079	0.0011	0.0013	0.00087	0.00076	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0013	0.00051	0.00065	0.00058	0.00047	0.00046	0.00044	0.0005	0.00072	0.00054	0.00050	0.00066	0.00066	0.00048	0.00049	0.00043
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.55	0.54	0.54	0.47	0.49	0.52	0.51	0.48	0.50	0.48	0.49	0.49	0.48	0.5	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00036	0.00014	0.0002	0.00017	0.00012	0.000097	0.00013	0.00016	0.00016	0.00013	0.00012	0.00016	0.00016	0.000088	0.00017	0.0001
Silicon	mg/L	-	-	-	-	-	2.0	2.1	1.9	1.9	1.5	1.6	1.6	1.7	1.7	1.9	1.8	1.7	1.7	1.7	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.2	1.0	1.1	1.1	0.96	1.0	0.94	0.95	1.0	0.97	1.0	1.1	1.1	0.99	1.0	0.98
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.15	0.15	0.15	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00018	0.00018	0.00019	0.00016	0.00017	0.00016	0.00017	0.00018	0.00017	0.00018	0.00016	0.00016	0.00018	0.00016	0.00015

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-B	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT
Depth							B	B	B	B	B	B	B	B	B	B	B	BT	BT	BT	BT	BT
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27	2025-07-15	2025-09-16	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2020-06-24
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	0.008	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.015	0.022	0.0076	0.0073	0.0037	0.0071	0.0065	0.0046	0.0063	0.0069	0.0058	0.0066	0.0072	0.0056	0.0055	0.0067
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.00012	<0.00010	<0.00010	0.00011	0.0001	<0.00010	<0.00010	<0.00010	0.00012	<0.0001	<0.00010	0.00011	<0.00010	0.00011	<0.00010
Barium	mg/L	-	-	-	-	-	0.0057	0.0063	0.0057	0.005	0.0049	0.0054	0.005	0.005	0.0049	0.0054	0.0050	0.0055	0.0054	0.0054	0.005	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00060	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00097(Bc)	0.0014(Bc)	0.00062	0.00064(Bc)	0.00056(Bc)	0.00066(Bc)	0.00058	<0.00050	0.00064	0.00084(Bc)	0.00059	0.00056	0.00061	<0.00050	<0.0005	0.00058
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00066	0.00085	0.00017	0.00023	0.00014	0.00024	0.00027	0.0002	0.00024	0.00026	0.00027	0.00021	0.00018	<0.00010	<0.00010	<0.00010
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0013	0.00045	0.00062	0.00052	0.00047	0.00044	0.0004	0.00048	0.00077	0.00053	0.00049	0.00065	0.00072	0.00044	0.00051	0.00046
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00029	0.00014	0.0002	0.00014	0.00012	0.0001	0.0001	0.0001	0.00016	0.00015	0.00015	0.00014	0.00017	0.000086	0.00015	0.000097
Silicon	mg/L	-	-	-	-	-	1.9	1.8	1.8	1.6	1.5	1.5	1.5	1.5	1.8	1.7	1.8	1.7	1.7	1.8	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.14	0.15	0.14	0.13	0.14	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00016	0.00018	0.00016	0.00016	0.00017	0.00016	0.00018	0.00017	0.00016	0.00017	0.00017	0.00017	0.00016	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID
Depth							BT	BT	BT	BT	BT	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2020-08-11	2022-06-27	2024-09-05	2025-07-15	2025-09-16	2015-12-02	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2016-05-17	2018-06-04	2019-04-25	2019-05-02	2020-11-10
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.8	7.6	7.7	7.8	7.8	7.8	7.7	7.9	8.0	7.7	7.5	7.8	7.8	7.4
Temperature	°C	**15**[d]	-	-	-	-	4.8	5.3	5.6	5	5.3	5.2	5.0	4.8	4.5	3.0	3.1	4.9	5.2	3.5	3.8	5.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	11	12	11	11	11	11	11	12	12	11	12	12	12	11
Dissolved oxygen	%	-	-	-	-	-	89	91	89	92	89	84	84	85	84	88	93	88	91	88	88	89
Turbidity	NTU	**1.0**	-	-	-	-	0	0.45	0.1	0.2	**1.61**[(DW)]	0.74	0.82	0.62	0.76	0.41	0.46	0.4	0	0.83	0.75	**1.47**[(DW)]
Conductivity	µS/cm	-	-	-	-	-	110	110	110	117.2	113	147	150	144	152	109	113	101	111	112	115	111
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.8	7.9	7.9	7.6	7.8	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.8	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	52	53	53	55	53	53	57	55	55	54	53	53	58	53	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	51	49	51	51	48	49	51	49	49	50	50	47	48	52	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	75	68	72	70	70	70	58	73	62	68	69	56	72	72	79	-
Total suspended solids	mg/L	-	-	-	-	-	<1.1	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	4.0	<1.0	<1.0	<1.0	-
Dissolved organic carbon	mg/L	-	-	-	-	-	2.4	2.4	1.9	1.7	1.8	1.6	1.5	1.4	1.5	1.7	1.6	2.0	2.1	1.8	2.0	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.19	0.38	0.15	0.13	0.11	**1.07**[(DW)]	0.52	0.54	0.46	0.4	0.53	**2.15**[(DW)]	0.38	0.37	0.29	-
Conductivity	µS/cm	-	-	-	-	-	111	111	114	116	112	111	113	113	113	113	114	114	106	120	112	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	50	53	-	56	57	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	18	18	18	18	18	19	19	19	18	18	18	20	18	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.036	0.033	0.031	0.032	0.038	0.033	0.033	0.035	0.037	0.033	0.036	0.035	0.036	0.046	0.033	-
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.0	2.2	2.3	2.0	2.0	2.1	2.0	2.0	2.1	2.1	2.2	2.1	2.2	-
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.5	0.53	0.51	0.48	0.5	0.48	0.49	0.48	0.54	0.52	0.55	0.51	0.52	-
Sodium	mg/L	-	-	-	-	-	1.0	0.99	0.93	1.1	0.98	0.94	0.99	0.93	0.96	0.97	1.1	0.96	1.1	1.2	1.2	-
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.9	6.3	6.8	7.0	7.3	6.6	6.7	6.6	6.8	6.8	7.3	6.8	6.8	7.5	7.7	-
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.13	0.14	0.14	0.15	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.14	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.13	0.14	0.14	0.15	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.14	-
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	0.0075	0.0051	<0.0050	<0.005	0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.21	0.17	0.19	0.18	0.17	0.14	0.21	0.17	0.16	0.17	0.17	0.2	0.22	0.2	0.2	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0032[Bc]	0.0029[Bc]	0.0024[Bc]	0.0025[Bc]	0.0033[Bc]	0.0025[Bc]	0.0034[Bc]	<0.002[Bc]	0.0034[Bc]	0.0044[Bc]	**0.012**[(DW)]	0.0063	0.004[Bc]	0.005	-
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.002	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0027	<0.0020	<0.0020	-
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.018	0.018	0.008	0.0074	0.0085	0.047	0.045	0.041	0.038	0.026	0.061	**0.24**[Bc]	0.02	0.022	0.028	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00012	0.00013	0.00010	<0.0001	0.00015	0.00013	0.00012	0.00014	0.00012	<0.00010	0.00027	0.00012	0.00016	0.00015	-
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0056	0.0053	0.0050	0.0051	0.0059	0.0057	0.0061	0.0058	0.0054	0.0059	0.01	0.0056	0.0055	0.0054	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	0.0000064	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000053	-
Calcium	mg/L	-	-	-	-	-	17	18	17	19	19	18	18	19	18	18	18	19	16	19	19	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00078	0.0006	0.00058	0.00063	0.00057	0.0019	0.0016	0.0016	0.0014	0.0012	0.0016	0.007	0.00078	0.0013	0.00098	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	0.035	<0.030	<0.030	<0.030	<0.030	<0.030	0.17	<0.030	<0.030	<0.030	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.0004	0.00014	<0.000050	0.000051	0.0014	0.000064	0.00021	0.00025	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	-
Magnesium	mg/L	-	-	-	-	-	2.0	2.2	2.2	2.0	2.2	2.0	2.0	2.1	2.0	2.0	2.1	2.3	2.1	2.0	2.1	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0012	0.0015	0.0008	0.00077	0.00085	0.0019	0.0014	0.0015	0.0013	0.0011	0.002	0.0052	0.0017	0.0014	0.0015	-
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00042	0.00044	0.0004	0.00053	0.00045	0.00042	0.00044	0.00045	0.00045	0.00048	0.00061	0.00049	0.0004	0.00084	0.00075	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Potassium	mg/L	-	-	-	-	-	0.49	0.5	0.52	0.48	0.49	0.5	0.5	0.52	0.5	0.49	0.53	0.65	0.5	0.53	0.49	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00015	0.00011	0.00016	0.00014	0.00008	0.0001	0.00011	0.00011	0.00012	0.00013	0.00013	0.00012	0.00018	0.00021	-
Silicon	mg/L	-	-	-	-	-	1.9	2.0	1.6	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.8	2.3	1.8	1.7	1.8	-
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium	mg/L	-	-	-	-	-	0.99	0.99	0.93	0.94	1.0	0.95	1.0	0.99	1.0	0.99	1.1	1.1	1.0	1.1	1.1	-
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.15	0.13	-
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	<0.010	<0.010	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00016	0.00017	0.00017	0.00017	0.00017	0.00016	0.00016	0.00016	0.00017	0.00018	0.00017	0.00018	0.00015	-

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-BT	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID
Depth							BT	BT	BT	BT	BT	MID	MID	MID	MID	MID	MID	MID	MID	MID	MID
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2020-08-11	2022-06-27	2024-09-05	2025-07-15	2025-09-16	2015-12-02	2015-12-09	2015-12-14	2015-12-21	2016-01-25	2016-03-28	2016-05-17	2018-06-04	2019-04-25	2019-05-02	2020-11-10
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0012	<0.00050	<0.00050	<0.00050	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0059	0.0086	0.0044	0.0064	0.0048	0.0056	0.0067	0.0051	0.0056	0.0048	0.0061	0.0076	0.012	0.0075	0.0072	-
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	<0.00010	0.00011	<0.0001	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	-
Barium	mg/L	-	-	-	-	-	0.0054	0.0055	0.0049	0.0054	0.0050	0.0052	0.0051	0.0054	0.0052	0.0049	0.0054	0.0053	0.0059	0.0054	0.005	-
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00054	0.00056	<0.00050	0.0006[Bc]	0.00053	0.00087[Bc]	0.00085[Bc]	0.00076[Bc]	0.00081[Bc]	0.00073[Bc]	0.00097[Bc]	0.001[Bc]	0.001[Bc]	0.00062	0.00062	-
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-
Lead	mg/L	-	0.0018 - 0.0068[g,j]	-	-	-	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.00014	0.00012	<0.000050	<0.000050	0.00024	0.000092	0.00013	0.00022	<0.000050	<0.000050	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Manganese	mg/L	-	-	-	-	-	0.00012	0.0002	0.00018	0.00020	0.00031	0.00034	0.00017	0.00017	0.00022	0.00021	0.00085	0.00042	0.00038	0.00021	0.00027	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00042	0.00042	0.00037	0.00050	0.00043	0.00038	0.00038	0.00041	0.00042	0.00043	0.00056	0.00043	0.00038	0.00088	0.00073	-
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Selenium	mg/L	-	-	-	-	-	0.00013	0.00013	0.000084	0.00017	0.00012	0.0001	0.0001	0.000086	0.000096	0.000094	0.00012	0.0001	0.00014	0.00026	0.00016	-
Silicon	mg/L	-	-	-	-	-	1.9	2.0	1.4	1.7	1.7	1.6	1.6	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	-
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.14	0.13	0.13	0.14	0.13	0.13	0.14	0.14	0.13	0.14	0.15	0.14	-
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00016	0.00016	0.00016	0.00016	0.00016	0.00015	0.00015	0.00015	0.00016	0.00016	0.00016	0.00018	0.00016	-
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,j]**	-	-	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MP	QUL-59-MP	QUL-59-MP	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MP	MP	MP	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2022-05-10	2023-05-10	2023-05-17	2024-05-30	2024-07-04	2020-09-16	2021-09-16	2023-09-14	2015-12-02	2015-12-09	2015-12-14	2015-12-21	2016-01-25
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.3	7.7	7.7	7.7	**6.4**[Ba,Bc]	7.5	7.5	7.8	7.9	8.4	7.8	7.8	7.8	7.8	7.7	8.0
Temperature	°C	**15**[d]	-	-	-	-	5.4	5.8	5.5	4.0	3.8	4.0	6.5	5.2	4.8	5.1	5.0	5.2	5.1	4.7	4.5	2.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	11	12	-	-	12	12	11	11	-	11	11	11	11	12
Dissolved oxygen	%	-	-	-	-	-	94	96	90	91	-	-	96	93	88	87	-	85	86	88	86	90
Turbidity	NTU	**1.0**	-	-	-	-	0.07	0.91	0	0	-	0.03	0.43	0.27	0.06	0.07	0.07	0.73	0.69	0.58	0.62	0.57
Conductivity	µS/cm	-	-	-	-	-	113	110	130	115	116	116	110	113	111	113	111	146	150	144	152	109
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	-	7.8	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	50	52	55	51	54	51	54	54	53	53	-	54	57	55	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	48	50	51	51	50	50	49	48	48	50	-	48	50	50	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	79	67	83	71	82	83	74	72	72	81	76	-	65	64	64	65
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.1	1.6	<1.0	1.0	<1.0	<1.0	<1.0	<1.4	1.6	-	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.3	2.2	1.9	2.0	2.6	2.0	2.2	2.0	2.0	1.9	2.0	-	1.5	1.3	1.6	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.22	0.2	0.14	0.2	0.23	0.31	0.29	0.11	<0.10	<0.10	<0.10	-	0.47	0.47	0.49	0.38
Conductivity	µS/cm	-	-	-	-	-	114	110	108	114	115	116	113	110	111	110	111	-	112	113	115	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	54	54	54	54	55	55	-	-	57	56	50	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	18	18	17	18	17	18	18	18	18	-	18	19	19	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.038	0.031	0.032	0.036	0.036	0.04	0.028	0.031	0.036	0.036	0.033	-	0.033	0.035	0.037	0.033
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.2	-	2.0	2.1	2.0	2.1
Potassium	mg/L	-	-	-	-	-	0.49	0.51	0.51	0.47	0.49	0.53	0.49	0.51	0.52	0.49	0.5	-	0.51	0.49	0.49	0.47
Sodium	mg/L	-	-	-	-	-	1.1	1.0	0.96	0.99	1.1	1.1	1.0	0.96	1.1	0.99	1.1	-	1.0	0.94	0.97	0.96
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.6	7.0	6.6	7.6	7.9	8.5	6.6	6.8	6.6	7.3	6.8	-	6.7	6.6	6.8	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.13	0.14	0.13	0.14	0.15	0.12	0.13	0.14	0.15	0.14	-	0.11	0.12	0.12	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.13	0.14	0.13	0.14	0.15	0.12	0.13	0.14	0.15	0.14	-	0.11	0.12	0.12	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	0.0056	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.19	0.18	0.21	0.19	0.22	0.17	0.2	0.19	0.2	0.2	-	0.16	0.17	0.16	0.17
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	<0.002[Bc]	0.0021[Bc]	0.0023[Bc]	<0.002[Bc]	0.0021[Bc]	0.0025[Bc]	0.003[Bc]	<0.002[Bc]	<0.002[Bc]	0.0028[Bc]	0.0026[Bc]	-	0.003[Bc]	0.0021[Bc]	0.0022[Bc]	0.0035[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	0.0011	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0029	0.0045	<0.0020	0.0022	<0.0020	0.002	-	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.018	0.018	0.012	0.019	0.025	0.014	0.014	0.009	0.012	0.011	0.01	-	0.035	0.033	0.034	0.03
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00011	0.0001	0.00013	0.00015	0.00012	0.00012	0.00013	0.00012	0.00011	0.00011	-	0.00014	0.00013	0.00015	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0056	0.0054	0.0059	0.0054	0.0052	0.0052	0.0053	0.005	0.0054	0.0053	-	0.0057	0.0061	0.0058	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	0.000086	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	0.0000079
Calcium	mg/L	-	-	-	-	-	18	18	18	18	19	18	18	18	19	19	17	-	18	19	18	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00087	0.00081	0.0006	0.00083	0.00087	0.00077	0.00082	0.00068	0.00066	0.00058	0.00055	-	0.0015	0.0013	0.0014	0.0014
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	0.001	<0.0010	0.0011	<0.0010	-	<0.0010	<0.0010	0.0012	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.0	-	2.0	2.1	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0014	0.0016	0.0012	0.0013	0.0015	0.0011	0.0015	0.00099	0.00091	0.00086	0.00079	-	0.0012	0.0012	0.0012	0.0014
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00058	0.00052	0.00042	0.00074	0.001	0.00094	0.00043	0.00047	0.00045	0.00055	0.00052	-	0.00055	0.00042	0.00051	0.00049
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.52	0.51	0.5	0.52	0.51	0.48	0.53	0.45	0.52	0.52	-	0.51	0.52	0.5	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00014	0.00021	0.00012	0.0002	0.00026	0.00029	0.00012	0.000081	0.00017	0.00017	0.00015	-	0.00011	0.000091	0.0001	0.00012
Silicon	mg/L	-	-	-	-	-	2.0	2.0	2.0	1.8	2.0	1.9	1.6	1.7	1.9	1.8	1.8	-	1.7	1.7	1.7	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	0.99	1.1	1.1	1.2	1.1	1.0	0.96	1.0	1.0	-	1.0	0.95	1.0	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.15	0.15	0.15	0.15	-	0.14	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00016	0.00017	0.00017	0.00016	0.00016	0.00016	0.00015	0.00017	0.00017	-	0.00017	0.00015	0.00016	0.00016

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MID	QUL-59-MP	QUL-59-MP	QUL-59-MP	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							MID	MID	MID	MID	MID	MID	MID	MID	MP	MP	MP	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-05-19	2021-06-02	2021-07-21	2022-05-10	2023-05-10	2023-05-17	2024-05-30	2024-07-04	2020-09-16	2021-09-16	2023-09-14	2015-12-02	2015-12-09	2015-12-14	2015-12-21	2016-01-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0089	0.01	0.0073	0.0079	0.014	0.011	0.0053	0.0078	0.0064	0.0079	0.0058	-	0.0055	0.008	0.0053	0.0058
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00016	0.0001	<0.00010	0.00012	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	0.00011	0.00011	0.00012	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0053	0.0053	0.0051	0.0055	0.0054	0.0049	0.0053	0.0053	0.0052	0.0055	-	0.0051	0.0055	0.0053	0.005
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00068	0.00082[Bc]	0.00051	0.00065	**0.00096[Bc,Ba]**	0.00075[Bc]	0.00061[Bc]	0.00074	0.0009[Bc]	0.00051	0.00055	-	0.00079[Bc]	0.0008[Bc]	0.0008[Bc]	0.00072[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0011	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00034	0.00023	0.0001	0.00024	0.00058	0.00038	0.00049	0.0003	0.0002	<0.00010	0.0001	-	0.00017	0.00022	0.0002	0.00045
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00058	0.00054	0.00037	0.00073	0.00095	0.00098	0.00045	0.00043	0.00045	0.00047	0.00051	-	0.00038	0.00044	0.0004	0.00042
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00016	0.00013	0.000083	0.00018	0.00022	0.00019	0.000099	0.00011	0.00016	0.00015	0.00015	-	0.000099	0.00011	0.000086	0.00011
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.8	1.7	1.9	1.9	1.6	1.5	1.8	1.7	1.8	-	1.6	1.7	1.6	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.14	-	0.14	0.12	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00016	0.00016	0.00017	-	0.00016	0.00015	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-03-28	2016-05-17	2018-01-04	2018-05-03	2018-05-22	2018-06-04	2018-06-13	2018-07-16	2018-08-27	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-04-25
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.2	7.6	7.8	7.6	7.4	7.7	7.9	8.0	7.9	7.9	7.4	7.9	8.0	7.7	7.6	7.7
Temperature	°C	**15**[d]	-	-	-	-	3.2	12	1.9	3.3	14	11	9.3	**18**[DW]	**15.3**[DW]	**15.9**[DW]	9.8	8.9	9.0	8.4	7.6	3.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	13	11	12	12	9.3	11	11	8.5	9.4	9.7	10	11	10	12	11	11
Dissolved oxygen	%	-	-	-	-	-	97	101	88	88	90	97	94	90	93	98	91	91	90	100	91	86
Turbidity	NTU	**1.0**	-	-	-	-	0.44	**1.67**[DW]	0	0.91	0.52	0	0	0	0.58	0.5	0	0	0	0	0	0.82
Conductivity	µS/cm	-	-	-	-	-	112	98	108	106	110	100	101	102	96	100	104	107	106	101	104	111
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	8.0	-	-	-	7.9	-	-	-	-	-	-	-	-	-	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	52	-	-	-	48	-	-	-	-	-	-	-	-	-	58
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	49	-	-	-	44	-	-	-	-	-	-	-	-	-	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	69	55	-	-	-	72	-	-	-	-	-	-	-	-	-	67
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	-	-	-	<1.0	-	-	-	-	-	-	-	-	-	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	2.1	-	-	-	2.5	-	-	-	-	-	-	-	-	-	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.49	0.41	-	-	-	0.57	-	-	-	-	-	-	-	-	-	0.32
Conductivity	µS/cm	-	-	-	-	-	116	108	-	-	-	94	-	-	-	-	-	-	-	-	-	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	-	-	-	16	-	-	-	-	-	-	-	-	-	20
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	-	-	-	<0.50	-	-	-	-	-	-	-	-	-	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.033	-	-	-	0.034	-	-	-	-	-	-	-	-	-	0.037
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	-	-	-	2.1	-	-	-	-	-	-	-	-	-	2.1
Potassium	mg/L	-	-	-	-	-	0.53	0.51	-	-	-	0.56	-	-	-	-	-	-	-	-	-	0.51
Sodium	mg/L	-	-	-	-	-	1.1	0.94	-	-	-	1.0	-	-	-	-	-	-	-	-	-	1.2
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.6	6.2	-	-	-	6.0	-	-	-	-	-	-	-	-	-	7.4
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.097	-	-	-	0.084	-	-	-	-	-	-	-	-	-	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	-	-	-	<0.0010	-	-	-	-	-	-	-	-	-	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.097	-	-	-	0.084	-	-	-	-	-	-	-	-	-	0.14
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	-	-	-	<0.0050	-	-	-	-	-	-	-	-	-	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.17	-	-	-	0.17	-	-	-	-	-	-	-	-	-	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0028[Bc]	0.0026[Bc]	-	-	-	0.0048[Bc]	-	-	-	-	-	-	-	-	-	0.0072
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	-	-	-	0.0012	-	-	-	-	-	-	-	-	-	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	-	-	-	0.0031	-	-	-	-	-	-	-	-	-	0.0021
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.039	0.023	-	-	-	0.029	-	-	-	-	-	-	-	-	-	0.024
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00016	-	-	-	0.00012	-	-	-	-	-	-	-	-	-	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0057	0.0056	-	-	-	0.0059	-	-	-	-	-	-	-	-	-	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	-	-	-	<0.000050	-	-	-	-	-	-	-	-	-	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	-	-	-	<0.010	-	-	-	-	-	-	-	-	-	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	-	-	-	0.0000054	-	-	-	-	-	-	-	-	-	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	17	-	-	-	14	-	-	-	-	-	-	-	-	-	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0016	0.0014	-	-	-	0.00078	-	-	-	-	-	-	-	-	-	0.0011
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	-	-	-	0.04	-	-	-	-	-	-	-	-	-	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	-	-	-	<0.000050	-	-	-	-	-	-	-	-	-	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	0.0011	-	-	-	<0.0010	-	-	-	-	-	-	-	-	-	0.001
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	-	-	-	2.0	-	-	-	-	-	-	-	-	-	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0021	0.002	-	-	-	0.0025	-	-	-	-	-	-	-	-	-	0.0013
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00068	0.00039	-	-	-	0.00038	-	-	-	-	-	-	-	-	-	0.00084
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Potassium	mg/L	-	-	-	-	-	0.53	0.55	-	-	-	0.51	-	-	-	-	-	-	-	-	-	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.00011	-	-	-	0.00011	-	-	-	-	-	-	-	-	-	0.00014
Silicon	mg/L	-	-	-	-	-	1.7	1.8	-	-	-	1.9	-	-	-	-	-	-	-	-	-	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	-	-	-	<0.000010	-	-	-	-	-	-	-	-	-	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	0.96	-	-	-	0.94	-	-	-	-	-	-	-	-	-	1.2
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.12	-	-	-	0.11	-	-	-	-	-	-	-	-	-	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	-	-	-	<0.000010	-	-	-	-	-	-	-	-	-	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	-	-	-	<0.010	-	-	-	-	-	-	-	-	-	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00018	0.00015	-	-	-	0.00014	-	-	-	-	-	-	-	-	-	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-03-28	2016-05-17	2018-01-04	2018-05-03	2018-05-22	2018-06-04	2018-06-13	2018-07-16	2018-08-27	2018-09-04	2018-10-11	2018-10-18	2018-10-24	2018-10-29	2018-11-07	2019-04-25
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	0.00066	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	-	-	-	<0.0030	-	-	-	-	-	-	-	-	-	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0069	0.009	-	-	-	0.014	-	-	-	-	-	-	-	-	-	0.007
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	-	-	0.00011	-	-	-	-	-	-	-	-	-	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.0053	-	-	-	0.0059	-	-	-	-	-	-	-	-	-	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	-	-	-	<0.000050	-	-	-	-	-	-	-	-	-	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	-	-	-	<0.010	-	-	-	-	-	-	-	-	-	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.0000050	<0.0000050	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00085(Bc)	0.00079(Bc)	-	-	-	0.00072	-	-	-	-	-	-	-	-	-	0.00063
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	-	-	-	<0.030	-	-	-	-	-	-	-	-	-	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	-	-	-	<0.000050	-	-	-	-	-	-	-	-	-	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	-	-	-	<0.0010	-	-	-	-	-	-	-	-	-	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00096	0.001	-	-	-	0.00099	-	-	-	-	-	-	-	-	-	0.00029
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00061	0.00034	-	-	-	0.00038	-	-	-	-	-	-	-	-	-	0.0008
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00013	0.00011	-	-	-	0.00014	-	-	-	-	-	-	-	-	-	0.00018
Silicon	mg/L	-	-	-	-	-	1.7	1.8	-	-	-	1.7	-	-	-	-	-	-	-	-	-	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	-	-	-	<0.000010	-	-	-	-	-	-	-	-	-	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.12	-	-	-	0.12	-	-	-	-	-	-	-	-	-	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	-	-	-	<0.000010	-	-	-	-	-	-	-	-	-	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	-	-	-	<0.010	-	-	-	-	-	-	-	-	-	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00014	-	-	-	0.00014	-	-	-	-	-	-	-	-	-	0.00018
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	-	-	-	<0.00050	-	-	-	-	-	-	-	-	-	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[q,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	-	-	-	<0.0030	-	-	-	-	-	-	-	-	-	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.

BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-05-02	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2019-10-30	2020-06-02	2020-06-16	2020-06-24	2020-06-29	2020-08-11	2020-09-16	2020-11-10	2021-05-19	2021-06-02	2021-07-21
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.7	8.0	7.9	7.9	7.9	7.8	7.6	7.8	8.0	8.2	7.7	8.2	7.9	7.8
Temperature	°C	**15**[d]	-	-	-	-	4.0	6.4	8.1	**15.4**[DW]	**17.4**[DW]	7.6	9.0	12	14	11	**16.4**[DW]	**15.4**[DW]	5.7	8.5	12	**20**[DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	87	12	11	11	9.4	11	11	11	11	9.6	9.6	9.8	11	12	11	9.1
Dissolved oxygen	%	-	-	-	-	-	115	94	96	108	98	93	93	102	104	87	98	99	89	98	102	101
Turbidity	NTU	**1.0**	-	-	-	-	0.65	0.44	0.95	0.94	0	0.45	**1.88**[DW]	0.45	0.59	0.81	0	0.14	**1.47**[DW]	0.05	0.93	0
Conductivity	µS/cm	-	-	-	-	-	115	112	111	100	102	108	21	109	104	103	99	105	111	111	116	119
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	8.0	8.0	-	-	-	7.8	-	6.9	8.0	-	7.9	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	57	58	51	47	-	-	-	55	-	47	52	-	53	74	48
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	52	51	52	45	46	-	-	-	52	-	43	47	-	49	66	46
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	77	84	82	66	68	-	-	-	82	-	70	68	-	72	95	60
Total suspended solids	mg/L	-	-	-	-	-	1.2	<1.0	1.1	<1.0	<1.0	-	-	-	1.1	-	<1.0	<1.0	-	<1.0	1.6	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	2.0	5.9	1.9	2.2	-	-	-	5.0	-	3.4	2.0	-	2.3	8.3	2.3
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.28	0.19	0.83	0.23	0.26	-	-	-	1.18[DW]	-	0.38	0.2	-	0.26	0.52	0.19
Conductivity	µS/cm	-	-	-	-	-	112	115	110	101	102	-	-	-	106	-	99	104	-	111	154	98
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	49	-	48	55	-	48	72	49
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	19	19	17	16	-	-	-	17	-	16	17	-	18	23	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.033	0.036	0.038	0.034	0.033	-	-	-	0.042	-	0.035	0.034	-	0.038	0.043	0.03
Magnesium	mg/L	-	-	-	-	-	2.2	2.2	2.9	2.0	2.0	-	-	-	3.0	-	2.0	2.1	-	2.1	4.1	2.0
Potassium	mg/L	-	-	-	-	-	0.52	0.53	0.49	0.52	0.46	-	-	-	0.51	-	0.54	0.49	-	0.52	0.76	0.52
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.5	1.0	0.94	-	-	-	1.5	-	0.98	0.96	-	1.0	3.3	0.88
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	7.7	6.9	5.6	6.0	5.8	-	-	-	4.7	-	5.4	5.8	-	6.9	14	6.0
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.13	0.084	0.079	0.045	-	-	-	0.065	-	0.028	0.03	-	0.12	0.057	0.051
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.13	0.084	0.079	0.045	-	-	-	0.066	-	0.029	0.031	-	0.12	0.057	0.051
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	0.01	-	<0.0050	0.0057	-	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.21	0.18	0.27	0.2	0.13	-	-	-	0.21	-	0.15	0.11	-	0.17	0.29	0.13
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0043[Bc]	0.0032[Bc]	0.0044[Bc]	0.002[Bc]	0.0032[Bc]	-	-	-	0.0038[Bc]	-	0.003[Bc]	0.0022[Bc]	-	<0.002[Bc]	0.0118 [DW]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	0.0014	<0.0010	-	0.0014	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0031	0.0031	<0.0020	<0.0020	-	-	-	0.0028	-	0.0038	0.0026	-	<0.0020	0.0049	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.03	0.014	0.066	0.018	0.013	-	-	-	0.034	-	0.023	0.014	-	0.014	0.052	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00017	0.00019	0.00025	0.0001	0.00011	-	-	-	0.00016	-	0.00016	0.00014	-	0.00014	0.00038	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0052	0.0069	0.0053	0.0055	-	-	-	0.006	-	0.0056	0.005	-	0.0049	0.010	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	0.0000054	-	0.0000069	<0.0000050	-	<0.0000050	0.0000061	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	17	17	16	15	-	-	-	16	-	16	19	-	16	23	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0015	0.00068	0.002	0.00063	0.00058	-	-	-	0.00098	-	0.0008	0.0006	-	0.00073	0.0038	0.00064
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	0.093	<0.030	<0.030	-	-	-	0.052	-	<0.030	<0.030	-	<0.030	0.087	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.5	1.9	1.9	-	-	-	2.1	-	2.1	2.0	-	2.0	4.0	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0017	0.0011	0.0038	0.0019	0.0011	-	-	-	0.003	-	0.002	0.001	-	0.0013	0.013	0.0019
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00075	0.00053	0.00052	0.00034	0.00034	-	-	-	0.00042	-	0.00038	0.00032	-	0.00044	0.0018	0.00039
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	0.00064	<0.00050	<0.00050	-	-	-	0.00055	-	0.00051	<0.00050	-	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.47	0.47	0.48	-	-	-	0.51	-	0.5	0.42	-	0.45	0.72	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00017	0.00015	0.00017	0.000096	0.00013	-	-	-	0.00016	-	0.00011	0.00013	-	0.00011	0.00032	0.00011
Silicon	mg/L	-	-	-	-	-	1.8	1.8	2.3	1.6	1.7	-	-	-	2.0	-	2.0	1.7	-	2.0	3.1	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.1	1.3	0.92	0.91	-	-	-	1.0	-	0.94	0.86	-	0.98	3.3	0.89
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.12	0.12	0.12	-	-	-	0.12	-	0.11	0.13	-	0.12	0.16	0.11
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00013	0.00015	0.00014	-	-	-	0.00013	-	0.00013	0.00013	-	0.00016	0.00018	0.00014

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2019-05-02	2019-05-08	2019-05-15	2019-06-18	2019-08-20	2019-10-30	2020-06-02	2020-06-16	2020-06-24	2020-06-29	2020-08-11	2020-09-16	2020-11-10	2021-05-19	2021-06-02	2021-07-21
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	0.00057	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	0.00068	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	0.0071	-	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0076	0.0064	0.027	0.011	0.0096	-	-	-	0.023	-	0.013	0.012	-	0.0089	0.023	0.01
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	0.00022	<0.00010	0.00012	-	-	-	0.00023	-	0.00016	0.00013	-	<0.00010	0.00037	0.00013
Barium	mg/L	-	-	-	-	-	0.0051	0.0054	0.0067	0.0056	0.0053	-	-	-	0.007	-	0.0059	0.0056	-	0.0051	0.01	0.0057
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.0010	-	<0.0010	<0.0010	-	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	-	0.0000053	-	<0.0000050	<0.0000050	-	<0.0000050	0.0000055	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00080	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00061	<0.00050	0.0015	0.0005	0.00053	-	-	-	0.0012	-	0.00062	0.00081	-	0.00065	0.0032	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	0.039	<0.030	<0.030	-	-	-	0.043	-	<0.030	<0.030	-	<0.030	0.046	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	-	-	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	-	-	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00029	0.00029	0.0014	0.00099	0.00022	-	-	-	0.00065	-	<0.00010	0.00027	-	0.00068	0.0098	0.00081
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00071	0.00052	0.00064	0.00038	0.00034	-	-	-	0.00043	-	0.00036	0.00033	-	0.00043	0.002	0.00033
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	0.00064	<0.00050	<0.00050	-	-	-	0.00061	-	<0.00050	<0.00050	-	<0.00050	0.00055	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00018	0.0001	0.00016	0.00013	0.00011	-	-	-	0.00012	-	0.00013	0.000082	-	0.00012	0.00026	0.000098
Silicon	mg/L	-	-	-	-	-	1.8	1.7	2.3	1.7	1.7	-	-	-	2.4	-	1.9	1.7	-	1.8	2.7	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.13	0.12	-	-	-	0.13	-	0.11	0.12	-	0.14	0.16	0.11
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	-	-	<0.000010	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	-	-	<0.00010	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00018	0.00016	0.00015	0.00014	-	-	-	0.00012	-	0.00012	0.00015	-	0.00015	0.00015	0.00013
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	-	-	<0.00050	-	<0.00050	<0.00050	-	<0.00050	0.00056	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	-	-	-	<0.0030	-	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermochline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermochline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.3	7.9	7.7	7.8	8.0	8.0	**6.4**[Ba,Bc]	7.6	7.9	8.4	7.7	7.6	8.0	8.1	7.9	7.7
Temperature	°C	**15**[d]	-	-	-	-	**15.5**[DW]	9.0	4.2	**15.1**[DW]	**21**[DW]	14	6.7	10	**17.3**[DW]	**16.7**[DW]	6.9	7.4	**15.4**[DW]	**17.8**[DW]	9.0	8.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	9.4	11	12	9.2	8.9	9.8	-	-	-	-	-	12	10	9.2	11	12
Dissolved oxygen	%	-	-	-	-	-	94	91	91	96	100	95	-	-	-	-	-	98	105	96	91	101
Turbidity	NTU	**1.0**	-	-	-	-	0.02	0.19	0	0.68	0.3	0.07	0.77	0.21	**1.86**[DW]	0.36	-	0.39	0.47	0.08	0.16	**1.4**[DW]
Conductivity	µS/cm	-	-	-	-	-	108	107	114	108	98	104	106	115	103	109	110	110	106	107	109	111
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.8	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	8.0	7.9	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	53	55	51	48	52	50	54	47	53	53	54	49	50	51	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	52	48	48	48	42	44	48	51	48	50	51	49	46	48	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	66	62	57	70	66	78	94	83	73	80	66	71	69	70	69	78
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	<1.0	2.9	1.2	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.8	2.2	3.7	2.1	1.9	10	3.0	2.3	2.1	2.1	2.0	2.7	2.0	1.8	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.16	0.11	0.24	0.76	0.22	0.19	1.57[DW]	0.48	0.21	0.62	0.33	0.22	0.44	0.14	0.23	0.34
Conductivity	µS/cm	-	-	-	-	-	112	109	115	98	97	104	107	116	102	108	114	112	101	106	110	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	53	56	49	47	49	54	53	53	51	53	-	-	-	-	50
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	17	16	18	15	18	16	18	18	18	16	17	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.03	0.035	0.04	0.033	0.035	0.035	0.038	0.039	0.033	0.033	0.032	0.032	0.03	0.03	0.032	0.033
Magnesium	mg/L	-	-	-	-	-	1.9	1.9	2.1	2.2	1.9	2.1	2.8	2.2	1.9	2.2	2.0	2.1	2.0	1.9	2.1	1.9
Potassium	mg/L	-	-	-	-	-	0.47	0.47	0.48	0.53	0.49	0.5	0.55	0.55	0.5	0.51	0.49	0.49	0.5	0.5	0.47	0.51
Sodium	mg/L	-	-	-	-	-	0.88	0.86	1.0	1.1	0.81	0.96	1.6	1.1	0.88	0.97	0.92	1.0	0.97	0.88	0.9	0.94
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.4	7.0	7.6	5.7	5.6	6.3	6.5	7.7	6.2	6.3	6.4	6.6	6.0	6.5	6.7	6.7
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.043	0.084	0.13	0.062	0.02	0.027	0.095	0.13	0.095	0.0079	0.076	0.12	0.055	0.046	0.089	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.043	0.084	0.13	0.062	0.02	0.027	0.095	0.13	0.095	0.0079	0.076	0.12	0.055	0.046	0.089	0.12
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	0.0091	<0.0050	0.0054	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.12	0.13	0.21	0.16	0.087	0.11	0.35	0.22	0.15	0.11	0.14	0.17	0.17	0.12	0.15	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[i]	-	-	-	0.0022[Bc]	<0.002[Bc]	<0.002[Bc]	0.0058	<0.002[Bc]	0.0024[Bc]	0.0109 [DW]	0.0036[Bc]	0.003[Bc]	0.0024[Bc]	<0.002[Bc]	0.0022[Bc]	0.0021[Bc]	0.002[Bc]	<0.002[Bc]	0.0042[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0021	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	0.0073	0.0048	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.012	0.015	0.017	0.03	0.019	0.01	**0.17**[Bc]	0.023	0.019	0.015	0.011	0.009	0.019	0.01	0.022	0.014
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	<0.00010	0.00012	0.00013	0.00017	0.00014	0.00014	0.0003	0.00016	0.00013	0.00012	0.00012	0.00012	0.00014	0.00014	0.00011	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0047	0.005	0.0054	0.0061	0.0053	0.005	0.0077	0.0057	0.0056	0.0053	0.0051	0.0051	0.0056	0.0055	0.0051	0.0051
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050	0.0000059	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	19	16	16	17	17	17	18	17	18	18	16	16	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00055	0.0027	0.00084	0.001	0.00078	<0.00050	0.0031	0.0014	0.0011	0.00055	0.0006	0.0006	0.00079	0.00054	0.00052	0.00075
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	0.042	<0.030	<0.030	0.22	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	0.00018	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.0	2.2	1.9	1.9	2.9	2.3	2.1	2.0	2.2	2.0	2.1	2.0	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0008	0.0011	0.0013	0.0029	0.0014	0.001	0.0087	0.0032	0.0016	0.00096	0.00081	0.0012	0.002	0.00087	0.00086	0.0018
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00032	0.00042	0.00079	0.00047	0.00032	0.00031	0.0008	0.00073	0.00038	0.00036	0.00044	0.00044	0.00047	0.00035	0.00036	0.00043
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	<0.00050	0.0009	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.49	0.51	0.48	0.48	0.56	0.5	0.52	0.52	0.51	0.48	0.53	0.51	0.49	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000087	0.000078	0.0002	0.00014	0.000067	0.00011	0.00025	0.00018	0.0001	0.00012	0.00015	0.0001	0.00012	0.000086	0.00011	0.00012
Silicon	mg/L	-	-	-	-	-	1.5	1.6	1.8	2.2	1.7	1.3	3.0	2.1	1.8	0.79	1.3	1.5	1.7	1.4	1.6	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.92	0.91	1.1	1.1	0.84	0.85	1.6	1.2	0.94	0.97	1.0	0.99	1.1	0.88	0.9	0.97
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.15	0.11	0.12	0.13	0.12	0.14	0.14	0.15	0.15	0.13	0.13	0.13	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00018	0.00018	0.00013	0.00014	0.00015	0.00013	0.00015	0.00015	0.00017	0.00018	0.00016	0.00015	0.00015	0.00016	0.00017

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59	QUL-59
Station ID							QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S	QUL-59-S
Depth							S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-09-16	2021-10-27	2022-05-10	2022-06-27	2022-08-16	2022-10-19	2023-05-10	2023-05-17	2023-06-27	2023-09-14	2023-10-31	2024-05-30	2024-07-04	2024-09-05	2024-10-30	2025-05-27
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0008	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0091	0.02	0.012	0.016	0.011	0.012	0.07	0.011	0.021	0.0052	0.0055	0.005	0.0093	0.0078	0.0069	0.0078
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00011	<0.00010	0.00014	0.0001	0.00012	0.00028	0.00011	0.00011	0.0001	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	0.0001
Barium	mg/L	-	-	-	-	-	0.0051	0.0047	0.0051	0.0062	0.005	0.0054	0.0074	0.0059	0.0057	0.0055	0.0049	0.0048	0.0057	0.0052	0.005	0.0048
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00017[g]	**0.00025 - 0.00043[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000052	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00045[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	<0.00050	**0.0049[Bc,Ba]**	0.00084[Bc]	0.00091	0.00052	0.00066	0.0029[Bc]	0.00099	0.0011[Bc]	0.00054	0.0005	0.00057	0.00063	<0.00050	<0.00050	0.00059
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.095	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00034	0.00081	0.00036	0.0014	0.00059	0.00061	0.0043	0.002	0.00094	0.0002	0.00023	0.00045	0.00044	0.00028	0.00022	0.00063
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00029	0.00038	0.00072	0.00045	0.0003	0.00034	0.00078	0.00066	0.00033	0.00035	0.00041	0.00045	0.0004	0.00033	0.00032	0.00043
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00084	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00006	0.000079	0.00018	0.00016	0.00011	0.000063	0.00024	0.00016	0.00011	0.000094	0.00011	0.000085	0.00012	0.000078	0.00013	0.0001
Silicon	mg/L	-	-	-	-	-	1.3	1.4	1.7	2.2	1.5	1.3	2.9	2.0	1.6	0.77	1.2	1.5	1.5	1.3	1.4	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.15	0.11	0.12	0.13	0.11	0.14	0.12	0.13	0.13	0.14	0.12	0.13	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00017	0.00013	0.00013	0.00015	0.00013	0.00017	0.00014	0.00017	0.00016	0.00016	0.00015	0.00015	0.00017	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	Count	Non-detects	Non Detects (%)	Samples Above Guideline (%)				
Station ID							QUL-59-S	QUL-59-S								
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	S	S				DW	Bc	Ba	Wc	Wa
Date Sampled							2025-07-15	2025-09-16								
Field Measured																
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	8.1	668	0	0%	-	1.3%	**1.3%**	-	-
Temperature	°C	**15**[d]	-	-	-	-	**16.3**[DW]	**18.2**[DW]	683	0	0%	**10%**	-	-	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	9.0	613	0	0%	-	0.3%	-	-	-
Dissolved oxygen	%	-	-	-	-	-	108	95	613	0	0%	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.5	**1.45**[DW]	663	0	0%	**10%**	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	105.2	109	683	0	0%	-	-	-	-	-
Conventional Parameters																
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	8.0	660	0	0%	-	-	-	-	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	48	50	660	0	0%	-	-	-	-	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	46	49	660	0	0%	-	-	-	-	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	61	70	660	0	0%	-	-	-	-	-
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	660	546	83%	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	1.8	660	0	0%	-	-	-	-	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	2	2	100%	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.37	0.15	660	25	4%	**1.7%**	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	104	108	660	0	0%	-	-	-	-	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	49	53	270	0	0%	-	-	-	-	-
Major Ions																
Calcium	mg/L	-	-	-	1000[c,f]	-	16	17	660	0	0%	-	-	-	-	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.5	<0.5	660	658	100%	-	-	-	-	-
Fluoride	mg/L	**1.5**	-	**0.99 - 1.2**[g]	1.0	**1.5**	0.031	0.036	660	2	0%	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	660	0	0%	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.53	0.50	660	0	0%	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	0.95	0.90	660	0	0%	-	-	-	-	-
Sulphate	mg/L	**500**[d]	218[b]	-	1000[c]	-	6.1	7.0	660	1	0%	-	-	-	-	-
Nutrients																
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.056	0.031	660	2	0%	-	-	-	-	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.001	<0.001	660	656	99%	-	-	-	-	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.056	0.031	660	4	1%	-	-	-	-	-
Total ammonia	mg-N/L	-	0.28 - 2.1[i]	**1.5 - 27**[i]	-	-	<0.005	0.0098	660	561	85%	-	-	-	-	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	0	0	0%	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	0	0	0%	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.13	0.081	660	0	0%	-	-	-	-	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0024[Bc]	<0.002[Bc]	660	0	0%	**2.4%**	85%	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	<0.001	<0.001	660	602	91%	-	-	-	-	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	9	0	0%	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.002	<0.002	660	510	77%	-	-	-	-	-
Total Metals																
Aluminum	mg/L	**9.5**	0.059 - 0.80[g,k,l]	-	-	5	0.016	0.011	660	2	0%	-	0.9%	-	-	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.0001	<0.0001	660	654	99%	-	-	-	-	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	660	39	6%	-	-	-	-	-
Barium	mg/L	-	1.0	-	-	-	0.0052	0.0054	660	0	0%	-	-	-	-	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.0001	<0.0001	660	660	100%	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.00005	660	659	100%	-	-	-	-	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.01	<0.01	660	660	100%	-	-	-	-	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.000005	<0.000005	660	614	93%	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	17	18	660	0	0%	-	-	-	-	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.0005	<0.0005	660	656	99%	-	-	-	-	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.0001	<0.0001	660	656	99%	-	-	-	-	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00066	0.00057	660	10	2%	-	-	-	-	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.03	<0.03	660	574	87%	**0.2%**	-	-	-	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.00005	<0.00005	660	496	75%	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.001	<0.001	660	531	80%	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	1.8	2.1	660	0	0%	-	-	-	-	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.79 - 0.93[g]	**1.0 - 1.4**[g]	-	-	0.0015	0.0010	660	0	0%	-	-	-	-	-
Mercury	mg/L	**0.01**	0.000010	-	-	**0.003**[c]	-	-	47	46	98%	-	2.1%	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00036	0.00033	660	0	0%	-	-	-	-	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.0005	<0.0005	660	615	93%	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.49	0.47	660	0	0%	-	-	-	-	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00016	0.000096	660	0	0%	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	1.6	1.4	660	0	0%	-	-	-	-	-
Silver	mg/L	-	0.00012	-	-	-	<0.00001	<0.00001	660	659	100%	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	0.86	0.92	660	0	0%	-	-	-	-	-
Strontium	mg/L	**7.0**	-	-	-	-	0.12	0.13	660	0	0%	-	-	-	-	-
Thallium	mg/L	-	0.000030	-	-	-	<0.00001	<0.00001	660	660	100%	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.0001	<0.0001	660	649	98%	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	<0.01	<0.01	660	657	100%	-	-	-	-	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00017	660	0	0%	-	-	-	-	-

Location	Unit	BC ENV Drinking WQG	BC WLRS WQGs for the protection of Freshwater Aquatic Life:		BC WLRS WQGs for the Protection of Wildlife[a]:		QUL-59	QUL-59	Count	Non-detects	Non Detects (%)	Samples Above Guideline (%)				
Station ID							QUL-59-S	QUL-59-S								
Depth			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	S	S				DW	Bc	Ba	Wc	Wa
Date Sampled							2025-07-15	2025-09-16								
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.0005	<0.0005	660	645	98%	-	-	-	-	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.003	<0.003	660	644	98%	-	-	-	-	-
Dissolved Metals																
Aluminum	mg/L	-	-	-	-	-	0.012	0.0080	660	1	0%	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	<0.0001	<0.0001	660	660	100%	-	-	-	-	-
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00011	660	280	42%	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	0.0056	0.0051	660	0	0%	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	<0.0001	<0.0001	660	660	100%	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.00005	660	660	100%	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	<0.01	<0.01	660	660	100%	-	-	-	-	-
Cadmium	mg/L	-	0.00011 - 0.00017[q]	**0.00025 - 0.00043[q]**	-	-	<0.000005	<0.000005	660	631	96%	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	<0.0005	<0.0005	660	660	100%	-	-	-	-	-
Cobalt	mg/L	-	0.00039 - 0.00045[q]	-	-	-	<0.0001	<0.0001	660	660	100%	-	-	-	-	-
Copper	mg/L	-	0.0002 - 0.0059[q]	**0.0008 - 0.0359[q]**	-	-	0.00062[Bc]	0.00053	660	67	10%	-	47%	**1.4%**	-	-
Iron	mg/L	-	-	**0.35**	-	-	<0.03	<0.03	660	651	99%	-	-	-	-	-
Lead	mg/L	-	0.0018 - 0.0068[g,l]	-	-	-	<0.00005	<0.00005	660	509	77%	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.001	<0.001	660	612	93%	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	0.00058	0.00059	660	30	5%	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	9	9	100%	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00037	0.00034	660	1	0%	-	-	-	-	-
Nickel	mg/L	-	0.0017 - 0.0098[q]	**0.0255 - 0.0812[q]**	-	-	<0.0005	<0.0005	660	642	97%	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	0.00011	0.000097	660	0	0%	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	1.4	1.3	660	0	0%	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	<0.00001	<0.00001	660	659	100%	-	-	-	-	-
Strontium	mg/L	-	1.3	-	-	-	0.12	0.13	660	0	0%	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	<0.00001	<0.00001	660	660	100%	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.0001	<0.0001	660	657	100%	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	<0.01	<0.01	660	660	100%	-	-	-	-	-
Uranium	mg/L	-	-	-	-	-	0.00014	0.00015	660	0	0%	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	<0.0005	<0.0005	660	659	100%	-	-	-	-	-
Zinc	mg/L	-	0.0034 - 0.026[g,k,l]	**0.022 - 0.051[g,l]**	-	-	<0.003	<0.003	660	657	100%	-	0.2%	-	-	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.

Notes:

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within 30 days.

In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.

(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.

(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.

(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.

(d) The guideline is based on an aesthetic objective rather than a health-based objective.

(e) The guideline is a minimum value.

(f) The guideline is a working guideline.

(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (43 to 74 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.

(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.

(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.

(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.0 to 8.3). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.

(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (1.3 to 2.6 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.

(m) The guideline is for chromium VI.

(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).

(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).

(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.

(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.

(DW) = concentration is higher than the BC ENV drinking WQG.

(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.

(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.

(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.

AT = above thermocline; B = bottom; BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; BT = below thermocline; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; MID = middle; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; S = surface; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2015-03-16	2015-04-29	2015-05-13	2015-05-20	2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-07-20	2016-08-24	2017-04-10
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	-	-	-	-	7.3	8.1	7.5	8.3	7.7	7.6	-	8.3	8.2	8.4	7.6
Temperature	°C	**15**[d]	-	-	-	-	-	-	-	-	-	**18.7**[DW]	**19.1**[DW]	15	11	6.7	6.4	-	**18.8**[DW]	**18.7**[DW]	**17.7**[DW]	2.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	-	9.4	8.7	9.5	11	11	11	-	8.1	8.9	8.6	12
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	-	101	94	94	104	89	91	-	88	96	91	89
Turbidity	NTU	**1.0**	-	-	-	-	-	-	-	-	-	0.46	**1.04**[DW]	0.57	0.43	0.3	0.56	-	0	0.04	0.94	0.44
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	106	142	182	129	140	98	-	91	93	103	107
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	8.0	8.0	-	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	52	52	-	48	53	51	54	53	53	51	47	47	47	50	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	53	49	-	45	47	49	49	50	49	49	43	39	44	48	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	68	65	68	-	66	63	68	67	61	69	58	63	78	84	81	73
Total suspended solids	mg/L	-	-	-	-	-	12	<3.0	<3.0	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	2.1	1.9	-	2.1	2.2	1.8	1.7	1.7	1.5	1.8	2.6	2.1	2.2	1.8	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.2	0.31	0.24	-	0.49	0.23	0.21	0.21	0.22	0.27	0.38	0.75	0.27	0.27	0.27	0.22
Conductivity	µS/cm	-	-	-	-	-	110	111	109	-	95	104	106	108	107	110	110	93	95	96	105	116
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	17	18	-	16	18	17	18	18	18	17	15	16	16	17	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.032	0.029	0.034	-	0.032	0.031	0.031	0.031	0.03	0.032	0.034	0.032	0.033	0.032	0.034	0.031
Magnesium	mg/L	-	-	-	-	-	2.1	1.9	1.9	-	1.9	2.1	1.9	2.0	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.1
Potassium	mg/L	-	-	-	-	-	0.47	0.46	0.49	-	0.52	0.49	0.47	0.5	0.47	0.43	0.49	0.62	0.51	0.52	0.49	0.54
Sodium	mg/L	-	-	-	-	-	0.92	0.95	0.96	-	0.94	0.87	0.82	0.87	0.86	0.88	0.93	0.97	0.91	0.89	0.85	0.94
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.2	6.2	-	5.7	5.8	6.3	6.5	6.5	6.3	6.1	5.3	5.5	5.8	6.3	6.5
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.13	-	0.082	0.054	0.052	0.051	0.059	0.095	0.12	0.067	0.064	0.045	0.059	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	-	0.14	0.13	-	0.082	0.054	0.052	0.051	0.059	0.095	0.12	0.067	0.064	0.045	0.059	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.013	<0.0050	<0.0050	0.0079	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.18	0.18	-	0.15	0.12	0.097	0.5	0.13	0.18	0.2	0.2	0.17	0.13	0.12	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	0.0024[Bc]	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]	0.0022[Bc]	0.0086	0.0024[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	0.23	0.13	0.38	0.079	0.51	-	-	-	-	0.35	-	0.38	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0033	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.013	0.015	0.013	-	0.025	0.014	0.011	0.012	0.011	0.012	0.027	0.039	0.02	0.014	0.012	0.0095
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00013	<0.00010	-	0.00015	0.00016	0.00011	0.00014	<0.00010	0.00011	0.00011	0.00018	0.00013	0.00012	<0.00010	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0051	0.0053	0.0053	-	0.0055	0.006	0.005	0.0051	0.005	0.0052	0.0057	0.0068	0.0054	0.0053	0.005	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00050	<0.000050	<0.000050	-	0.00006	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.000010	0.0000057	<0.0000050	-	0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	17	-	16	17	17	18	18	18	17	15	15	16	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0006	0.0011	0.00074	-	0.00095	<0.001	0.00062	0.00058	0.00063	0.0006	0.00075	0.0011	0.0008	0.00056	0.00054	0.00053
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	-	0.032	<0.030	<0.030	<0.030	<0.030	<0.030	0.046	0.058	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	0.00012	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	0.00077	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	1.9	-	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00074	0.0011	0.001	-	0.0026	0.002	0.00038	0.001	0.00088	0.00098	0.0021	0.0041	0.002	0.0017	0.00078	0.00088
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00031	0.00043	0.00031	-	0.00048	0.00038	0.00034	0.00032	0.0003	0.0003	0.00034	0.00043	0.00039	0.00035	0.00028	0.00034
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.5	0.49	-	0.52	0.5	0.48	0.51	0.47	0.43	0.49	0.61	0.5	0.48	0.48	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	<0.00050	0.00013	0.0001	-	0.00015	0.00011	0.000088	0.000099	0.000079	0.000087	0.000093	0.00013	0.00011	0.000099	0.000062	0.000091
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	-	1.7	1.6	1.5	1.5	1.4	1.6	1.8	2.1	1.7	1.7	1.5	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.92	1.0	0.97	-	0.93	0.89	0.86	0.88	0.88	0.91	0.95	0.99	0.91	0.86	0.88	0.98
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.13	-	0.11	0.12	0.13	0.14	0.14	0.14	0.13	0.1	0.11	0.11	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island
Depth (m)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2015-03-16	2015-04-29	2015-05-13	2015-05-20	2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-07-20	2016-08-24	2017-04-10
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00017	0.00015	-	0.00014	0.00014	0.00016	0.00015	0.00017	0.00016	0.00016	0.00012	0.00013	0.00014	0.00014	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.0010	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.006	0.0061	0.0072	-	0.011	0.0088	0.0089	0.0072	0.0062	0.0058	0.011	0.015	0.014	0.011	0.0096	0.0044
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	-	0.00013	0.00011	<0.00010	0.00011	<0.00010	<0.00010	0.0001	0.00013	0.00011	0.00012	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.005	0.0052	-	0.0053	0.0058	0.005	0.005	0.0049	0.005	0.0054	0.0063	0.0055	0.0055	0.0049	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000010	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00054	0.00059	-	0.00064	<0.0005	0.00051	<0.0005	<0.00050	<0.0005	0.00062[(Bc)]	0.00075	0.00058	<0.00050	<0.00050	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[q,f]	-	-	-	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	0.00092	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00017	0.00033	0.00056	-	0.0014	0.00027	0.00085	0.00023	0.00013	0.00025	0.0011	0.0019	0.0013	0.0008	0.00038	0.00021
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00027	0.00034	0.00029	-	0.00035	0.00034	0.00031	0.00032	0.00028	0.00029	0.00034	0.0004	0.00036	0.00034	0.00026	0.00031
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	<0.00050	0.0001	0.000071	-	0.00013	0.00012	0.000095	0.000092	0.000076	0.000098	0.000086	0.00015	0.00011	0.000098	0.00005	0.00009
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.7	-	1.7	1.6	1.5	1.5	1.4	1.5	1.8	2.0	1.7	1.7	1.4	1.6
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.13	-	0.11	0.12	0.13	0.13	0.14	0.13	0.13	0.1	0.11	0.11	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00014	0.00017	0.00015	-	0.00013	0.00014	0.00015	0.00015	0.00016	0.00016	0.00014	0.00012	0.00013	0.00013	0.00013	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.0010	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[e]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2017-06-21	2017-08-31	2018-05-23	2018-06-19	2018-08-27	2018-10-17	2019-06-19	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.1	7.7	8.0	6.9	7.4	8.0	7.7	7.9	8.3	8.0	8.3	8.0	8.9	7.9
Temperature	°C	**15**[d]	-	-	-	-	12	**17.5**[DW]	12	**17**[DW]	15[DW]	9.3	8.9	**18**[DW]	10	**17**[DW]	**16**[DW]	7.0	7.1	**20**[DW]	**16**[DW]	9.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	9.3	9.1	9.8	9.5	11	11	9.1	11	9.4	9.7	11	12	9.0	9.4	11
Dissolved oxygen	%	-	-	-	-	-	99	97	85	102	95	92	94	96	97	98	98	88	95	100	95	91
Turbidity	NTU	**1.0**	-	-	-	-	0.63	0.36	0.7	0	0.95	0	0.29	0.11	0.4	0	0.11	0.13	0.22	0.05	0.06	0.19
Conductivity	µS/cm	-	-	-	-	-	104	109	99	92	101	107	102	103	110	99	105	108	106	118	109	107
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.8	7.9	7.9	8.0	7.9	7.8	8.0	8.0	7.9	7.8	8.0	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	46	49	44	46	49	52	52	49	51	45	52	53	52	48	52	52
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	45	46	47	42	48	49	46	45	47	43	47	48	47	45	52	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	64	68	64	86	74	82	67	64	62	69	77	67	76	85	70
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.1	1.9	2.3	2.2	1.8	1.5	1.8	1.7	2.4	2.8	2.3	13	2.4	2.2	1.7	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.44	0.27	0.6	0.44	0.3	0.37	0.23	0.24	0.37	0.33	0.19	0.16	0.42	0.16	0.13	0.16
Conductivity	µS/cm	-	-	-	-	-	99	103	102	94	104	105	104	100	104	99	104	108	107	99	112	107
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	49	48	53	52	47	48	55	53
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	15	17	15	15	17	18	18	17	17	15	17	18	17	16	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.03	0.03	0.035	0.033	0.032	0.033	0.037	0.032	0.037	0.034	0.034	0.034	0.037	0.03	0.033	0.035
Magnesium	mg/L	-	-	-	-	-	2.0	1.9	1.8	2.1	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.0	2.1	1.8	1.9	1.9
Potassium	mg/L	-	-	-	-	-	0.48	0.48	0.48	0.55	0.49	0.49	0.52	0.45	0.51	0.48	0.5	0.5	0.53	0.48	0.47	0.48
Sodium	mg/L	-	-	-	-	-	0.91	0.88	0.85	1.0	0.87	0.88	0.98	0.82	0.91	0.92	0.95	0.89	1.0	0.82	0.86	0.85
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.0	6.5	6.0	5.8	6.0	6.7	6.4	5.8	6.1	5.4	5.9	6.7	6.3	5.9	6.4	6.8
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.047	0.11	0.065	0.041	0.082	0.11	0.051	0.11	0.03	0.027	0.1	0.13	0.051	0.044	0.087
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.047	0.11	0.065	0.041	0.082	0.11	0.051	0.11	0.03	0.027	0.1	0.13	0.051	0.044	0.087
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	0.012	<0.0050	<0.0050	<0.0050	0.0066	<0.0050	<0.0050	<0.0050	<0.0050	0.0052	0.0059	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.14	0.17	0.13	0.14	0.17	0.18	0.14	0.19	0.14	0.1	0.16	0.18	0.12	0.12	0.14
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0041[Bc]	**<0.02**[Bc, DW]	0.0047[Bc]	0.0033[Bc]	0.0048[Bc]	0.0062	0.0045[Bc]	0.0022[Bc]	0.0086	0.0024[Bc]	<0.002[Bc]	0.0021[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	0.0013	0.0014	0.0015	0.002	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	0.56	-	0.45	1.1	-	0.7	0.75	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0023	<0.0020	0.0029	0.0025	<0.0020	<0.0020	<0.0020	0.0057	0.0024	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.023	0.011	0.029	0.029	0.012	0.04	0.015	0.014	0.025	0.021	0.014	0.013	0.022	0.015	0.012	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00015	0.00011	0.00013	0.00017	0.00012	0.00017	0.0001	<0.00010	0.00015	0.00016	0.00015	<0.00010	0.00015	0.00014	0.0001	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0051	0.0057	0.0056	0.0067	0.0055	0.006	0.0051	0.0045	0.0054	0.0054	0.0049	0.0048	0.0052	0.0055	0.0046	0.005
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	0.0000056	0.0000055	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	16	17	16	13	17	19	16	16	16	16	18	17	16	16	19	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00061	0.00056	0.00077	0.0011	0.00077	0.0027	0.00055	0.00062	0.00078	0.00067	0.00058	0.00089	0.00063	0.00053	0.00053	0.00053
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	0.032	0.038	<0.030	0.034	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.03	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	1.9	2.0	2.0	2.3	1.9	1.8	2.0	2.1	2.0	2.0	2.0	1.9	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0019	0.0016	0.0021	0.0031	0.0014	0.0024	0.0014	0.00066	0.0016	0.0016	0.0012	0.00088	0.0019	0.0018	0.00063	0.0011
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00033	0.00035	0.00039	0.00033	0.00033	0.00037	0.00026	0.00034	0.00038	0.0003	0.0003	0.00038	0.00037	0.0003	0.00035
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	0.00057	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.5	0.52	0.56	0.5	0.52	0.43	0.44	0.51	0.49	0.42	0.46	0.47	0.51	0.48	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.000095	0.000099	0.00016	0.00013	0.0001	0.00011	0.00011	0.00011	0.00013	0.00013	0.000095	0.00011	0.00013	0.0001	0.000089
Silicon	mg/L	-	-	-	-	-	1.9	1.6	1.8	1.9	1.6	1.6	1.8	1.4	1.9	2.0	1.7	1.6	2.1	1.8	1.4	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.96	0.97	1.0	0.94	1.0	0.86	0.78	0.93	0.92	0.85	0.9	0.96	0.9	0.88	0.91
Strontium	mg/L	**7.0**	-	-	-	-	0.12	0.13	0.12	0.094	0.12	0.14	0.12	0.12	0.13	0.11	0.13	0.14	0.12	0.11	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2017-06-21	2017-08-31	2018-05-23	2018-06-19	2018-08-27	2018-10-17	2019-06-19	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00015	0.00016	0.00012	0.00015	0.00018	0.00015	0.00015	0.00015	0.00014	0.00015	0.00016	0.00015	0.00014	0.00015	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	0.004	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.012	0.0081	0.012	0.012	0.008	0.0064	0.0081	0.01	0.012	0.013	0.012	0.0079	0.013	0.011	0.0087	0.01
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	0.00011	0.00013	<0.00010	<0.00010	0.00011	<0.00010	0.0001	0.00014	0.00011	<0.00010	0.0001	0.00012	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0051	0.0054	0.0049	0.0065	0.0054	0.0054	0.0053	0.0048	0.0055	0.0058	0.0058	0.0046	0.0052	0.0053	0.005	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[g]	**0.00025 - 0.00034[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00059	<0.00050	<0.00050	0.00072	<0.00050	<0.0005	<0.0005	<0.00050	0.0005	0.00053	0.00058	<0.00050	0.0006	<0.00050	<0.00050	0.00069
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00064	0.00023	0.0011	0.0022	0.00046	0.00034	0.00049	<0.00010	0.0004	0.00012	0.00037	0.00035	0.0011	0.00075	0.00023	0.001
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.0003	0.00031	0.00043	0.00037	0.0003	0.00033	0.00027	0.00032	0.00039	0.0003	0.00032	0.00035	0.00038	0.00028	0.00034
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000083	0.0001	0.000088	0.00014	0.000083	0.000081	0.00013	0.000068	0.000084	0.00011	0.000084	0.000078	0.00011	0.00011	0.00012	0.000088
Silicon	mg/L	-	-	-	-	-	1.7	1.5	1.8	1.8	1.5	1.4	1.7	1.5	1.9	1.8	1.7	1.5	1.9	1.6	1.4	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.11	0.13	0.11	0.11	0.13	0.14	0.13	0.13	0.13	0.11	0.13	0.15	0.13	0.12	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00014	0.00014	0.00013	0.00013	0.00015	0.00016	0.00016	0.00014	0.00014	0.00012	0.00015	0.00016	0.00014	0.00014	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	0.022[Bc]	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
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BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[e]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40
Date Sampled							2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	8.0	7.9	8.1	7.8	8.0	8.1	7.9	7.7	7.8	7.5	-	-	-	-	7.6
Temperature	°C	**15**[d]	-	-	-	-	3.3	13	**20.7**[DW]	13	7.5	**15.8**[DW]	**19.2**[DW]	8.6	11	**17.4**[DW]	**18.3**[DW]	-	-	-	-	4.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	11	9.0	9.9	11	10	9.1	11	11	10	8.8	-	-	-	-	11
Dissolved oxygen	%	-	-	-	-	-	90	100	100	95	95	103	98	91	99	105	94	-	-	-	-	83
Turbidity	NTU	**1.0**	-	-	-	-	0	0.68	0	0	0.29	0.2	0.6	-	**4.37**[DW]	0.30	0.47	-	-	-	-	0.35
Conductivity	µS/cm	-	-	-	-	-	112	95	97	105	108	99	107	109	6.5	106	105	-	-	-	-	117
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.9	7.9	7.9	8.0	7.9	8.0	8.0	-	7.9	8.0	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	46	46	54	54	47	50	51	50	48	51	56	52	51	53	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	44	42	44	49	45	49	49	47	46	49	50	52	47	51	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	78	66	62	79	69	64	65	66	64	66	64	66	68	67	66	70
Total suspended solids	mg/L	-	-	-	-	-	1.5	1.2	<1.0	<1.0	<1.0	7.1	<1.0	<1.0	<1.0	1.3	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	2.7	2.3	1.7	1.9	2.4	2.0	1.1	2.3	2.0	1.7	2.1	2.1	1.8	1.6	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.19	0.75	0.28	0.19	0.26	0.72	0.17	0.21	0.58	0.38	-	0.22	0.38	0.21	0.17	0.16
Conductivity	µS/cm	-	-	-	-	-	112	95	100	105	112	102	110	110	102	106	106	110	110	106	106	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	54	48	44	51	-	-	-	-	49	50	55	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	15	15	18	18	16	17	17	17	16	17	19	18	17	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.035	0.032	0.029	0.035	0.028	0.03	0.026	0.036	0.039	0.033	0.034	0.032	0.032	0.033	0.034	0.033
Magnesium	mg/L	-	-	-	-	-	2.1	1.9	1.9	1.9	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.1	2.0	1.9	2.0	2.1
Potassium	mg/L	-	-	-	-	-	0.5	0.48	0.51	0.47	0.49	0.55	0.49	0.46	0.52	0.53	0.50	0.48	0.47	0.46	0.5	0.51
Sodium	mg/L	-	-	-	-	-	0.99	0.85	0.87	0.85	0.96	1.0	0.94	0.85	0.94	0.90	0.85	0.92	0.98	0.92	0.96	0.94
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.4	5.2	5.3	6.5	6.2	5.7	6.1	6.8	6.3	5.7	7.3	6.3	6.2	6.2	6.3	6.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.081	0.021	0.037	0.12	0.05	0.045	0.094	0.11	0.057	0.036	0.14	0.14	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.081	0.021	0.037	0.12	0.05	0.045	0.094	0.11	0.057	0.036	-	0.14	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	0.0061	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050	<0.005	0.013	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.22	0.14	0.088	0.11	0.17	0.16	0.094	0.15	0.18	0.13	0.12	0.19	0.18	0.18	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0047[Bc]	<0.002[Bc]	0.0029[Bc]	0.0025[Bc]	0.0042[Bc]	0.0021[Bc]	0.0027[Bc]	0.004[Bc]	0.0022[Bc]	0.002[Bc]	0.002[Bc]	0.0024[Bc]	0.0036[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	0.0021	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	0.0021	<0.0020	<0.002	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.033	0.036	0.018	0.014	0.011	0.022	0.01	0.013	0.029	0.013	0.014	0.017	0.014	0.013	0.019	0.011
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00013
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00012	0.0001	0.0001	0.00014	0.0001	0.0001	0.00014	0.00011	0.00011	0.0001	0.00013	<0.00010	0.0001	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0061	0.0055	0.0054	0.0049	0.0055	0.0055	0.0049	0.0049	0.0056	0.0053	0.0050	0.0051	0.0052	0.0052	0.0051	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	16	15	17	17	15	16	16	16	17	19	18	18	17	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0011	0.0046	0.00055	0.00051	0.00055	0.00072	0.0005	0.00072	0.0037	0.00056	0.00069	0.00065	0.00067	0.00096	0.00069	<0.001
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.039	0.04	<0.030	<0.030	<0.030	0.034	<0.030	<0.030	0.042	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	0.000058	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.00046	0.00053	0.00018	0.000065
Lithium	mg/L	-	-	-	-	-	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00081	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	1.8	1.9	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	1.9	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0029	0.0023	0.0015	0.0015	0.0014	0.0026	0.00087	0.00085	0.003	0.0010	0.00080	0.0018	0.001	0.00081	0.00093	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00035	0.00033	0.00035	0.00028	0.00038	0.00039	0.00032	0.00031	0.00039	0.00035	0.00031	0.00032	0.00038	0.00027	0.00034	0.00038
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.48	0.49	0.48	0.48	0.5	0.47	0.46	0.52	0.47	0.49	0.48	0.46	0.47	0.51	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00013	0.000084	0.00012	0.00011	0.00012	0.00016	0.00013	0.000079	0.00015	0.000082	0.00014	<0.00050	0.00013	0.000084	0.0001	0.000082
Silicon	mg/L	-	-	-	-	-	1.9	1.9	1.6	1.4	1.6	1.7	1.5	1.6	1.8	1.4	1.3	1.7	1.7	1.6	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.83	0.86	0.85	0.96	0.96	0.87	0.88	0.97	0.89	0.92	0.94	0.97	0.94	0.97	0.95
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.12	0.12	0.14	0.15	0.11	0.13	0.14	0.13	0.12	0.13	0.13	0.14	0.13	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-0m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40
Date Sampled							2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00014	0.00013	0.00016	0.00015	0.00013	0.00015	0.00015	0.00016	0.00016	0.00017	0.00016	0.00017	0.00016	0.00016	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0051	0.02	0.011	0.0085	0.0062	0.017	0.0054	0.0095	0.01	0.010	0.0090	0.0054	0.0068	0.0062	0.006	0.0052
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.00013	0.00013	0.00018	<0.00010	0.00012	<0.00010	<0.00010	0.00011	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0051	0.0053	0.0053	0.0052	0.0049	0.0058	0.0049	0.0048	0.0053	0.0053	0.0050	0.005	0.0049	0.0051	0.005	0.0056
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[g]	**0.00025 - 0.00034[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00061	0.00064	<0.00050	<0.00050	<0.00050	0.00099	0.0005	0.00054[Bc]	0.0027[Bc]	0.00055	0.00064[Bc]	0.00057	0.00058[Bc]	0.00061[Bc]	0.00073[Bc]	0.00079[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.0003	0.00071	0.00022	0.00024
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00084	<0.0010	<0.0010	<0.0010	0.001
Manganese	mg/L	-	-	-	-	-	0.00029	0.00087	0.00058	0.00023	0.00042	0.0012	0.00025	0.00026	0.0015	0.00047	0.00063	0.00017	0.00034	0.00024	0.00019	0.00025
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050
Molybdenum	mg/L	-	-	-	-	-	0.00034	0.00031	0.00033	0.00027	0.00037	0.00042	0.00031	0.00033	0.00037	0.00031	0.00032	0.00029	0.00034	0.00029	0.00029	0.00036
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	0.00052	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000086	0.00011	0.00012	0.000093	0.00008	0.00014	0.00013	0.000099	0.000095	0.00011	0.000077	<0.00050	0.00009	0.000072	0.000076	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	1.9	1.5	1.3	1.6	1.5	1.7	1.6	1.8	1.4	1.3	1.6	1.7	1.6	1.7	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.11	0.11	0.14	0.13	0.12	0.13	0.14	0.12	0.12	0.14	0.13	0.14	0.13	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00013	0.00013	0.00015	0.00016	0.00013	0.00017	0.00016	0.00015	0.00015	0.00016	0.00014	0.00017	0.00015	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	8.0	7.7	7.3	-	7.7	7.6	7.8	7.5	7.4	7.8	7.0	7.6	7.7	7.8
Temperature	°C	**15**[d]	-	-	-	-	4.5	4.6	5.1	6.7	4.1	-	4.7	4.6	4.4	4.6	4.2	8.6	5.2	4.8	4.4	4.3
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	10	11	11	11	-	11	11	11	11	12	11	11	11	12	12
Dissolved oxygen	%	-	-	-	-	-	82	81	87	87	85	-	86	84	88	85	88	95	84	85	93	90
Turbidity	NTU	**1.0**	-	-	-	-	0.69	0.51	0.17	0.14	0.12	-	0	0.33	0.57	0.48	0.67	**1.1**[DW]	0	0.11	0.34	0
Conductivity	µS/cm	-	-	-	-	-	147	184	138	140	101	-	108	104	114	113	107	107	110	111	116	110
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	8.0	7.9	7.9	7.8	7.7	7.8	8.0	7.8	7.9	7.9	7.9	8.0	7.8	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	55	55	54	53	53	53	53	50	50	54	51	54	53	53	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	51	51	49	50	50	43	50	50	49	50	50	49	48	50	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	72	69	74	61	71	88	82	58	69	67	80	69	73	68	72
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	<1.0	3.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.4	1.4	1.5	1.8	1.6	1.6	1.8	1.7	1.6	1.6	1.9	2.0	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.18	0.51	0.13	0.27	0.19	**2.11**[DW]	0.31	0.24	0.24	0.18	0.27	0.18	0.27	0.16	0.33	0.14
Conductivity	µS/cm	-	-	-	-	-	110	111	107	110	114	108	107	106	109	107	109	108	107	109	109	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	53
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	18	19	19	18	18	18	18	18	17	17	18	17	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.033	0.033	0.032	0.032	0.034	0.033	0.034	0.036	0.031	0.032	0.034	0.033	0.034	0.035	0.038	0.036
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2	1.9	2.0	2.1	2.1	2.1
Potassium	mg/L	-	-	-	-	-	0.5	0.51	0.5	0.44	0.48	0.56	0.51	0.53	0.46	0.47	0.52	0.5	0.5	0.49	0.5	0.51
Sodium	mg/L	-	-	-	-	-	0.95	0.99	0.94	0.9	0.92	0.95	0.97	1.0	0.94	0.98	1.0	0.93	0.99	0.99	0.94	0.98
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.5	6.7	6.5	6.3	6.7	6.4	6.5	6.5
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.15	0.092	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.13	0.14	0.13	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.15	0.092	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.13	0.14	0.13	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.005	0.006	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.2	0.2	0.16	0.19	0.18	0.19	0.17	0.19	0.19	0.15	0.19	0.18	0.22	0.21	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0023[Bc]	0.0023[Bc]	0.0031[Bc]	0.0024[Bc]	<0.002[Bc]	0.0065	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	**<0.02**[Bc, DW]	0.0027[Bc]	0.0049[Bc]	0.0024[Bc]	0.0069	0.0062	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.0012	0.0013	0.0018	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.003	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.013	0.22[Bc]	0.009	0.013	0.016	0.086	0.017	0.016	0.015	0.0084	0.015	0.01	0.0082	0.012	0.019	0.018
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.0001	0.00022	0.00011	0.00012	0.00012	0.00015	0.00011	<0.00010	0.00013	0.00011	<0.00010	0.00011	0.0001	<0.00010	0.00013	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0052	0.0081	0.0052	0.0051	0.0053	0.0072	0.0052	0.0054	0.0049	0.0056	0.0055	0.0054	0.0058	0.0046	0.0053	0.0049
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	18	18	18	18	18	18	18	18	18	17	17	16	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0013	0.0073	0.00063	0.0006	0.00093	0.0025	0.0014	0.001	0.00057	0.00063	0.0007	0.0011	0.00063	0.00066	0.00076	0.00065
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	0.17	<0.030	<0.030	<0.030	0.06	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.044
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00012	0.00019	<0.000050	0.00034	0.00023	0.00012	0.00032	0.00035	0.000055	0.00047	0.0005	0.00063	0.00086	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	1.9	1.9	2.0	2.1	2.0	2.1	2.2	2.1	2.2	2.2	2.0	1.9	2.0	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0012	0.0089	0.00072	0.001	0.001	0.0022	0.0012	0.0014	0.001	0.0012	0.0013	0.0013	0.0011	0.0011	0.0014	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0004	0.00037	0.00033	0.00031	0.00034	0.00032	0.00036	0.00035	0.00032	0.00039	0.00033	0.00039	0.0004	0.00038	0.00036	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	0.00051	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.57	0.49	0.44	0.47	0.61	0.5	0.51	0.52	0.49	0.5	0.51	0.49	0.46	0.51	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0001	0.000084	0.000066	0.000091	0.000085	0.000065	0.000088	0.000075	0.0001	0.00012	0.000091	0.00013	0.00012	0.0001	0.00016	0.000097
Silicon	mg/L	-	-	-	-	-	1.8	2.1	1.7	1.6	1.7	1.8	1.7	1.8	1.8	1.8	1.9	1.8	1.7	1.6	1.9	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.97	0.99	0.97	0.92	0.94	0.97	0.95	1.0	1.0	1.0	0.97	1.1	1.0	0.92	0.94	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11
Titanium	mg/L	-	-	-	-	-	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[(c,f)]	-	0.00018	0.00016	0.00017	0.00017	0.00017	0.00016	0.00015	0.00015	0.00016	0.00016	0.00017	0.00017	0.00017	0.00015	0.00016	0.00016
Vanadium	mg/L	-	0.060	-	0.1[(b,c,f)]	-	<0.00050	0.00075	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[(c)]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0057	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0095	0.0053	0.0048	0.0057	0.005	0.0072	0.0073	0.0059	0.0061	0.0055	0.0063	0.0058	0.0051	0.0053	0.0077	0.0059
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0052	0.0051	0.005	0.0051	0.0057	0.0053	0.005	0.005	0.0052	0.0056	0.0049	0.0052	0.0049	0.0054	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[(g)]	**0.00025 - 0.00034[(g)]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[(g)]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[(q)]	**0.0007 - 0.0349[(q)]**	-	-	0.0013[(Bc)]	0.00081[(Bc)]	0.00057	0.00064[(Bc)]	0.00065[(Bc)]	0.00081[(Bc)]	0.00091[(Bc)]	0.00079[(Bc)]	0.00051	0.00054[(Bc)]	0.00068[(Bc)]	0.00056	0.0007[(Bc)]	<0.0005	0.00057	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[(g,f)]	-	-	-	0.000065	0.000059	0.000054	0.00043	0.00018	<0.000050	0.00051	0.00019	0.000067	0.00065	0.0005	0.0005	0.00051	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00027	0.00028	0.00011	0.00025	0.00024	0.00054	0.00024	0.00032	0.00018	0.00036	0.00014	0.00029	0.00034	0.00016	0.00021	0.00012
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00037	0.00036	0.00032	0.0003	0.0003	0.00032	0.00036	0.00035	0.0003	0.00034	0.00031	0.00037	0.00036	0.00044	0.00036	0.00033
Nickel	mg/L	-	0.0011 - 0.0094[(q)]	**0.0249 - 0.0798[(q)]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000077	0.00009	0.000077	0.000059	0.000091	0.000081	0.0001	0.000073	0.000083	0.0001	0.0001	0.000074	0.0001	0.0001	0.0001	0.0001
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.5	1.7	1.6	1.7	1.7	1.7	1.8	1.7	1.6	1.6	1.8	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.14	0.12	0.13	0.14	0.14	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00015	0.00016	0.00016	0.00015	0.00016	0.00015	0.00014	0.00015	0.00015	0.00017	0.00016	0.00015	0.00015	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[(g,k,l)]	**0.021 - 0.046[(g,l)]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0081[(Bc)]	0.0031	<0.0030	<0.0030	0.0078[(Bc)]	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
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BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)							40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	8.1	8.4	7.5	8.8	7.8	7.7	7.9	7.8	7.6	7.5	7.7	7.7	7.9	7.7	7.6
Temperature	°C	**15**[d]	-	-	-	-	4.4	7.0	4.1	4.9	4.4	7.7	3.2	4.1	4.3	4.7	4.3	4.5	4.6	8.3	4.1	4.4
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	12	12	11	11	12	12	11	11	12	12	12	10	12	12
Dissolved oxygen	%	-	-	-	-	-	88	88	91	90	88	89	90	90	88	87	90	91	89	89	89	91
Turbidity	NTU	**1.0**	-	-	-	-	0.08	0.24	0.28	0	0.08	0.21	0	0.4	0	0	0.22	-	0.55	-	0.22	0.12
Conductivity	µS/cm	-	-	-	-	-	111	108	110	130	114	109	111	111	108	110	111	112	110	110	117	116
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.8	7.9	7.8	8.0	7.9	7.9	7.8	7.9	8.0	8.0	8.0	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	54	54	54	55	52	55	53	48	54	51	49	53	55	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	47	48	51	53	47	51	50	47	46	50	50	50	50	51	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	73	76	80	84	70	74	73	75	92	72	70	67	75	68	78
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.1	<1.1	<1.0	<1.1	<1.0	11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	13	2.2	2.0	1.8	1.7	2.0	1.9	2.1	2.0	1.8	1.7	1.7	1.5	1.9	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	<0.10	0.15	0.35	<0.10	<0.10	0.13	0.17	0.22	0.18	0.11	0.18	0.18	0.13	0.21	0.14	<0.1
Conductivity	µS/cm	-	-	-	-	-	111	106	110	109	117	109	112	110	112	110	115	115	114	110	112	115
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	56	50	50	53	54	53	53	53	52	53	-	-	-	-	54	55
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	18	19	17	18	18	16	18	17	16	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.035	0.036	0.036	0.032	0.035	0.036	0.034	0.034	0.033	0.038	0.028	0.031	0.028	0.032	0.041	0.034
Magnesium	mg/L	-	-	-	-	-	2.2	2.0	2.1	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.54	0.48	0.48	0.5	0.51	0.49	0.53	0.51	0.49	0.48	0.48	0.46	0.49	0.55
Sodium	mg/L	-	-	-	-	-	1.1	0.91	1.0	0.9	0.98	0.88	0.99	0.93	1.0	1.0	0.97	0.93	0.88	0.85	0.95	1.00
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.7	6.7	6.7	6.7	6.9	6.4	6.3	6.1	6.9	6.4	6.5	6.2	6.8	6.9	6.3
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.1	0.14	0.14	0.15	0.1	0.13	0.14	0.14	0.15	0.14	0.13	0.14	0.098	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.1	0.14	0.14	0.15	0.1	0.13	0.14	0.14	0.15	0.14	0.13	0.14	0.098	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.17	0.18	0.19	0.2	0.15	0.21	0.18	0.18	0.2	0.17	0.2	0.17	0.15	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0023[Bc]	<0.002[Bc]	0.0024[Bc]	<0.002[Bc]	0.0026[Bc]	0.007	0.0029[Bc]	<0.002[Bc]	<0.002[Bc]	0.0023[Bc]	0.0024[Bc]	0.0024[Bc]	0.0031[Bc]	0.0023[Bc]	0.0022[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.011	0.014	0.023	0.011	0.0095	0.014	0.1	0.011	0.014	0.011	0.0064	0.013	0.009	0.013	0.0086	0.0075
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00011	0.00014	0.00011	<0.00010	0.00011	0.00016	<0.00010	0.00011	0.00011	0.00012	<0.00010	0.00011	0.00011	0.0001	<0.0001
Barium	mg/L	-	1.0	-	-	-	0.005	0.0048	0.0051	0.0052	0.0051	0.0051	0.0069	0.0052	0.0053	0.0052	0.0052	0.0051	0.0049	0.005	0.0051	0.0050
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Calcium	mg/L	-	-	-	-	-	19	17	17	18	18	18	18	18	17	18	18	18	16	17	18	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0015	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0011	0.00064	0.0006	0.00054	0.00094	0.00056	0.0024	<0.00050	0.00063	0.00052	0.00052	0.00057	0.0006	<0.0005	0.012	0.00053
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	0.031	<0.030	<0.030	<0.030	0.088	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0011	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.1	2.2	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.001	0.0009	0.0019	0.0014	0.0018	0.0012	0.0046	0.0011	0.0011	0.0016	0.00092	0.0014	0.0013	0.00075	0.00096	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00036	0.0003	0.00033	0.0004	0.00039	0.00036	0.00034	0.00032	0.00039	0.00043	0.00039	0.00037	0.00037	0.0003	0.00037	0.00041
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.001	<0.00050	<0.00050	<0.0005
Potassium	mg/L	-	-	-	-	-	0.44	0.47	0.47	0.51	0.52	0.5	0.51	0.48	0.51	0.5	0.5	0.5	0.48	0.46	0.51	0.46
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.000073	0.00015	0.0001	0.00012	0.000098	0.000087	0.000082	0.00011	0.000097	0.00011	0.00012	0.00013	0.000098	0.00007	0.00010
Silicon	mg/L	-	-	-	-	-	1.9	1.6	2.0	2.0	1.9	1.7	2.0	1.9	1.9	1.8	1.6	1.7	1.7	1.6	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Sodium	mg/L	-	-	-	-	-	0.93	0.91	0.97	0.98	1.0	0.93	1.0	0.92	0.99	0.96	1.1	1.0	0.94	0.86	0.98	0.94
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.15	0.14	0.15	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-40m	QUL-120a-40m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00015	0.00016	0.00017	0.00016	0.00018	0.00017	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00015	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0058	0.0074	0.0095	0.0064	0.0086	0.0068	0.0055	0.0068	0.0066	0.0063	0.0052	0.0053	0.0076	0.0094	0.0088	0.0047
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00014	<0.00010	0.0001	<0.00010	<0.00010	0.0001	<0.0001
Barium	mg/L	-	-	-	-	-	0.0056	0.0048	0.0052	0.0048	0.005	0.005	0.0052	0.0052	0.0052	0.0056	0.0049	0.005	0.005	0.0048	0.0051	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00074	0.00094	0.00073	0.00053	0.00051	0.00058	0.00063	<0.00050	0.00062	0.00052	<0.0005	0.00057	<0.00050	0.00059	**0.013[Bc,Ba]**	0.00062[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Manganese	mg/L	-	-	-	-	-	0.00024	0.00037	0.00036	0.00021	0.00017	0.00044	0.0003	0.00011	0.00018	0.00039	0.0002	0.00022	0.0004	0.00037	0.00042	0.00034
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0004	0.00032	0.00035	0.0004	0.00035	0.00037	0.00035	0.00031	0.00036	0.00045	0.00034	0.00035	0.0003	0.00032	0.00035	0.00038
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Selenium	mg/L	-	-	-	-	-	0.00011	0.000084	0.00012	0.00016	0.00009	0.00011	0.00011	0.000073	0.000093	0.00011	0.00007	0.000099	0.000088	0.000099	0.00011	0.00011
Silicon	mg/L	-	-	-	-	-	1.9	1.5	1.8	1.8	1.7	1.5	1.8	1.9	1.8	1.8	1.7	1.5	1.4	1.5	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.14	0.15	0.14	0.15	0.13	0.14	0.14	0.13	0.13	0.14	0.13	0.14	0.12	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00016	0.00015	0.00015	0.00016	0.00016	0.00017	0.00016	0.00017	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	80	80	80	80	80	80	80	80	80	80	80	80	80
Date Sampled							2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-04-10	2017-06-21
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	-	-	-	-	7.5	7.7	7.6	7.8	7.8	7.2	-	7.6	7.4	7.6	-
Temperature	°C	**15**[d]	-	-	-	-	5.3	-	-	-	-	4.1	3.9	3.8	3.8	3.8	4.0	-	4.0	4.0	2.5	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	-	-	-	-	11	11	11	11	11	11	-	11	11	12	-
Dissolved oxygen	%	-	-	-	-	-	88	-	-	-	-	83	81	80	86	82	83	-	83	84	86	-
Turbidity	NTU	**1.0**	-	-	-	-	0.44	-	-	-	-	0.31	0.68	0.45	0.26	0.14	0.19	-	0	0.23	0.29	-
Conductivity	µS/cm	-	-	-	-	-	110	-	-	-	-	115	147	184	138	141	102	-	109	105	108	-
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	56	52	51	53	56	54	55	55	55	53	54	53	53	54	50
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	52	41	50	50	51	51	51	51	50	49	48	50	49	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	66	70	66	65	62	67	72	67	76	62	65	84	78	73	66
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	2.2	2.2	1.8	1.6	1.8	1.6	1.8	1.5	1.4	1.6	1.5	1.6	1.4	1.5	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.14	0.27	0.25	0.21	0.15	0.13	0.19	0.81	0.14	0.17	0.2	0.66	0.38	0.15	0.19	0.3
Conductivity	µS/cm	-	-	-	-	-	111	111	110	103	107	111	111	111	109	112	112	108	108	107	115	107
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	19	18	17	18	19	18	19	19	19	18	18	18	18	18	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.037	0.033	0.032	0.033	0.034	0.034	0.033	0.034	0.031	0.033	0.035	0.032	0.034	0.035	0.031	0.031
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.0	1.9	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
Potassium	mg/L	-	-	-	-	-	0.53	0.49	0.46	0.47	0.5	0.52	0.49	0.53	0.49	0.47	0.48	0.59	0.5	0.49	0.53	0.47
Sodium	mg/L	-	-	-	-	-	1.00	0.95	0.96	0.94	0.95	0.94	0.91	1.0	0.96	0.98	0.94	0.98	0.94	0.95	0.94	0.94
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	7.2	6.4	6.2	6.3	6.3	6.1	6.4	6.4	6.3	6.1	6.3	6.2	6.3	6.2	6.5	6.5
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.14	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	-	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.19	0.18	0.18	0.18	0.19	0.17	0.2	0.2	0.21	0.19	0.18	0.18	0.18	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	0.0026[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0055	<0.002[Bc]	<0.002[Bc]	0.0022[Bc]	0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0029	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.0077	0.016	0.017	0.015	0.013	0.012	0.01	0.035	0.0096	0.01	0.019	0.04	0.013	0.0096	0.0082	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00014	0.00011	<0.00010	0.00012	0.00011	0.00015	<0.00010	0.00013	0.00011	0.00013	0.00011	<0.00010	0.00011	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0050	0.0052	0.0052	0.0055	0.005	0.0054	0.005	0.0056	0.0053	0.0052	0.0055	0.0063	0.005	0.0052	0.0052	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.000005	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	20	18	18	17	18	18	18	19	18	18	18	18	17	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00060	0.00082	0.00078	0.00067	0.00075	<0.001	0.00061	0.0017	0.00066	0.00072	0.0011	0.0015	0.0008	0.00099	0.00054	0.00078
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.033	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.00005	<0.000050	0.00023	0.00024	0.000074	0.000063	<0.000050	0.000096	<0.000050	0.00014	0.00018	0.00007	0.00017	0.00012	0.00008	0.00008
Lithium	mg/L	-	-	-	-	-	<0.001	0.00072	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0011	0.00087	0.0013	0.001	0.00086	0.00083	0.00065	0.0014	0.00049	0.00067	0.0014	0.0015	0.0009	0.00073	0.00063	0.0013
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	<0.000005	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00039	0.00033	0.00038	0.00032	0.00032	0.00033	0.00034	0.00034	0.00033	0.00032	0.00034	0.00029	0.00031	0.00031	0.00034	0.00035
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.49	0.47	0.48	0.5	0.48	0.47	0.54	0.48	0.45	0.48	0.59	0.51	0.52	0.49	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00010	<0.00050	0.0001	0.000089	0.00007	0.00011	0.000083	0.000083	0.000068	0.000098	0.000097	0.000099	0.00011	0.000071	0.000099	0.000089
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.8	1.6	1.6	1.7	1.7	1.8	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.94	1.0	0.96	0.95	0.91	0.92	0.99	0.95	0.97	0.97	0.96	0.96	0.97	0.96	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-40m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	80	80	80	80	80	80	80	80	80	80	80	80	80
Date Sampled							2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-04-10	2017-06-21
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00015	0.00017	0.00016	0.00015	0.00016	0.00017	0.00016	0.00017	0.00017	0.00017	0.00015	0.00018	0.00015	0.00017	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00066	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0066	0.0058	0.0069	0.0063	0.0059	0.0055	0.0054	0.0079	0.0048	0.0093	0.0063	0.0064	0.005	0.0051	0.0045	0.0059
Antimony	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0051	0.0051	0.0051	0.005	0.0054	0.005	0.0053	0.005	0.0053	0.0052	0.0056	0.0051	0.005	0.0049	0.0049
Beryllium	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[g]	**0.00025 - 0.00034[g]**	-	-	<0.000005	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000065	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[g]	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00072[Bc]	0.0007[Bc]	0.00095[Bc]	0.00065[Bc]	0.00061[Bc]	0.0016[Bc]	0.00071[Bc]	0.00093[Bc]	0.00064[Bc]	0.001[Bc]	0.00071[Bc]	0.00087[Bc]	0.00069[Bc]	0.00073[Bc]	0.00051[Bc]	0.00064[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.00005	0.000052	0.00015	0.00024	0.00014	0.00016	0.000054	0.00011	0.000061	0.00056	0.00014	0.00012	0.00022	0.00011	0.00018	0.00009
Lithium	mg/L	-	-	-	-	-	<0.001	0.00088	0.001	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00057	0.00018	0.00036	0.00021	0.00019	0.00015	0.00015	0.00042	0.00011	0.00033	0.00031	0.00023	0.00012	0.00019	0.00016	0.00018
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00039	0.00029	0.00035	0.00029	0.00031	0.00033	0.00034	0.00038	0.0003	0.00031	0.00032	0.0003	0.00032	0.00031	0.0003	0.0003
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	<0.00050	0.000092	0.000079	0.00009	0.00009	0.000086	0.000093	0.0001	0.000067	0.00011	0.000081	0.000086	0.000057	0.000077	0.0001
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.7
Silver	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.12
Thallium	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00017	0.00014	0.00016	0.00015	0.00015	0.00016	0.00016	0.00016	0.00015	0.00016	0.00015	0.00015	0.00014	0.00014	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0031	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location							QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[e]:		QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Date Sampled							2017-08-31	2018-05-23	2018-06-19	2018-08-27	2018-10-17	2019-06-19	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.4	7.2	7.9	6.7	7.8	7.5	7.7	7.7	7.8	8.0	8.3	7.4	8.8	7.6	7.7
Temperature	°C	**15**[d]	-	-	-	-	-	3.8	3.8	6.9	3.9	5.3	4.0	4.0	3.9	3.9	4.4	3.9	4.0	3.9	4.1	3.2
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	12	12	12	11	11	11	12	12	12	11	12	12	12	12	12
Dissolved oxygen	%	-	-	-	-	-	-	89	88	94	86	90	86	93	90	90	86	90	90	89	88	90
Turbidity	NTU	**1.0**	-	-	-	-	-	0.72	0.68	**1.4**[DW]	0	0.89	0.09	0.36	0	0.07	0.15	0.06	0	0.05	0.08	0
Conductivity	µS/cm	-	-	-	-	-	-	108	108	107	111	113	111	118	111	112	111	111	131	114	110	112
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	8.0	7.9	7.9	7.9	8.0	8.0	7.8	7.9	8.0	7.8	7.8	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	46	53	51	58	55	55	55	53	54	52	52	54	54	55	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	52	50	51	49	49	49	51	48	49	48	49	51	53	48	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	65	71	67	79	64	84	77	71	73	74	71	74	78	80	69	82
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.1	<1.0	<1.1	<1.0	<1.1	<1.0	6.1
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	1.8	1.6	1.4	1.3	1.5	1.6	2.2	1.7	1.6	13	2.0	1.8	1.7	1.7	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.15	0.26	0.2	0.23	0.28	<0.10	0.15	0.13	<0.10	<0.10	<0.10	0.19	<0.10	<0.10	<0.10	0.22
Conductivity	µS/cm	-	-	-	-	-	106	109	110	108	109	110	111	110	111	112	110	112	108	118	110	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	53	54	57	51	53	53	56	54	53
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	18	15	18	17	20	19	19	19	18	18	18	18	19	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.032	0.034	0.034	0.033	0.034	0.038	0.035	0.038	0.037	0.033	0.038	0.038	0.032	0.032	0.035	0.036
Magnesium	mg/L	-	-	-	-	-	2.1	1.8	2.1	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	1.9	2.0	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.48	0.44	0.49	0.48	0.5	0.5	0.51	0.49	0.5	0.49	0.48	0.51	0.47	0.48	0.5	0.51
Sodium	mg/L	-	-	-	-	-	0.98	0.85	1.0	0.9	0.98	0.97	0.98	0.91	0.98	0.98	0.95	0.99	0.88	0.95	0.91	1.0
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.6	6.5	6.5	6.2	6.5	6.8	6.2	6.7	6.6	6.3	6.8	6.8	6.6	6.6	6.9	6.4
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.13
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.16	0.15	0.19	0.19	0.21	0.2	0.2	0.2	0.19	0.19	0.18	0.18	0.19	0.18	0.22
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	**<0.02**[Bc, DW]	0.0038[Bc]	0.0028[Bc]	0.0043[Bc]	0.0057	0.0033[Bc]	0.0059	0.0061	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	0.0014	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.0027	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.0084	0.021	0.011	0.0092	0.0068	0.0068	0.0077	0.01	0.01	0.0083	0.01	0.021	0.01	0.0088	0.0086	0.015
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.0001	0.00011	<0.00010	0.0001	<0.00010	0.00011	<0.00010	0.00012	<0.00010	0.00011	<0.00010	0.00014	<0.00010	<0.00010	0.00011	0.0001
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0056	0.005	0.0053	0.0054	0.0048	0.0043	0.0051	0.0049	0.0047	0.0051	0.0054	0.0051	0.0047	0.0051	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	17	18	18	17	16	18	18	19	17	18	18	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0006	0.00085	0.00061	0.0008	0.00053	0.00061	<0.0005	0.00066	0.00061	0.00056	0.00057	0.00059	0.0005	0.00055	0.00063	0.00057
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.031	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	-	0.00032	0.00028	0.0006	0.00031	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	0.0011	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.001	0.001
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.2	2.1	2.1	2.2	2.1	2.0	2.1	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00085	0.0018	0.00097	0.00078	0.00059	0.0007	0.00044	0.0009	0.00075	0.00057	0.0011	0.0019	0.00081	0.00057	0.00085	0.0017
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00035	0.00035	0.00031	0.00029	0.00032	0.00034	0.0003	0.00033	0.00033	0.0003	0.00034	0.00036	0.00033	0.00034	0.00037	0.00034
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.53	0.51	0.47	0.5	0.47	0.41	0.48	0.49	0.49	0.43	0.49	0.51	0.5	0.51	0.5	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000081	0.000093	0.00012	0.000061	0.00012	0.00011	0.000091	0.000093	0.000081	0.00012	0.00011	0.00014	0.000096	0.000075	0.000093	0.000085
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.8	1.8	1.8	1.7	2.0	1.9	1.7	1.9	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.99	0.89	0.98	0.92	0.84	0.9	0.93	0.97	0.92	0.98	1.0	0.96	0.98	0.97	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.13	0.15	0.14	0.13	0.14	0.15	0.15	0.14	0.14	0.14	0.15	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Date Sampled							2017-08-31	2018-05-23	2018-06-19	2018-08-27	2018-10-17	2019-06-19	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00016	0.00017	0.00017	0.00016	0.00016	0.00016	0.00017	0.00016	0.00016	0.00018	0.00016	0.00016	0.00018	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0066	0.0053	0.0098	0.0041	0.0062	0.0048	0.005	0.0058	0.0053	0.0047	0.0053	0.0069	0.0059	0.004	0.0061	0.0051
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0047	0.0054	0.005	0.0053	0.0048	0.0051	0.0052	0.0053	0.0051	0.0049	0.005	0.0046	0.005	0.0048	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000084	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00063[Bc]	0.0006[Bc]	0.00078[Bc]	<0.0005	0.00069[Bc]	<0.00050	<0.0005	0.00055	<0.00050	0.00074[Bc]	<0.00050	0.00054	<0.0005	<0.00050	<0.0005	0.0006
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	0.00041	0.00026	0.00035	0.0003	0.00028	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00022	0.00023	0.00029	0.00014	0.00019	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	0.00022	0.00025	0.00011	<0.00010	0.00012	0.00037
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00034	0.00032	0.00031	0.00031	0.00031	0.00032	0.00034	0.00033	0.00032	0.00032	0.00036	0.00034	0.00036	0.00029	0.00034	0.00034
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0001	0.000089	0.000061	0.00008	0.000066	0.0001	0.0001	0.000089	0.000084	0.000091	0.000092	0.000079	0.00009	<0.000050	0.000078	0.00014
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.6	1.6	1.7	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.12	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.13	0.14	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00017	0.00016	0.00017	0.00018	0.00015	0.00016	0.00016	0.00016	0.00015	0.00015	0.00017	0.00016	0.00017	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location							QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	80	80	80	80	80	80	80	80	80	80	120	120	120	120	120
Date Sampled							2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22	2015-08-12
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.6	7.5	7.4	7.5	7.7	7.6	7.7	7.6	7.2	-	-	-	-	7.5	-
Temperature	°C	**15**[d]	-	-	-	-	3.9	3.9	3.9	4.0	3.8	4.0	4.3	3.8	3.8	4.0	-	-	-	-	3.9	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	12	12	12	12	11	12	12	12	-	-	-	-	11	-
Dissolved oxygen	%	-	-	-	-	-	91	89	88	88	90	89	85	88	91	88	-	-	-	-	83	-
Turbidity	NTU	**1.0**	-	-	-	-	0.37	0	0	0.15	-	0.68	-	0.15	0.21	0.45	-	-	-	-	0.31	-
Conductivity	µS/cm	-	-	-	-	-	111	108	110	111	114	110	112	117	116	111	-	-	-	-	115	-
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.9	8.0	8.0	7.8	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	52	52	54	54	50	52	55	54	54	54	52	51	54	56	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	48	47	50	50	50	50	52	50	50	48	51	50	51	49	52
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	74	70	90	69	69	73	74	69	73	67	66	69	68	66	65	70
Total suspended solids	mg/L	-	-	-	-	-	<1.2	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	1.8	1.7	1.7	1.7	1.6	1.9	1.7	1.6	1.5	2.1	2.1	1.8	1.7	1.8	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.35	0.15	<0.10	0.13	<0.10	0.16	0.11	0.13	<0.1	0.24	0.2	0.34	0.24	0.23	0.13	0.2
Conductivity	µS/cm	-	-	-	-	-	110	112	111	111	115	114	112	112	116	111	110	103	110	106	113	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	55	53	52	-	-	-	-	55	53	55	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	18	18	18	17	18	19	18	18	18	18	17	18	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.034	0.032	0.038	0.028	0.031	0.028	0.038	0.041	0.034	0.035	0.032	0.033	0.033	0.034	0.033	0.033
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.2	2.1	2.0	2.0	1.9	2.0	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.47	0.52	0.5	0.49	0.48	0.48	0.46	0.5	0.55	0.49	0.48	0.46	0.47	0.52	0.51	0.49
Sodium	mg/L	-	-	-	-	-	0.91	1.0	0.99	0.96	0.92	0.95	0.88	0.96	0.99	0.94	0.93	0.93	0.94	0.99	0.94	0.92
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.2	6.7	6.4	6.5	6.2	6.7	6.9	6.3	7.2	6.3	6.2	6.3	6.3	6.1	6.4
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.15	-	0.14	0.14	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.18	0.19	0.17	0.19	0.16	0.19	0.18	0.18	0.19	0.2	0.18	0.19	0.18	0.18	0.17
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0025[Bc]	<0.002[Bc]	<0.002[Bc]	0.0022[Bc]	0.0025[Bc]	0.0021[Bc]	0.0055	0.0021[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	0.0021[Bc]	<0.002[Bc]	0.0022[Bc]	0.0022[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0027	<0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.007	0.0095	0.0078	0.0093	0.0093	0.0074	0.0081	0.0077	0.0070	0.0059	0.015	0.022	0.015	0.014	0.012	0.011
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	<0.00010	0.0001	0.00011	0.00012	<0.00010	<0.00010	0.00011	<0.00010	<0.0001	0.00010	0.00011	0.00013	0.00011	0.00012	0.00012	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0052	0.0052	0.0053	0.0052	0.0047	0.0048	0.005	0.0049	0.0050	0.0049	0.0051	0.0053	0.0052	0.005	0.0057	0.0051
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	17	17	18	17	17	19	18	19	18	18	17	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00054	0.00056	0.00065	0.00068	<0.0005	<0.00050	<0.0005	0.011	0.00062	0.00081	0.00093	0.001	0.00064	0.00083	<0.001	0.00071
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.000068	0.00014	0.000099	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	0.0011	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	0.0010	0.00078	0.001	<0.0010	<0.0010	0.0012	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.1	2.1	2.1	2.1	2.0	2.0	1.9	2.1	2.0	2.0	1.9	2.0	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00012	0.00078	0.00068	0.00087	0.00075	0.00067	0.00093	0.00069	0.00060	0.00051	0.00074	0.0015	0.001	0.00089	0.00074	0.00072
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00035	0.00031	0.00038	0.00033	0.00035	0.00034	0.00034	0.00033	0.00035	0.00033	0.00041	0.00031	0.00033	0.00033	0.00034
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.48	0.5	0.51	0.49	0.48	0.47	0.46	0.49	0.47	0.51	0.49	0.48	0.47	0.5	0.49	0.48
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000076	0.000092	0.000068	0.000086	0.000081	0.00012	0.00013	0.000089	0.00012	0.000080	<0.00050	0.0001	0.000099	0.000083	0.000081	0.000082
Silicon	mg/L	-	-	-	-	-	1.8	1.9	1.8	1.6	1.7	1.8	1.8	1.7	1.7	1.8	1.7	1.8	1.6	1.7	1.7	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.94	0.97	0.96	1.0	0.96	0.94	0.89	0.96	0.93	1.0	0.94	0.99	0.95	0.96	0.94	0.9
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.15	0.15	0.14	0.15	0.14	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-80m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	80	80	80	80	80	80	80	80	80	80	120	120	120	120	120	120
Date Sampled							2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13	2015-06-10	2015-07-22	2015-08-12
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00015	0.00017	0.00018	0.00017	0.00016	0.00018	0.00015	0.00016	0.00016	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0061	0.0056	0.0055	0.0073	0.0099	0.0053	0.0043	0.0046	0.0063	0.0046	0.0062	0.0064	0.0047	0.006	0.0052	0.0053
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001
Barium	mg/L	-	-	-	-	-	0.0049	0.0051	0.0054	0.0048	0.0051	0.0048	0.005	0.0049	0.0053	0.0050	0.005	0.0051	0.0051	0.0051	0.0054	0.005
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[g]	**0.00025 - 0.00034[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000005	<0.0000005	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.0006	<0.0005	0.00066[Bc]	0.00066[Bc]	0.00051[Bc]	<0.0005	**0.0069[Bc,Ba]**	0.00077[Bc]	0.00058[Bc]	0.0007[Bc]	0.001[Bc]	0.0006	0.00077[Bc]	0.00086[Bc]	0.00064[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.00012	0.0002	0.00012	0.000082	<0.000050
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.001	0.00084	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00012	0.00011	0.00014	0.00031	0.00035	0.00016	0.00011	0.00015	0.00037	0.00026	0.000086	0.00033	0.00025	0.00021	0.00016	0.00016
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-
Molybdenum	mg/L	-	-	-	-	-	0.00031	0.00033	0.00033	0.00034	0.00034	0.00032	0.00034	0.00034	0.00035	0.00035	0.00027	0.00036	0.0003	0.00031	0.00032	0.00033
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00009	0.000085	0.000096	0.00012	0.000088	0.0001	0.0001	0.000084	0.000088	0.000098	<0.00050	0.00009	0.000077	0.000083	0.000081	0.000073
Silicon	mg/L	-	-	-	-	-	1.9	1.8	1.8	1.6	1.5	1.7	1.7	1.7	1.7	1.7	1.6	1.8	1.6	1.7	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00016	0.00016	0.00016	0.00017	0.00016	0.00017	0.00018	0.00017	0.00014	0.00017	0.00015	0.00016	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Date Sampled							2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11	2020-09-16
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	-	-	-	7.8	7.5	7.9	-	7.7	7.2	8.0	6.7	7.5	7.6	7.7	7.8
Temperature	°C	**15**[d]	-	-	-	-	-	-	-	-	4.9	3.9	8.7	-	6.6	3.8	6.5	3.8	3.9	3.9	3.8	3.8
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	11	11	11	-	12	12	11	11	11	12	12	12
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	89	81	97	-	95	88	93	86	87	93	90	90
Turbidity	NTU	**1.0**	-	-	-	-	-	0.39	-	-	**1.42**[DW]	0	0.28	-	**2.99**[DW]	0.41	0.55	0	0.12	0.29	0	0.01
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	105	109	109	-	116	108	108	111	112	118	111	112
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	7.8	7.9	7.8	7.9	7.8	8.0	7.8	7.9	7.9	8.0	8.0	7.8	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	56	55	55	53	54	53	53	50	52	54	51	55	50	54	53	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	51	51	50	50	48	51	51	49	50	50	50	49	51	48	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	67	64	75	61	66	80	81	70	57	72	77	68	71	73	75	73
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.5	1.3	1.5	1.6	1.5	1.6	1.7	1.5	1.9	1.6	1.4	1.7	1.9	1.7	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.28	0.12	0.12	0.27	0.38	0.26	0.16	0.27	0.13	0.22	0.19	0.2	<0.10	0.28	0.16	<0.10
Conductivity	µS/cm	-	-	-	-	-	109	109	113	113	109	108	108	110	105	111	109	111	111	110	113	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	54	58
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	19	19	19	18	18	18	18	17	17	18	17	19	17	18	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.032	0.032	0.033	0.034	0.033	0.034	0.036	0.031	0.032	0.034	0.033	0.034	0.035	0.036	0.034	0.03
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.2	2.0	2.0	2.1	2.1	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.51	0.48	0.45	0.48	0.51	0.5	0.51	0.48	0.47	0.51	0.49	0.48	0.5	0.51	0.51	0.51
Sodium	mg/L	-	-	-	-	-	0.95	0.93	0.93	0.95	1.0	0.94	0.97	0.95	0.97	1.0	0.92	0.94	0.97	0.94	1.0	1.0
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.4	6.3	6.1	6.3	6.2	6.3	6.2	6.5	6.7	6.5	6.2	6.6	6.2	6.6	6.6	6.3
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.15	0.15	0.14	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.15	0.15	0.14	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.2	0.2	0.19	0.18	0.17	0.18	0.18	0.22	0.14	0.19	0.19	0.2	0.2	0.2	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0048[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	**<0.02**[Bc, DW]	0.0022[Bc]	**0.044**[Bc, DW]	0.0022[Bc]	0.0053	0.0057	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0032	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.018	0.0093	0.0085	0.017	0.036	0.011	0.01	0.013	0.0078	0.014	0.011	0.0069	0.01	0.013	0.011	0.01
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	<0.00010	0.00012	0.00012	0.00012	0.0001	<0.00010	0.00012	0.00011	0.00011	0.0001	<0.00010	<0.00010	0.00011	<0.00010	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0051	0.005	0.0055	0.006	0.005	0.0052	0.0048	0.0052	0.0054	0.0052	0.0052	0.0047	0.0051	0.005	0.0048
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	18	18	17	19	18	18	18	18	18	16	18	18	20
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00094	0.00054	0.00055	0.00092	0.0014	0.00078	0.00085	0.00065	0.00083	0.00065	0.0012	0.00054	0.00067	0.00057	0.00067	0.00071
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.031	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	0.000092	0.000077	0.000076	0.00012	0.000089	0.00006	0.00021	0.00041	0.00085	0.00032	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	1.9	2.0	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.1	2.0	1.8	2.0	2.2	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00082	0.00046	0.00056	0.0015	0.0015	0.00083	0.00069	0.0011	0.00066	0.0012	0.00072	0.00056	0.00076	0.0011	0.00079	0.00064
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00033	0.0003	0.00035	0.0003	0.00032	0.00031	0.00033	0.00035	0.00032	0.0003	0.00032	0.0003	0.00034	0.00031	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.53	0.5	0.45	0.49	0.58	0.49	0.51	0.53	0.48	0.51	0.5	0.47	0.45	0.5	0.51	0.44
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000071	0.0001	0.000086	0.000081	0.000084	0.000075	0.000064	0.000069	0.00011	0.00012	0.000068	0.0001	0.000084	0.000094	0.000071	0.000088
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.8	1.8	1.9	1.7	1.6	1.6	1.9	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.97	0.97	0.95	0.99	0.93	0.94	0.99	1.0	0.98	0.95	1.0	0.91	0.86	0.93	1.0	0.92
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.13	0.14	0.14	0.13	0.14	0.12	0.14	0.14	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island
Depth (m)							120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Date Sampled							2015-09-14	2015-10-15	2015-11-18	2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11	2020-09-16
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00017	0.00016	0.00017	0.00016	0.00015	0.00015	0.00016	0.00016	0.00017	0.00017	0.00017	0.00015	0.00016	0.00016	0.00015
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0051	0.0082	0.006	0.0059	0.0065	0.0052	0.0047	0.0055	0.0054	0.0056	0.0052	0.0054	0.0042	0.006	0.0046	0.0052
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0052	0.0051	0.0053	0.0053	0.0051	0.005	0.0048	0.0052	0.0054	0.005	0.005	0.0049	0.0053	0.0052	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00062	0.00054[Bc]	0.00069[Bc]	0.00073[Bc]	0.00079[Bc]	0.00066[Bc]	0.00072[Bc]	0.00054[Bc]	0.00078[Bc]	0.00055[Bc]	0.00078[Bc]	**0.00094[Bc,Ba]**	<0.0005	<0.0005	<0.00050	0.00076[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	0.000063	<0.000050	0.00018	0.00014	0.000095	0.00027	0.00011	0.000062	0.00026	0.00031	0.00036	0.00025	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00016	0.00012	0.00016	0.00038	0.00028	0.00013	0.00016	0.00018	0.00019	0.00017	0.00018	0.00019	0.00011	0.00012	<0.00010	<0.00010
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.0003	0.0003	0.00031	0.00028	0.00032	0.0003	0.0003	0.0003	0.00033	0.00033	0.0003	0.00038	0.00034	0.00033	0.00032
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00007	0.0001	0.00008	0.000087	0.000089	0.000073	0.00006	0.000082	0.000087	0.000081	0.000078	0.00007	0.000094	0.0001	0.00011	0.00013
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.6	1.7	1.7	1.6	1.6	1.7	1.8	1.8	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00016	0.00015	0.00015	0.00015	0.00014	0.00015	0.00016	0.00017	0.00017	0.00015	0.00015	0.00016	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0044	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location							QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island	QUL-120a-120m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Date Sampled							2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	8.4	7.3	8.7	7.6	7.7	7.7	7.5	7.5	7.3	7.4	7.6	7.5	7.6	7.5	6.9
Temperature	°C	**15**[d]	-	-	-	-	3.9	3.9	3.9	3.8	3.9	3.3	3.9	3.8	3.9	3.8	3.7	3.9	3.9	3.7	3.7	3.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12
Dissolved oxygen	%	-	-	-	-	-	87	90	90	89	88	91	91	89	89	87	90	88	85	87	90	87
Turbidity	NTU	**1.0**	-	-	-	-	0.16	0.08	0.03	0.03	0.05	0	0.33	0	0	0.16	-	0.57	-	0.18	**2.85**[DW]	0.59
Conductivity	µS/cm	-	-	-	-	-	112	110	131	114	111	112	111	109	110	111	114	111	113	118	117	111
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.8	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	53	53	52	54	53	54	52	55	54	54	50	51	56	52	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	49	50	54	49	51	51	48	47	49	50	50	51	52	50	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	71	72	84	71	71	76	70	66	92	64	74	71	71	71	70	72
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.1	<1.0	3.9	1.2	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	13	2.1	1.9	1.8	1.6	2.2	2.2	2.0	1.9	1.7	1.7	1.8	1.5	1.7	1.6	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	<0.10	0.19	<0.10	<0.10	<0.10	0.24	0.18	0.14	<0.10	0.16	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1
Conductivity	µS/cm	-	-	-	-	-	111	112	109	118	110	113	109	112	111	115	115	116	112	108	115	110
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	50	53	55	57	54	53	55	53	52	-	-	-	-	52	56	56
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	17	18	18	18	17	19	18	18	17	17	19	17	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.039	0.038	0.032	0.032	0.036	0.037	0.034	0.032	0.038	0.028	0.031	0.028	0.033	0.042	0.033	0.038
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	1.9	2.1	2.0	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1
Potassium	mg/L	-	-	-	-	-	0.5	0.52	0.47	0.51	0.48	0.52	0.49	0.53	0.5	0.49	0.5	0.47	0.47	0.5	0.54	0.49
Sodium	mg/L	-	-	-	-	-	0.96	0.99	0.89	1.0	0.91	1.0	0.95	0.99	0.98	0.96	0.94	0.93	0.89	0.96	0.97	0.94
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.8	6.7	6.6	6.5	6.8	6.3	6.3	6.1	6.7	6.4	6.5	6.2	6.7	6.9	6.3	7.1
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.14	0.14	0.14	0.15	0.13	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.15
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.14	0.14	0.14	0.15	0.13	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.15
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0084	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.18	0.22	0.19	0.19	0.22	0.16	0.18	0.19	0.17	0.19	0.17	0.18	0.18	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	0.0029[Bc]	<0.002[Bc]	0.0022[Bc]	0.0021[Bc]	<0.002[Bc]	0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.016	<0.0020	<0.002	<0.002
Total Metals																					
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.008	0.019	0.0097	0.0099	0.0094	0.027	0.011	0.0096	0.007	0.0065	0.0086	0.007	0.007	0.0087	0.0066	0.0071
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.0001	0.00012	0.0001	<0.00010	0.00012	0.00011	<0.00010	0.00011	0.00013	0.00011	<0.00010	<0.00010	0.00011	0.00011	0.00010	<0.0001
Barium	mg/L	-	1.0	-	-	-	0.0051	0.0053	0.0052	0.0049	0.005	0.0056	0.0052	0.0052	0.005	0.0052	0.0048	0.0049	0.0049	0.0048	0.0049	0.0048
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005
Calcium	mg/L	-	-	-	-	-	17	18	18	20	18	18	19	18	17	18	18	17	17	18	19	19
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00097	0.0006	0.00051	0.00057	0.00056	0.00074	<0.00050	<0.0005	<0.0005	0.00051	0.00052	<0.0005	0.00051	0.0051	0.00052	0.00056
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0006	0.0019	0.00076	0.00064	0.00063	0.0022	0.001	0.00075	0.00056	0.00094	0.00092	0.00062	0.00067	0.00074	0.00056	0.00057
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00032	0.00036	0.00035	0.00032	0.00035	0.00037	0.00035	0.00035	0.00031	0.00038	0.00036	0.00033	0.00033	0.00034	0.00033	0.00035
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Potassium	mg/L	-	-	-	-	-	0.48	0.51	0.5	0.51	0.5	0.52	0.49	0.51	0.5	0.48	0.48	0.48	0.46	0.48	0.46	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000084	0.000092	0.000082	0.000057	0.000089	0.00012	0.00008	0.000093	0.000082	0.000085	0.00013	0.00011	0.000096	0.000076	0.00011	0.00010
Silicon	mg/L	-	-	-	-	-	1.8	2.0	2.0	1.8	1.9	1.8	1.9	1.9	1.8	1.6	1.7	1.7	1.7	1.7	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001
Sodium	mg/L	-	-	-	-	-	0.98	1.0	0.98	1.0	1.0	1.0	0.95	0.98	0.95	0.96	0.99	0.94	0.91	0.97	0.93	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.14	0.14	0.15	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m	QUL-120a-120m - Quesnel Lake Beyond Caribou Island	QUL-120a-120m - Quesnel Lake Beyond Caribou Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Date Sampled							2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00017	0.00016	0.00016	0.00018	0.00016	0.00016	0.00017	0.00017	0.00016	0.00016	0.00016	0.00016	0.00018	0.00018	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0041	0.0081	0.0055	0.0053	0.0056	0.0064	0.0077	0.0051	0.0053	0.0043	0.0052	0.0064	0.005	0.0037	0.0046	0.0040
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Barium	mg/L	-	-	-	-	-	0.005	0.0052	0.0046	0.0052	0.0047	0.0053	0.0053	0.005	0.0053	0.0049	0.0051	0.0049	0.0051	0.0047	0.0050	0.0049
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00091	0.00057	<0.0005	0.00053	<0.0005	0.00065	<0.00050	0.00052	<0.0005	<0.0005	0.00055[Bc]	<0.0005	<0.0005	**0.0062[Bc,Ba]**	0.00055[Bc]	0.00054[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001
Manganese	mg/L	-	-	-	-	-	<0.00010	0.00028	0.00011	<0.00010	0.00013	0.00042	0.00016	0.00018	0.00013	0.00015	0.00021	0.00016	0.00014	0.00016	0.00018	0.00023
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.00034	0.00039	0.00029	0.00033	0.00036	0.00031	0.00033	0.00033	0.00034	0.00035	0.00029	0.00033	0.00033	0.00033	0.00035
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	**0.0012**	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Selenium	mg/L	-	-	-	-	-	0.000095	0.000081	0.00014	0.000079	0.000074	0.000088	0.000077	0.00008	0.000098	0.000094	0.00011	0.00011	0.000083	0.000069	0.00011	0.000090
Silicon	mg/L	-	-	-	-	-	1.6	1.8	1.7	1.6	1.6	1.8	1.9	1.8	1.8	1.7	1.6	1.7	1.7	1.6	1.7	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.15	0.14	0.15	0.13	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.13	0.14	0.15	0.14	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00017	0.00015	0.00016	0.00016	0.00015	0.00015	0.00015	0.00017	0.00016	0.00017	0.00016	0.00017	0.00017	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	140	140	140	140	140	140	140	140	140	140	140	140	140	140
Date Sampled							2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.8	7.4	8.0	-	7.7	7.2	7.9	6.7	7.5	7.7	7.7	7.8	8.0	8.4	7.3
Temperature	°C	**15**[d]	-	-	-	-	-	5.4	3.8	6.5	-	6.7	3.7	5.3	3.7	3.8	3.9	3.8	3.8	3.8	3.9	3.9
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	11	11	11	-	11	12	12	11	11	12	12	12	12	12	12
Dissolved oxygen	%	-	-	-	-	-	-	91	80	92	-	92	88	91	86	87	93	90	89	87	90	89
Turbidity	NTU	**1.0**	-	-	-	-	-	**1.84**[DW]	0	0	-	**1.14**[DW]	0.44	0.48	0	0.09	0.24	0	0.05	0.13	0.06	0
Conductivity	µS/cm	-	-	-	-	-	-	105	109	107	-	115	108	107	111	112	118	111	112	112	111	132
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.8	8.0	7.8	7.9	7.8	8.0	8.0	7.8	7.8	7.9	7.8	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	54	53	53	51	53	54	52	55	53	54	53	56	54	53	55
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	49	49	51	50	49	50	52	50	49	51	48	49	49	49	48
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	60	68	81	81	68	70	69	77	68	74	69	70	76	72	73	88
Total suspended solids	mg/L	-	-	-	-	-	<1.0	1.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.1	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.4	1.7	1.4	1.6	1.5	1.5	0.67	1.8	1.2	1.6	2.0	2.0	1.8	13	2.0	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.3	0.53	0.22	0.14	0.2	0.13	0.25	0.1	0.26	<0.10	0.22	0.11	<0.10	<0.10	0.26	<0.10
Conductivity	µS/cm	-	-	-	-	-	113	108	108	108	109	107	110	110	109	110	111	111	111	111	112	110
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	54	53	53	50	53
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	17	18	18	17	19	18	18	18	19	18	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.035	0.034	0.033	0.036	0.031	0.032	0.034	0.033	0.034	0.035	0.036	0.034	0.036	0.039	0.038	0.038
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.0	2.0	2.0	2.2	1.9	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.0
Potassium	mg/L	-	-	-	-	-	0.48	0.57	0.5	0.49	0.49	0.47	0.52	0.48	0.49	0.51	0.51	0.51	0.52	0.51	0.52	0.48
Sodium	mg/L	-	-	-	-	-	0.92	0.97	0.95	0.94	0.95	0.95	1.0	0.91	0.96	0.98	0.94	1.0	1.1	0.96	1.0	0.91
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.2	6.3	6.3	6.5	6.7	6.5	6.2	6.6	6.2	6.6	6.5	6.4	6.8	6.7	6.5
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.14	0.15	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.15	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.14	0.15	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.15	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.01	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.18	0.19	0.18	0.18	0.18	0.15	0.18	0.19	0.21	0.2	0.2	0.21	0.21	0.18	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0043[Bc]	0.004[Bc]	<0.002[Bc]	<0.002[Bc]	**<0.02**[Bc, DW]	0.0023[Bc]	**0.077**[Bc, DW]	<0.002[Bc]	0.0063	0.0061	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0022[Bc]	0.0023[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0027	0.003	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.013	0.046	0.014	0.01	0.012	0.007	0.016	0.011	0.0063	0.0073	0.014	0.011	0.0077	0.0088	0.016	0.0099
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00014	0.00011	<0.00010	0.00013	<0.00010	0.0001	0.00011	<0.00010	<0.00010	0.00011	0.0001	<0.00010	<0.00010	0.00012	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0052	0.006	0.0051	0.005	0.0047	0.005	0.0053	0.0052	0.0053	0.0045	0.0051	0.005	0.0051	0.005	0.005	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000071	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	17	18	18	18	17	18	18	17	18	18	18	18	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00089	0.0017	0.00089	0.00093	0.00054	0.00082	0.0011	0.0018	0.00061	<0.0005	0.0008	0.00066	0.00054	0.00057	0.00056	0.00052
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	0.039	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000083	0.000076	0.00012	0.00015	<0.000050	0.00014	0.00033	0.00035	0.0003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	2.1	2.2	2.1	2.0	2.0	1.9	2.0	2.0	2.2	2.1	2.1	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00096	0.0017	0.00084	0.00071	0.00094	0.00064	0.0014	0.00076	0.00056	0.00074	0.0012	0.00074	0.00064	0.00066	0.0016	0.001
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00033	0.00032	0.00033	0.0003	0.00032	0.00032	0.00033	0.0003	0.00032	0.00031	0.00034	0.00034	0.00032	0.00032	0.00035	0.00034
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00068	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.47	0.56	0.49	0.52	0.52	0.48	0.48	0.51	0.46	0.47	0.5	0.51	0.47	0.48	0.47	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000082	0.000078	0.000085	0.000064	0.000076	0.000099	0.000093	0.000078	0.000097	0.00007	0.00011	0.00011	0.00012	0.00013	0.00011	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	1.8	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.7	1.8	1.8	1.7	1.7	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.94	0.92	0.95	0.98	1.0	0.98	0.92	0.99	0.92	0.92	0.93	0.99	0.93	0.96	0.98	0.98
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.13	0.14	0.13	0.14	0.14	0.13	0.14	0.13	0.14	0.14	0.13	0.14	0.13	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island
Depth (m)							140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
Date Sampled							2016-04-26	2016-05-19	2016-06-27	2016-08-24	2017-06-21	2017-08-31	2018-06-19	2018-08-27	2018-10-17	2019-08-19	2020-06-16	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[(c,f)]	-	0.00016	0.00016	0.00016	0.00015	0.00016	0.00016	0.00017	0.00017	0.00018	0.00016	0.00016	0.00017	0.00016	0.00016	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[(b,c,f)]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[(c)]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0054	0.0081	0.0049	0.0046	0.0054	0.0053	0.006	0.0051	0.0046	0.0043	0.0063	0.0045	0.0047	0.0042	0.008	0.005
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	0.0001	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0054	0.0051	0.005	0.005	0.005	0.0055	0.0053	0.0052	0.0054	0.0054	0.0052	0.0056	0.0049	0.0051	0.0048
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[(g)]	**0.00025 - 0.00034[(g)]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[(g)]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[(q)]	**0.0007 - 0.0349[(q)]**	-	-	0.0007[(Bc)]	0.00083[(Bc)]	0.00068[(Bc)]	0.00072[(Bc)]	<0.0005	0.0008[(Bc)]	0.00059[(Bc)]	<0.00050	**0.00078[(Bc,Ba)]**	<0.0005	<0.00050	<0.00050	0.00056	0.0012	0.00061	<0.0005
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[(g,f)]	-	-	-	0.00015	0.00019	0.00016	0.00011	0.00006	0.00021	0.00028	0.00021	0.00026	<0.000050	<0.000050	<0.000050	<0.000050	0.00014	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00027	0.00042	0.00011	0.00016	0.00015	0.00013	<0.00010	0.00013	0.0003	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	0.00026	0.0001
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00031	0.00029	0.0003	0.00029	0.0003	0.00031	0.00033	0.00032	0.00029	0.00034	0.00034	0.00034	0.00036	0.00031	0.00034	0.00035
Nickel	mg/L	-	0.0011 - 0.0094[(q)]	**0.0249 - 0.0798[(q)]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000082	0.000067	0.000088	0.000069	0.000076	0.000081	0.000087	0.00007	0.000082	0.000082	0.00013	0.00011	0.00011	0.000088	0.00011	0.000092
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.8	1.8	1.8	1.9	1.6	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.14	0.13	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00015	0.00014	0.00016	0.00015	0.00017	0.00017	0.00015	0.00016	0.00015	0.00016	0.00017	0.00016	0.00015	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[(g,k,l)]	**0.021 - 0.046[(g,l)]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m	QUL-120a-140m Quesnel Lake Beyond Cariboo Island	QUL-120a-140m Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	140	140	140	140	140	140	140	140	140	140	140	140	140	190	190	190
Date Sampled							2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.7	7.6	7.7	7.7	7.5	7.4	7.3	7.3	7.6	7.5	7.6	7.5	6.9	-	-	-
Temperature	°C	**15**[d]	-	-	-	-	3.8	3.9	3.3	3.9	3.8	3.8	3.8	3.7	3.8	3.9	3.6	3.6	3.8	-	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	12	12	12	12	11	12	12	11	12	12	11	-	-	-
Dissolved oxygen	%	-	-	-	-	-	88	88	90	91	89	89	87	90	88	84	87	89	86	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.06	0.05	0	0.44	0	0	0.15	-	0.59	-	0.13	**4.08**[DW]	0.64	-	-	-
Conductivity	µS/cm	-	-	-	-	-	114	111	112	111	109	110	111	113	111	113	118	118	111	-	-	-
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.8	7.9	7.9	7.9	7.9	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	55	53	55	53	53	55	55	51	51	54	51	54	53	52	51
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	53	49	51	51	48	47	50	50	50	51	52	51	50	49	52	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	82	69	80	72	76	89	70	72	69	70	58	76	69	65	66	68
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	3.8	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.9	1.7	2.3	2.2	1.9	1.9	1.6	1.6	1.7	1.6	1.6	1.8	1.5	2.1	2.3	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	<0.10	<0.10	0.24	0.26	0.14	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.1	0.13	0.36	0.49	0.29
Conductivity	µS/cm	-	-	-	-	-	118	111	112	109	112	112	116	115	114	113	112	114	109	111	111	110
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	58	53	52	55	51	52	-	-	-	-	56	54	56	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	19	18	18	18	18	19	18	17	17	18	17	18	18	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.038	0.038	0.037	0.035	0.033	0.038	0.028	0.031	0.027	0.039	0.041	0.036	0.036	0.032	0.033	0.033
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.1	1.9
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.53	0.5	0.53	0.51	0.48	0.52	0.48	0.47	0.5	0.54	0.50	0.49	0.47	0.47
Sodium	mg/L	-	-	-	-	-	0.97	0.92	1.0	0.96	1.0	1.0	0.97	0.97	0.94	0.89	0.95	0.98	0.95	0.95	0.97	0.96
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.6	6.8	6.4	6.3	6.1	6.7	6.4	6.5	6.2	6.7	6.9	6.3	7.2	6.3	6.1	6.3
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.13	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.15	0.15	0.13	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.13	0.14	0.14	0.15	0.14	0.14	0.15	0.15	0.15	0.14	0.15	-	0.13	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.18	0.22	0.18	0.18	0.19	0.18	0.19	0.17	0.18	0.18	0.18	0.19	0.2	0.18	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	0.0025[Bc]	0.003[Bc]	<0.002[Bc]	<0.002[Bc]	0.0023[Bc]	<0.002[Bc]	0.0022[Bc]	0.0021[Bc]	0.0021[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0027[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	0.0014	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	<0.002	0.0024	0.0022	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.0084	0.0081	0.018	0.011	0.0097	0.0074	0.0077	0.014	0.0066	0.0072	0.0079	0.0073	0.0063	0.021	0.027	0.018
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00011	<0.00010	0.00011	0.00011	0.00011	0.00011	<0.00010	<0.00010	0.00011	<0.0001	0.00010	0.00012	0.00014	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0047	0.0052	0.0055	0.0055	0.0051	0.0052	0.0052	0.0051	0.0047	0.005	0.0048	0.0051	0.0048	0.0053	0.0056	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	20	18	17	18	17	17	18	18	17	17	19	18	19	18	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0006	0.00059	0.00068	<0.00050	<0.0005	<0.0005	0.00051	0.00088	<0.0005	<0.0005	0.0034	0.00064	0.00055	0.00084	0.00089	0.00072
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	0.037	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.000084	0.00014
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	0.0010	0.0007	0.001	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.2	2.0	2.1	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00069	0.00065	0.0019	0.0012	0.0008	0.00068	0.00086	0.0014	0.00057	0.00091	0.00091	0.00063	0.00060	0.0014	0.0027	0.0014
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00036	0.00034	0.00034	0.00032	0.00034	0.00032	0.00037	0.00037	0.00033	0.00035	0.00034	0.00033	0.00034	0.00032	0.0004	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.5	0.51	0.49	0.5	0.51	0.48	0.5	0.48	0.45	0.49	0.47	0.53	0.5	0.49	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000078	0.000092	0.00011	0.000092	0.00014	0.000071	0.00011	0.00012	0.000073	0.000092	0.00011	0.000099	0.000087	<0.00050	0.00012	0.000095
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.9	2.0	1.9	1.8	1.6	1.8	1.7	1.7	1.6	1.7	1.8	1.7	1.9	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.99	0.94	1.0	0.96	0.97	0.97	0.96	1.0	0.93	0.89	0.98	0.94	1.0	0.95	1.0	0.99
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.14	0.14	0.14	0.14	0.15	0.15	0.14	0.14	0.14	0.15	0.14	0.14	0.13	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m - Quesnel Lake Beyond Cariboo Island	QUL-120a-140m	QUL-120a-140m Quesnel Lake Beyond Cariboo Island	QUL-120a-140m Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island
Depth (m)							140	140	140	140	140	140	140	140	140	140	140	140	140	190	190	190
Date Sampled							2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-16	2015-04-29	2015-05-13
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00018	0.00017	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00016	0.00018	0.00018	0.00017	0.00015	0.00017	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0072	0.0057	0.006	0.0063	0.0052	0.0059	0.0095	0.0059	0.0054	0.0037	0.0049	0.0051	0.0048	0.0052	0.0072	0.0059
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	0.0001	<0.00010	0.0001	<0.0001	<0.0001	<0.00010	0.0001	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0046	0.0053	0.0052	0.0051	0.0054	0.0052	0.0054	0.0049	0.005	0.0048	0.0052	0.0049	0.0051	0.0053	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000005	<0.0000005	<0.0000010	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00051	0.00063	<0.00050	0.00056	<0.0005	0.00062[Bc]	0.00059[Bc]	<0.0005	<0.0005	**0.011[Bc,Ba]**	0.00057[Bc]	0.00055[Bc]	0.0007[Bc]	0.00067	0.00066[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.000069	0.00016
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00087	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00016	<0.00010	0.00042	0.00012	0.00012	0.00014	0.00028	0.00024	0.00024	0.00013	0.0002	0.00018	0.00025	0.00034	0.00089	0.00021
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0003	0.00033	0.00036	0.00033	0.00036	0.00034	0.00036	0.00033	0.00031	0.00033	0.00032	0.00034	0.00033	0.00026	0.00038	0.00029
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000098	0.000072	0.00012	0.000091	0.00007	0.0001	0.000099	0.00011	0.000097	0.00009	0.000067	0.000085	0.000088	<0.00050	0.000098	0.000063
Silicon	mg/L	-	-	-	-	-	1.8	1.6	1.9	1.9	1.8	1.8	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.14	0.14	0.13	0.14	0.14	0.15	0.13	0.14	0.15	0.14	0.15	0.13	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00015	0.00016	0.00016	0.00016	0.00016	0.00017	0.00017	0.00016	0.00017	0.00017	0.00017	0.00014	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	190	190	190	190	190	190	190	190	190	0	0	0	0	0	0
Date Sampled							2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2017-04-10	2018-05-23	2019-06-19	2015-03-11	2015-03-18	2015-03-24	2015-04-01	2015-04-08	2015-04-14	2015-05-06
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.3	-	-	-	-	7.6	7.3	7.7	-	-	-	-	-	-
Temperature	°C	**15**[d]	-	-	-	-	-	3.6	-	-	-	-	4.9	3.6	4.7	-	-	-	-	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	11	-	-	-	-	-	12	11	-	-	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	-	81	-	-	-	-	-	90	88	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	-	0.29	-	-	-	-	0.38	0.35	0.97	-	-	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	-	117	-	-	-	-	109	109	114	-	-	-	-	-	-
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.8	7.9	7.8	7.9	7.9	8.0	7.9	7.9	7.8	7.9	8.0	7.7	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	57	55	55	55	55	52	47	55	53	55	53	53	56	52	52
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	51	49	52	51	52	51	50	50	49	47	51	50	49	47	52	42
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	65	64	74	74	69	76	69	71	80	67	64	63	75	64	67	77
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	<1.0	1.1	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.8	1.6	1.7	1.5	1.5	1.5	1.8	1.6	2.3	1.6	1.8	2.7	2.0	2.2	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.24	0.13	0.18	0.28	0.15	0.12	0.29	0.28	<0.10	0.51	0.38	0.64	0.47	0.43	0.41	0.42
Conductivity	µS/cm	-	-	-	-	-	106	112	113	111	109	114	114	113	111	110	111	111	110	110	111	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																					
Calcium	mg/L	-	-	-	1000[c,f]	-	18	19	19	19	19	19	17	16	19	18	19	18	18	19	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.034	0.033	0.034	0.033	0.032	0.033	0.031	0.035	0.045	0.033	0.034	0.035	0.033	0.033	0.034	0.035
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.1	2.0	2.0	2.1	1.9	2.1	2.0	2.1	2.0	2.0	2.1	1.9	2.0
Potassium	mg/L	-	-	-	-	-	0.51	0.51	0.48	0.52	0.48	0.44	0.5	0.45	0.52	0.55	0.52	0.49	0.5	0.48	0.46	0.5
Sodium	mg/L	-	-	-	-	-	0.97	0.95	0.89	0.96	0.95	0.91	0.94	0.88	1.0	1.1	1.0	1.0	0.97	1.0	0.94	1.1
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.2	6.1	6.5	6.4	6.3	6.2	6.4	6.5	6.8	6.7	6.6	6.6	6.4	6.5	6.4	6.7
Nutrients																					
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.14	-	0.13	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.19	0.17	0.19	0.2	0.19	0.17	0.18	0.21	0.25	0.2	0.19	0.18	0.18	0.21	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.01	0.003[Bc]	0.0075	0.0026[Bc]	<0.002[Bc]	<0.002[Bc]	0.0034[Bc]	<0.002[Bc]	0.0032[Bc]	0.0027[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.0031	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0034	0.0042	<0.0020	<0.0020	<0.0020	0.0021	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																					
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.019	0.012	0.0098	0.02	0.01	0.0093	0.015	0.018	0.0091	0.037	0.031	0.024	0.024	0.022	0.024	0.032
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00011	0.00013	<0.00010	0.00012	0.00012	0.00011	0.0001	0.00015	0.00015	0.00011	0.00011	0.00014	0.00011	0.00014
Barium	mg/L	-	1.0	-	-	-	0.0052	0.0056	0.0052	0.0052	0.005	0.005	0.0053	0.0056	0.0048	0.0064	0.0062	0.0059	0.005	0.0055	0.0055	0.006
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050	<0.00050	<0.00050	0.000069	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	19	18	18	18	18	18	17	18	18	18	17	19	17	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00076	<0.001	0.00069	0.00091	0.00062	0.00067	0.00075	0.00078	0.00061	0.0014	0.0012	0.0011	0.00086	0.001	0.00086	0.0012
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00018	0.000078	<0.000050	0.000055	<0.000050	0.000071	0.000091	0.00032	<0.000050	0.000061	0.000092	<0.000050	0.0001	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.00072	0.00087	<0.0010	<0.0010	0.0011	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.1	2.0	1.9	2.0	2.1	2.1	1.9	2.1	2.1	2.0	1.9	2.2	1.9	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0012	0.00074	0.0009	0.0009	0.00054	0.00058	0.0013	0.0016	0.00093	0.0015	0.0015	0.0014	0.0013	0.0012	0.0012	0.0016
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00032	0.00032	0.00031	0.00033	0.0003	0.00033	0.00033	0.00036	0.00061	0.0005	0.00053	0.00068	0.00049	0.00042	0.00053
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0008	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.49	0.48	0.51	0.48	0.47	0.48	0.51	0.43	0.56	0.52	0.51	0.49	0.47	0.47	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000069	0.0001	0.000085	0.000074	0.000085	0.000093	0.000096	0.000082	0.00011	<0.00050	<0.00050	<0.00050	0.00011	0.00011	0.0001	0.0001
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.9	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.99	0.91	0.9	0.98	0.94	0.96	0.96	1.0	0.87	1.1	1.1	1.1	0.95	0.98	0.98	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.13	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-120a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-120a-190m - Quesnel Lake Beyond Cariboo Island	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	190	190	190	190	190	190	190	190	190	0	0	0	0	0	0
Date Sampled							2015-06-10	2015-07-22	2015-08-12	2015-09-14	2015-10-15	2015-11-18	2017-04-10	2018-05-23	2019-06-19	2015-03-11	2015-03-18	2015-03-24	2015-04-01	2015-04-08	2015-04-14	2015-05-06
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00018	0.00016	0.00017	0.00017	0.00016	0.00017	0.00016	0.00019	0.00017	0.00018	0.00018	0.00016	0.00017	0.00018
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0059	0.0053	0.005	0.0057	0.0052	0.0048	0.0047	0.0045	0.005	0.0064	0.006	0.0078	0.0055	0.0061	0.0056	0.0069
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.0001	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	0.00012	0.0001	<0.00010	<0.00010	<0.00010	0.00012
Barium	mg/L	-	-	-	-	-	0.005	0.0054	0.0049	0.0051	0.005	0.005	0.0049	0.0048	0.0051	0.0055	0.0054	0.0054	0.0049	0.0051	0.0052	0.0056
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000010	<0.0000010	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.0006	0.002[Bc]	0.00068[Bc]	0.00074[Bc]	0.00067[Bc]	0.00063[Bc]	0.00059[Bc]	0.00061[Bc]	<0.00050	0.0011[Bc]	0.00077[Bc]	0.00074[Bc]	0.00064	0.00069	0.00059	0.00082[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	0.00012	0.0001	<0.000050	0.00012	0.000056	0.00011	0.00013	0.00024	<0.000050	0.000054	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.00062	0.00082	<0.0010	<0.0010	0.001	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00021	0.00015	0.00017	0.00016	0.00011	0.00013	0.00017	0.00021	<0.00010	0.00051	0.00039	0.00032	0.00028	0.00033	0.00025	0.00049
Mercury	mg/L	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00033	0.00032	0.00029	0.00032	0.00029	0.00029	0.0003	0.00032	0.00035	0.00055	0.00039	0.00044	0.00036	0.00041	0.00038	0.00049
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0001	0.00009	0.000081	0.000087	0.000061	0.000063	0.000085	0.000085	0.00013	<0.00050	<0.00050	<0.00050	0.00013	0.000095	0.00011	0.00012
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.7	1.7	1.7	1.7	1.6	1.8	1.8	1.7	1.8	1.7	1.7	1.9	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.12	0.14	0.14	0.13	0.14	0.13	0.13	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00016	0.00016	0.00015	0.00016	0.00016	0.00015	0.00017	0.00017	0.00016	0.00017	0.00015	0.00016	0.00016	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2015-05-19	2015-06-03	2015-06-10	2015-07-01	2015-08-26	2015-09-14	2015-09-17	2015-10-06	2015-10-28	2015-11-09	2015-11-26	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	-	-	7.4	7.8	8.4	-	8.2	7.9	7.7	7.8	7.9	7.4	8.1	7.7	7.8
Temperature	°C	**15**[d]	-	-	-	-	-	-	-	**17.8**[DW]	**17.6**[DW]	15	-	12	9.5	8.0	5.6	4.9	2.6	8.3	13	**17.8**[DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	10	9.5	9.6	-	9.7	13	10	11	11	13	12	11	9.7
Dissolved oxygen	%	-	-	-	-	-	-	-	-	107	100	96	-	91	105	88	87	87	93	99	103	102
Turbidity	NTU	**1.0**	-	-	-	-	-	-	-	0.76	0.15	0.56	-	0.19	0.81	0.17	0.33	0.36	**5.34**[DW]	0.15	0.15	0
Conductivity	µS/cm	-	-	-	-	-	-	-	-	104	142	177	-	142	133	148	144	150	107	101	98	96
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	8.0	-	8.0	8.0	7.9	-	-	7.9	7.9	-	7.8	7.8	7.9	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	-	50	-	49	53	53	-	-	56	54	-	56	55	54	51	47
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	-	36	-	47	47	50	-	-	49	50	-	48	49	50	47	41
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	-	65	-	58	77	71	-	-	77	69	-	65	74	61	66	75
Total suspended solids	mg/L	-	-	-	-	-	-	<3.0	-	<3.0	<3.0	<3.0	-	-	<3.0	<3.0	-	<3.0	<3.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	-	2.3	-	2.0	1.6	1.7	-	-	1.3	1.6	-	1.8	1.6	2.0	1.9	2.3
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	-	0.22	-	0.23	0.16	0.23	-	-	0.24	0.23	-	0.25	0.19	0.53	0.68	0.33
Conductivity	µS/cm	-	-	-	-	-	-	103	-	102	107	109	-	-	110	111	-	110	112	114	102	95
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	-	17	-	17	18	18	-	-	19	18	-	19	19	18	17	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	-	<0.50	-	<0.50	<0.50	<0.50	-	-	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	-	0.033	-	0.031	0.031	0.032	-	-	0.031	0.034	-	0.034	0.034	0.034	0.032	0.033
Magnesium	mg/L	-	-	-	-	-	-	1.9	-	1.9	1.9	2.0	-	-	2.0	2.0	-	2.1	2.0	2.1	2.0	1.9
Potassium	mg/L	-	-	-	-	-	-	0.51	-	0.44	0.47	0.48	-	-	0.43	0.46	-	0.48	0.48	0.48	0.56	0.52
Sodium	mg/L	-	-	-	-	-	-	0.92	-	0.83	0.87	0.87	-	-	0.8	0.87	-	0.9	0.92	0.99	0.94	0.92
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	-	6.0	-	5.9	6.5	6.5	-	-	6.4	6.5	-	6.6	6.5	6.6	5.8	5.7
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	-	0.099	-	0.072	0.05	0.052	-	-	0.064	0.079	-	0.1	0.12	0.11	0.09	0.06
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	-	<0.0010	-	<0.0010	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	-	0.099	-	0.072	0.05	0.052	-	-	0.064	0.079	-	0.1	0.12	0.11	0.09	0.06
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	-	<0.0050	-	<0.0050	<0.0050	<0.0050	-	-	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	-	0.16	-	0.12	0.1	0.12	-	-	0.12	0.14	-	0.16	0.17	0.19	0.17	0.15
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	-	0.002[Bc]	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	-	-	<0.002[Bc]	<0.002[Bc]	-	0.0024[Bc]	0.0051	<0.002[Bc]	0.0036[Bc]	0.0047[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	-	<0.0010	-	<0.0010	0.0012	<0.0010	-	-	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
Chlorophyll a	µg/L	-	-	-	-	-	0.075	-	0.18	-	0.26	-	0.88	-	-	-	-	-	-	-	-	0.55
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	-	<0.0020	-	<0.0020	<0.0020	<0.0020	-	-	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	0.0021
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	-	0.028	-	0.015	0.01	0.012	-	-	0.021	0.011	-	0.016	0.011	0.023	0.021	0.02
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	-	0.00014	-	0.00012	0.00011	0.00015	-	-	0.00013	0.00011	-	0.00011	<0.00010	0.00011	0.00015	0.00013
Barium	mg/L	-	1.0	-	-	-	-	0.0056	-	0.0051	0.0051	0.0051	-	-	0.0054	0.0048	-	0.0053	0.005	0.0057	0.0059	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	-	<0.010	-	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	-	16	-	17	18	18	-	-	18	18	-	18	18	18	17	15
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	-	0.00079	-	0.00055	<0.00050	0.00061	-	-	0.0007	0.00068	-	0.00074	0.00064	0.001	0.00078	0.00067
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	-	0.041	-	<0.030	<0.030	<0.030	-	-	0.03	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	-	<0.000050	-	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	-	-	0.001	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	-	1.9	-	1.9	1.9	2.0	-	-	1.9	2.0	-	2.0	2.1	2.0	2.0	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	-	0.0027	-	0.0014	0.00057	0.00089	-	-	0.0011	0.00098	-	0.0011	0.0009	0.0016	0.0019	0.0024
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	-	0.00038	-	0.00032	0.0003	0.00031	-	-	0.00031	0.00038	-	0.00036	0.00035	0.00044	0.00034	0.00037
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	-	0.5	-	0.45	0.49	0.51	-	-	0.45	0.45	-	0.48	0.49	0.49	0.6	0.54
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	-	0.00011	-	0.00012	0.000091	0.000076	-	-	0.000077	0.0001	-	0.000091	0.000091	0.00011	0.00011	0.00013
Silicon	mg/L	-	-	-	-	-	-	1.7	-	1.6	1.4	1.5	-	-	1.5	1.5	-	1.7	1.7	1.8	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	-	0.92	-	0.84	0.88	0.92	-	-	0.83	0.88	-	0.91	0.92	1.0	0.97	0.97
Strontium	mg/L	**7.0**	-	-	-	-	-	0.12	-	0.11	0.13	0.14	-	-	0.13	0.14	-	0.14	0.14	0.14	0.12	0.11
Thallium	mg/L	-	0.000030	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)							0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2015-05-19	2015-06-03	2015-06-10	2015-07-01	2015-08-26	2015-09-14	2015-09-17	2015-10-06	2015-10-28	2015-11-09	2015-11-26	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28
Titanium	mg/L	-	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	-	0.00014	-	0.00015	0.00017	0.00015	-	-	0.00016	0.00016	-	0.00016	0.00016	0.00017	0.00014	0.00014
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	-	<0.0030	-	<0.0030	<0.0030	<0.0030	-	-	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	-	0.0098	-	0.01	0.0072	0.007	-	-	0.0053	0.0054	-	0.0051	0.0058	0.0075	0.01	0.013
Antimony	mg/L	-	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	-	0.0001	-	<0.00010	<0.00010	<0.00010	-	-	0.00016	<0.00010	-	<0.00010	<0.00010	0.00011	0.0001	0.00012
Barium	mg/L	-	-	-	-	-	-	0.0053	-	0.005	0.0049	0.005	-	-	0.0052	0.0049	-	0.0051	0.005	0.0053	0.0057	0.0054
Beryllium	mg/L	-	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	-	0.00063	-	0.00054[Bc]	<0.00050	<0.00050	-	-	<0.0005	<0.00050	-	0.00056	0.00051[Bc]	0.00073	0.00067[Bc]	0.0006
Iron	mg/L	-	-	**0.35**	-	-	-	<0.030	-	<0.030	<0.030	<0.030	-	-	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[q,f]	-	-	-	-	<0.000050	-	<0.000050	<0.000050	<0.000050	-	-	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	-	<0.0010	-	<0.0010	<0.0010	<0.0010	-	-	0.0011	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	-	0.00091	-	0.00055	0.00017	0.00023	-	-	0.00014	0.00015	-	0.00026	0.00025	0.00076	0.00087	0.0013
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	0.00034	-	0.0003	0.0003	0.00032	-	-	0.00031	0.00031	-	0.00035	0.00033	0.00047	0.00036	0.00034
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	-	0.00012	-	0.000091	0.00012	0.000066	-	-	0.000077	0.000085	-	0.000087	0.000097	0.00011	0.000094	0.000084
Silicon	mg/L	-	-	-	-	-	-	1.8	-	1.6	1.4	1.5	-	-	1.5	1.5	-	1.6	1.6	1.8	1.8	1.8
Silver	mg/L	-	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	-	0.12	-	0.12	0.13	0.13	-	-	0.13	0.14	-	0.14	0.13	0.13	0.12	0.11
Thallium	mg/L	-	-	-	-	-	-	<0.000010	-	<0.000010	<0.000010	<0.000010	-	-	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	-	<0.00010	-	<0.00010	<0.00010	<0.00010	-	-	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	-	<0.010	-	<0.010	<0.010	<0.010	-	-	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	-	0.00014	-	0.00014	0.00015	0.00015	-	-	0.00016	0.00016	-	0.00015	0.00015	0.00015	0.00014	0.00013
Vanadium	mg/L	-	-	-	-	-	-	<0.00050	-	<0.00050	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[q,k,l]	**0.021 - 0.046[q,l]**	-	-	-	<0.0030	-	<0.0030	<0.0030	<0.0030	-	-	<0.0030	<0.0030	-	<0.0030	<0.0030	0.0077[Bc]	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)							0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09	2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.4	8.1	7.7	-	7.2	7.6	7.7	7.5	7.8	-	7.9	-	8.1	8.1	7.9	7.8
Temperature	°C	**15**[d]	-	-	-	-	**18.9**[DW]	**20.3**[DW]	15	9.3	7.5	2.7	5.0	13	**17**[DW]	-	8.6	5.7	14	14	**17**[DW]	**16**[DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	8.9	8.0	9.3	11	11	12	12	9.9	9.3	-	12	13	8.0	10	9.6	9.5
Dissolved oxygen	%	-	-	-	-	-	96	89	92	95	92	86	95	93	96	-	99	100	79	107	99	96
Turbidity	NTU	**1.0**	-	-	-	-	0.47	0.26	0.17	**1.35**[DW]	0.54	0.76	0.25	0.94	0.23	-	0.13	0.16	0.74	0.13	0	0
Conductivity	µS/cm	-	-	-	-	-	95	99	102	101	108	109	110	101	100	-	113	109	95	100	102	100
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.7	7.9	8.0	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	47	50	50	49	52	54	53	47	53	50	50	49	45	49	46	49
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	45	48	49	50	48	50	49	45	46	49	50	49	43	46	47	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	76	56	73	78	69	73	73	70	75	67	76	60	58	91	68	66
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	2.4	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.7	2.3	1.9	1.7	2.0	1.6	1.7	2.0	1.9	1.6	2.0	1.4	4.1	2.1	1.8	1.5
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.36	0.21	0.35	0.34	0.26	0.32	0.3	0.44	0.26	0.24	0.31	0.17	**1.9**[DW]	0.45	0.28	0.18
Conductivity	µS/cm	-	-	-	-	-	97	100	104	108	105	117	112	97	102	103	107	106	89	99	103	107
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	16	17	17	17	18	18	18	16	18	17	17	16	15	16	16	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.032	0.031	0.035	0.032	0.034	0.032	0.032	0.032	0.031	0.028	0.033	0.035	0.037	0.032	0.031	0.032
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	1.9	1.8	2.0	2.2	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.1	1.8	1.9
Potassium	mg/L	-	-	-	-	-	0.49	0.5	0.5	0.44	0.5	0.54	0.51	0.52	0.52	0.48	0.49	0.49	0.61	0.55	0.49	0.44
Sodium	mg/L	-	-	-	-	-	0.91	0.94	0.95	0.84	0.92	1.1	0.96	0.96	0.93	0.87	0.88	0.95	1.0	0.96	0.88	0.86
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	5.7	6.0	6.3	6.5	6.8	7.3	6.6	6.0	6.4	6.3	6.7	6.6	5.3	5.9	5.9	6.4
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.037	0.042	0.056	0.079	0.09	0.14	0.13	0.11	0.047	0.049	0.086	0.11	0.052	0.083	0.088	0.045
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.037	0.042	0.056	0.079	0.09	0.14	0.13	0.11	0.048	0.049	0.086	0.11	0.052	0.083	0.088	0.045
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0085	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0094
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.14	0.11	0.13	0.14	0.16	0.19	0.17	0.21	0.14	0.12	0.14	0.18	0.16	0.18	0.17	0.12
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.003[Bc]	<0.002[Bc]	0.0033[Bc]	<0.002[Bc]	<0.002[Bc]	0.0031[Bc]	0.0022[Bc]	0.003[Bc]	<0.002[Bc]	<0.002[Bc]	0.0034[Bc]	<0.002[Bc]	**0.049**[Bc, DW]	0.0022[Bc]	0.003[Bc]	0.0044[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	0.0011	0.0023	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	0.34	-	-	-	-	-	0.65	-	-	-	-	-	-	1.1	0.44
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0036	0.0026	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.021	0.013	0.013	0.016	0.016	0.02	0.017	0.023	0.011	0.0098	0.011	0.017	0.078	0.014	0.039	0.018
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00015	0.00013	0.00012	0.00012	0.00012	0.00013	0.0001	0.00012	0.00011	0.00012	0.0001	0.00013	0.00022	0.00016	<0.0010	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0059	0.0055	0.0051	0.0052	0.0061	0.0056	0.0053	0.0053	0.0057	0.0054	0.0056	0.006	0.0076	0.006	0.0056	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.001[DL>Bc]	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.00001	<0.0000050	<0.000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	16	17	17	17	17	18	18	16	17	18	17	19	14	16	16	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.001[DL>Bc]	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00067	0.00077	0.00062	0.00064	0.00069	0.00097	0.0006	0.00069	0.00055	<0.00050	0.001	0.00077	0.0012	0.00069	<0.005	0.00073
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.038	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.12	<0.030	<0.10	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.0	1.9	2.3	2.2	2.2	1.9	2.1	1.9	1.9	2.4	2.1	2.0	1.8	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0024	0.0012	0.00092	0.0011	0.0012	0.0012	0.0011	0.0016	0.0015	0.00079	0.0013	0.0031	0.0065	0.0013	0.0017	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00044	0.00035	0.00032	0.00034	0.00039	0.00061	0.0004	0.00036	<0.00040	0.0003	0.00034	0.00042	0.00047	0.00035	0.00059	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	0.00064	<0.00050	<0.005	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.51	0.47	0.49	0.52	0.52	0.51	0.48	0.49	0.5	0.47	0.47	0.58	0.52	<0.50	0.45
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	0.00009	0.000084	0.000087	0.00011	0.00016	0.000096	0.00009	0.00011	0.000077	0.00016	0.00011	0.0002	0.00012	<0.00050	0.0001
Silicon	mg/L	-	-	-	-	-	1.9	1.6	1.6	1.6	1.6	1.8	1.8	1.7	1.5	1.5	1.5	1.6	2.5	1.8	1.6	1.5
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00010	0.000013
Sodium	mg/L	-	-	-	-	-	0.93	0.96	0.85	0.91	1.0	1.1	1.0	0.91	0.88	0.89	0.86	1.2	1.1	0.97	1.0	0.85
Strontium	mg/L	**7.0**	-	-	-	-	0.11	0.13	0.13	0.13	0.13	0.14	0.14	0.12	0.12	0.13	0.13	0.14	0.1	0.12	0.12	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0001[DL>Bc]	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09	2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00014	0.00016	0.00016	0.00016	0.00017	0.00016	0.00015	0.00014	0.00016	0.00014	0.00019	0.00012	0.00014	0.00016	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0035	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0043	0.0031	<0.0030	<0.03	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.012	0.01	0.0095	0.0081	0.0072	0.0047	0.0052	0.0097	0.0088	0.0077	0.0062	0.0063	0.016	0.01	0.027	0.01
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00012	0.00011	0.0001	<0.00010	0.00011	<0.00010	<0.00010	0.00011	0.00011	<0.00010	<0.00010	<0.00010	0.00018	0.00017	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0057	0.0054	0.0054	0.0048	0.0054	0.0051	0.0051	0.0055	0.0055	0.005	0.0056	0.0052	0.0068	0.0057	0.0085	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000054	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000063	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.0005	0.00052	0.00052	0.00055	0.00075[Bc]	0.00057[Bc]	0.00054	0.00054	<0.00050	<0.00050	<0.00050	0.00051[Bc]	0.00098	<0.00050	0.0015[Bc]	0.0008[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00092	0.0005	0.00023	0.00023	<0.00010	0.00029	0.00037	0.00065	0.00027	0.00019	0.00018	0.00017	0.0029	0.00055	0.0012	0.00064
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00039	0.00034	0.00029	0.00033	0.00042	0.00056	0.00039	0.00035	0.00028	0.00028	0.0003	0.00032	0.00046	0.00035	0.00046	0.00032
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.000089	0.000072	0.000077	0.00013	0.00013	0.000079	0.00011	0.000073	0.000074	0.000093	0.00012	0.00016	0.00013	0.00014	0.00011
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.7	1.4	1.6	1.6	1.7	1.7	1.5	1.4	1.5	1.6	2.1	1.8	1.4	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.11	0.12	0.13	0.13	0.13	0.14	0.13	0.12	0.12	0.13	0.13	0.13	0.099	0.12	0.12	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00013	0.00014	0.00014	0.00015	0.00014	0.00016	0.00014	0.00014	0.00014	0.00015	0.00014	0.00014	0.00012	0.00014	0.00014	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0041[Bc]	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-06-19	2019-07-25	2019-08-20	2019-10-30	2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	-	7.9	7.9	7.9	7.8	7.9	7.8	-	7.9	8.1	8.0	8.1	8.0	8.4
Temperature	°C	**15**[d]	-	-	-	-	9.0	4.3	-	14	12	**18**[DW]	**17**[DW]	7.7	11	-	**16**[DW]	**16**[DW]	6.6	8.7	**20**[DW]	**16**[DW]
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	-	11	10	9.1	9.0	11	11	-	9.6	9.8	11	11	9.2	9.4
Dissolved oxygen	%	-	-	-	-	-	91	91	-	106	97	96	93	93	101	-	98	99	88	97	101	95
Turbidity	NTU	**1.0**	-	-	-	-	0	0	-	**1.2**[DW]	0.77	0.38	0.12	0.02	0.37	-	0	0.09	0.19	0.2	0.41	0.04
Conductivity	µS/cm	-	-	-	-	-	107	105	-	84	105	101	91	100	105	-	89	105	109	108	118	110
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	8.0	8.0	8.0	7.9	8.0	7.9	7.8	7.5	7.9	8.0	7.9	7.9	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	57	56	49	54	49	47	50	48	44	47	49	51	52	47	49
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	49	48	45	45	45	48	49	45	43	43	47	49	48	43	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	64	75	74	75	53	67	66	65	65	66	66	67	70	72	82
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.7	1.7	1.9	1.9	2.3	2.0	1.9	3.0	4.1	2.9	2.2	13	2.5	2.2	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.34	0.22	0.28	0.45	0.31	0.23	0.25	0.22	0.92	**1.43**[DW]	0.49	0.29	0.18	0.38	0.25	0.18
Conductivity	µS/cm	-	-	-	-	-	106	107	114	100	102	99	102	110	99	95	99	104	108	109	97	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	47	49	48	49	54	48	49	51
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	18	19	19	17	18	16	16	17	16	14	15	17	17	18	16	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.034	0.034	0.034	0.038	0.039	0.036	0.033	0.035	0.038	0.039	0.035	0.035	0.037	0.037	0.035	0.031
Magnesium	mg/L	-	-	-	-	-	1.9	2.3	2.1	1.9	2.1	1.9	2.0	2.0	2.1	2.1	2.0	1.9	2.0	2.1	1.8	1.9
Potassium	mg/L	-	-	-	-	-	0.51	0.54	0.52	0.51	0.56	0.49	0.45	0.5	0.54	0.52	0.53	0.49	0.47	0.52	0.48	0.46
Sodium	mg/L	-	-	-	-	-	0.91	1.1	1.0	0.93	1.0	0.93	0.92	0.9	0.95	0.97	0.95	0.92	0.91	1.0	0.81	0.84
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.2	6.8	6.5	6.0	6.3	5.9	5.8	7.0	5.6	4.8	5.4	5.9	7.0	6.5	5.8	6.4
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.079	0.12	0.13	0.09	0.089	0.056	0.047	0.088	0.085	0.016	0.037	0.03	0.12	0.12	0.055	0.043
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.079	0.12	0.13	0.09	0.089	0.056	0.047	0.088	0.085	<0.050	0.037	0.03	0.12	0.12	0.055	0.043
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0057	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	0.0061	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.16	0.17	0.21	0.19	0.16	0.16	0.13	0.2	0.2	0.15	0.15	0.13	0.18	0.18	0.14	0.12
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.003[Bc]	0.0024[Bc]	0.0041[Bc]	0.0054	0.0068	0.0072	0.003[Bc]	0.0049[Bc]	0.0087	**0.0114**[DW]	0.0061	0.0027[Bc]	0.0022[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	0.86	-	1.4	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0021	<0.0020	0.0031	<0.0020	<0.0020	0.003	<0.0020	<0.0020	0.0026	<0.0020	0.0024	0.0022	<0.0020	<0.0020	<0.0020	0.0022
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.011	0.013	0.012	0.017	0.015	0.019	0.015	0.013	0.045	0.063	0.021	0.013	0.014	0.018	0.015	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00011	0.00012	<0.00010	0.00012	0.00014	<0.00010	<0.00010	0.00016	0.00023	0.00016	0.00011	0.00011	0.00014	0.00018	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0051	0.0053	0.0051	0.005	0.0056	0.005	0.0062	0.0062	0.0075	0.0055	0.0053	0.0049	0.0052	0.0059	0.0045
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000084	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	18	17	15	16	15	17	15	16	16	16	18	16	17	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00063	0.00056	0.0008	0.00061	0.00058	0.00097	0.00072	0.00064	0.00087	0.0012	0.00072	0.00066	0.00056	0.00074	0.00058	0.00062
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.066	0.1	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.1	2.0	1.9	1.8	1.9	1.8	1.9	2.1	2.3	2.1	2.0	2.1	2.0	1.8	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.001	0.001	0.0013	0.0018	0.0015	0.0014	0.0009	0.0011	0.0037	0.0043	0.0022	0.0012	0.0012	0.0018	0.0019	0.00078
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00041	0.0004	0.00036	0.00037	0.00034	0.00029	0.00038	0.00041	0.00048	0.00039	0.00032	0.00038	0.00039	0.00038	0.00032
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054	0.00075	0.00051	<0.00050	<0.00050	0.00057	<0.00050	0.00054
Potassium	mg/L	-	-	-	-	-	0.46	0.51	0.48	0.47	0.43	0.46	0.44	0.45	0.53	0.59	0.51	0.46	0.47	0.47	0.51	0.46
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000077	0.00012	0.00012	0.00011	0.00014	0.00014	0.000074	0.00012	0.00015	0.00016	0.00015	0.00013	0.00012	0.00014	0.00011	0.00011
Silicon	mg/L	-	-	-	-	-	1.5	1.8	1.7	1.7	1.7	1.7	1.6	1.6	2.2	2.4	2.0	1.7	1.7	1.7	1.7	1.4
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.87	1.0	1.1	0.88	0.85	0.96	0.85	0.92	0.96	1.1	0.93	0.89	0.97	0.98	0.89	0.86
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.13	0.12	0.12	0.12	0.11	0.13	0.11	0.099	0.12	0.12	0.14	0.12	0.12	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-06-19	2019-07-25	2019-08-20	2019-10-30	2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00014	0.00016	0.00017	0.00015	0.00015	0.00014	0.00013	0.00015	0.00013	0.00013	0.00013	0.00015	0.00016	0.00015	0.00015	0.00015
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.006	0.0063	0.005	0.011	0.01	0.0098	0.009	0.0082	0.016	0.02	0.015	0.0093	0.0094	0.011	0.01	0.0083
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	<0.00010	0.0001	0.00012	<0.00010	0.00011	<0.00010	0.00014	0.00019	0.00016	0.00012	<0.00010	0.00012	0.00012	<0.00010
Barium	mg/L	-	-	-	-	-	0.0049	0.0054	0.0054	0.0056	0.0056	0.0053	0.005	0.0052	0.0062	0.0059	0.0058	0.0055	0.0047	0.0052	0.0051	0.005
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00055	<0.00050	<0.00050	<0.00050	0.00051	<0.00050	<0.00050	0.00073	0.00077	0.00072	0.00069	<0.00050	0.00061	<0.00050	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.035	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[q,f]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00025	0.00027	0.00021	0.00087	0.00071	0.00018	0.0001	0.00019	0.00078	0.00042	<0.00010	0.00036	0.00045	0.0009	0.00073	0.00025
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00037	0.00044	0.00039	0.00036	0.00034	0.00033	0.00031	0.00039	0.00041	0.00044	0.00035	0.00035	0.00041	0.00036	0.00036	0.00029
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00057	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000094	0.00014	0.00014	0.0001	0.000099	0.000097	0.00011	0.00014	0.00015	0.00018	0.00013	0.000091	0.00013	0.00014	0.00013	0.00011
Silicon	mg/L	-	-	-	-	-	1.3	1.6	1.7	1.8	1.7	1.7	1.6	1.6	2.1	2.4	1.9	1.6	1.6	1.9	1.6	1.4
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.14	0.12	0.12	0.11	0.12	0.13	0.11	0.091	0.11	0.13	0.14	0.13	0.12	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00017	0.00018	0.00015	0.00017	0.00015	0.00014	0.00014	0.00012	0.00012	0.00013	0.00015	0.00015	0.00015	0.00014	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[q,k,l]	**0.021 - 0.046[q,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[e]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)							0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26	2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.9	8.1	7.0	7.6	7.6	8.3	7.7	7.8	8.2	8.1	8.0	7.6	8.0
Temperature	°C	**15**[d]	-	-	-	-	9.0	4.1	**16**[DW]	**21.1**[DW]	14	4.1	8.3	**16.7**[DW]	**17.4**[DW]	8.3	7.8	**16.3**[DW]	**18.7**[DW]	8.7	9.2	13
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	11	8.9	9.9	-	-	-	-	-	11	10	9.1	11	11	9.6
Dissolved oxygen	%	-	-	-	-	-	91	93	106	100	95	-	-	-	-	-	95	104	98	90	96	93
Turbidity	NTU	**1.0**	-	-	-	-	0.24	0.42	**1.1**[DW]	0	0	0.09	0	0	0.25	-	0.46	0.12	0.61	-	**7.81**[DW]	0.14
Conductivity	µS/cm	-	-	-	-	-	107	112	93	97	104	114	107	104	107	111	107	103	107	110	8.3	113
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	7.9	7.8	7.9	7.9	7.9	7.9	7.8	8.0	7.9	7.9	7.9	8.0	7.9	8.0	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	52	45	46	52	57	51	53	51	55	53	50	48	51	56	48
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	51	43	42	44	50	50	49	50	51	48	47	48	50	50	46
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	67	88	64	64	83	72	83	67	72	66	67	73	70	71	76	56
Total suspended solids	mg/L	-	-	-	-	-	<1.0	1.9	1.6	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	1.6	<1.0	1.2	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	2.0	3.4	2.3	2.0	2.1	2.0	2.3	2.4	2.1	2.0	2.5	2.4	1.8	2.1	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.28	0.3	**1.4**[DW]	0.27	0.2	0.26	0.42	**1.34**[DW]	0.57	0.43	0.43	0.58	0.2	0.26	0.24	0.37
Conductivity	µS/cm	-	-	-	-	-	107	112	91	98	106	111	111	102	109	112	107	106	109	110	108	103
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	54	45	46	50	51	52	50	54	54	-	-	-	-	52	49
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	15	15	17	19	17	18	17	19	18	17	16	17	19	16
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.034	0.037	0.031	0.03	0.036	0.035	0.036	0.028	0.037	0.028	0.029	0.031	0.027	0.038	0.039	0.031
Magnesium	mg/L	-	-	-	-	-	1.8	2.2	1.9	1.9	2.0	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.0
Potassium	mg/L	-	-	-	-	-	0.45	0.52	0.51	0.51	0.49	0.49	0.54	0.52	0.49	0.5	0.49	0.51	0.47	0.47	0.55	0.54
Sodium	mg/L	-	-	-	-	-	0.82	1.0	0.89	0.87	0.9	1.1	1.0	0.93	0.95	0.94	0.99	0.96	0.88	0.87	1.0	0.91
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.8	6.7	5.0	5.3	6.3	7.1	6.3	5.4	6.5	6.2	6.2	6.0	6.1	6.8	6.6	5.7
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.085	0.13	0.051	0.02	0.029	0.15	0.12	0.095	0.0074	0.044	0.11	0.045	0.045	0.089	0.11	0.054
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.085	0.13	0.051	0.02	0.029	0.15	0.12	0.095	0.0074	0.044	0.11	0.045	0.045	0.089	0.11	0.054
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0072	<0.0050	<0.0050	0.0066	<0.0050	<0.005
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.14	0.18	0.19	0.086	0.11	0.19	0.19	0.15	0.11	0.13	0.17	0.17	0.1	0.15	0.17	0.14
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0025[Bc]	0.0064	<0.002[Bc]	0.0023[Bc]	0.0032[Bc]	0.0029[Bc]	0.0024[Bc]	0.003[Bc]	0.0022[Bc]	0.003[Bc]	0.0036[Bc]	0.0026[Bc]	0.0026[Bc]	0.0026[Bc]	0.0035[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0029	<0.0020	<0.0020	0.0033	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024	<0.0020	<0.0020	<0.002
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.012	0.024	0.053	0.018	0.011	0.013	0.015	0.013	0.015	0.013	0.019	0.02	0.01	0.012	0.0086	0.014
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00012	0.00016	0.00012	0.00013	0.00012	0.00013	<0.00010	0.00012	0.00012	0.00013	0.00013	0.00012	<0.00010	0.00014	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0049	0.0055	0.0064	0.0052	0.0052	0.0053	0.0054	0.0055	0.0054	0.0051	0.0054	0.0054	0.0049	0.0049	0.005	0.0057
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	0.0000081	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Calcium	mg/L	-	-	-	-	-	18	18	15	16	17	17	18	17	18	18	16	16	15	17	17	16
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00052	0.00088	0.00083	0.00055	<0.00050	0.00063	0.00062	0.00054	0.00072	0.00054	0.00094	0.00075	0.00056	0.00067	0.0023	0.00065
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	0.074	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Magnesium	mg/L	-	-	-	-	-	1.9	2.2	1.9	1.9	2.0	2.1	2.1	2.0	2.2	2.1	2.1	2.0	2.0	2.0	2.0	1.9
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00096	0.0019	0.0036	0.0015	0.0011	0.0014	0.0013	0.0013	0.00096	0.00089	0.0024	0.0022	0.00084	0.00098	0.00084	0.0014
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00044	0.00038	0.00034	0.0003	0.0006	0.00038	0.00034	0.00036	0.00037	0.00046	0.00038	0.00035	0.00033	0.00038	0.00039
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	0.00054	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Potassium	mg/L	-	-	-	-	-	0.49	0.51	0.5	0.48	0.48	0.49	0.54	0.49	0.5	0.5	0.5	0.5	0.48	0.46	0.5	0.48
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0001	0.00014	0.00013	0.00011	0.000094	0.00019	0.00013	0.00011	0.00012	0.00012	0.00015	0.00013	0.00011	0.00012	0.00016	0.000097
Silicon	mg/L	-	-	-	-	-	1.6	1.9	2.2	1.5	1.3	1.8	1.9	1.6	0.8	1.1	1.6	1.7	1.5	1.6	1.8	1.5
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Sodium	mg/L	-	-	-	-	-	0.88	1.0	0.89	0.85	0.87	1.0	0.99	0.84	1.0	0.97	0.97	1.0	0.89	0.87	0.99	0.90
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.1	0.12	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.11	0.13	0.14	0.14	0.12
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-0m	QUL-2a-0m - QUL Between Cariboo Island and HAC
Depth (m)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Date Sampled							2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26	2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00013	0.00014	0.00015	0.00016	0.00015	0.00014	0.00017	0.00017	0.00015	0.00015	0.00016	0.00016	0.00017	0.00015
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0067	0.0062	0.018	0.011	0.0073	0.0068	0.0073	0.0091	0.015	0.0053	0.007	0.011	0.0089	0.0086	0.0079	0.0099
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	0.00014	0.00011	0.00014	<0.00010	0.00011	0.00011	0.00011	<0.00010	0.00012	0.00013	0.00011	<0.00010	0.00011	0.00011
Barium	mg/L	-	-	-	-	-	0.0045	0.0052	0.0058	0.0053	0.0053	0.0051	0.0052	0.005	0.0054	0.0049	0.0054	0.0055	0.0053	0.005	0.0055	0.0055
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	0.0000051	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0016	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00064	0.0007	<0.00050	<0.00050	0.00057(Bc)	<0.00050	0.00057	0.00085	0.00051	0.00064	0.00088	0.00054	0.00058	0.001(Bc)	0.00058
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001
Manganese	mg/L	-	-	-	-	-	0.00031	0.00037	0.0011	0.00058	0.00022	0.00046	0.00024	0.00036	0.00055	0.00022	0.00095	0.00063	0.00035	0.00041	0.00054	0.00049
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00032	0.00044	0.00036	0.00032	0.00034	0.00065	0.00038	0.00035	0.00036	0.00033	0.00041	0.00045	0.00032	0.00034	0.00038	0.00039
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	<0.00050	<0.00050	<0.00050	0.00054	0.00056	<0.00050	<0.00050	<0.00050	<0.0005
Selenium	mg/L	-	-	-	-	-	0.000097	0.00012	0.00015	0.000072	0.00008	0.00015	0.000099	0.000091	0.000093	0.000084	0.00012	0.00013	0.00012	0.000089	0.00012	0.00014
Silicon	mg/L	-	-	-	-	-	1.4	1.7	2.1	1.6	1.3	1.8	2.0	1.7	0.76	1.0	1.7	1.5	1.5	1.6	1.9	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.099	0.11	0.14	0.14	0.14	0.13	0.14	0.14	0.13	0.12	0.12	0.13	0.14	0.12
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00012	0.00013	0.00014	0.00015	0.00016	0.00015	0.00016	0.00017	0.00015	0.00014	0.00016	0.00016	0.00015	0.00014
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)							0	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2025-09-17	2015-12-07	2016-01-20	2016-04-26	2016-05-16	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09	2017-06-19	2017-08-21
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.4	8.0	7.9	-	7.2	7.9	8.0	7.9	-	7.3	7.6	7.8	7.5	8.2
Temperature	°C	**15**[d]	-	-	-	-	**18.5**[DW]	4.8	3.0	5.1	5.1	-	5.3	6.7	6.1	6.3	9.3	7.6	2.7	4.1	6.1	6.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	8.9	11	12	12	11	-	11	11	9.9	9.9	10	10	12	12	11	11
Dissolved oxygen	%	-	-	-	-	-	95	85	85	92	89	-	89	86	80	81	89	86	86	91	89	88
Turbidity	NTU	**1.0**	-	-	-	-	0.87	0.37	0.39	0.22	0.09	-	0	0.08	0.2	0.18	0	0.06	0.79	0.34	0.9	0.04
Conductivity	µS/cm	-	-	-	-	-	109	150	108	101	104	-	106	102	103	105	101	108	109	110	106	115
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.8	7.9	-	7.8	7.8	7.7	7.8	7.9	7.9	7.9	7.9	7.8	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	55	55	53	-	53	52	52	53	52	49	52	53	53	49	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	48	49	51	-	50	46	49	51	51	50	49	50	50	46	47
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	62	64	69	69	-	69	75	77	66	83	68	64	70	78	68	73
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<3.0	<3.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.5	1.7	1.6	-	1.8	1.6	1.9	2.2	1.7	1.8	1.9	1.7	1.5	1.8	1.7
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.20	0.28	0.31	0.33	-	0.44	0.3	0.36	0.22	0.28	0.35	0.31	0.55	0.31	0.38	0.17
Conductivity	µS/cm	-	-	-	-	-	105	111	112	112	-	106	107	106	106	106	105	106	118	112	100	105
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	17	19	19	18	-	18	18	17	18	17	17	18	18	18	16	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.5	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.036	0.032	0.035	0.035	-	0.033	0.035	0.034	0.033	0.036	0.033	0.034	0.032	0.032	0.032	0.032
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.0	2.0	-	2.1	2.0	2.0	2.1	2.0	1.8	2.0	2.2	2.1	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.51	0.47	0.48	0.48	-	0.6	0.51	0.48	0.53	0.52	0.46	0.49	0.55	0.52	0.5	0.54
Sodium	mg/L	-	-	-	-	-	0.90	0.89	0.94	0.94	-	1.0	0.98	0.91	1.0	1.0	0.85	0.92	1.1	0.97	0.94	1.0
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	7.1	6.5	6.8	6.3	-	6.3	6.7	6.5	6.5	6.6	6.5	6.8	7.8	6.7	6.2	6.6
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.034	0.1	0.12	0.13	-	0.13	0.14	0.13	0.13	0.13	0.081	0.09	0.15	0.13	0.13	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.001	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.034	0.1	0.12	0.13	-	0.13	0.14	0.13	0.13	0.13	0.081	0.09	0.15	0.13	0.13	0.13
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	0.0058	<0.0050	<0.0050	<0.0050	-	0.12	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.11	0.16	0.16	0.2	-	0.18	0.2	0.18	0.19	0.17	0.14	0.16	0.19	0.18	0.19	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0027[Bc]	<0.002[Bc]	<0.002[Bc]	-	0.0053	0.0032[Bc]	0.0037[Bc]	<0.002[Bc]	0.0038[Bc]	<0.002[Bc]	<0.002[Bc]	0.0029[Bc]	0.005	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	0.0015	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.002	<0.0020	<0.0020	<0.0020	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	0.0024	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.011	0.024	0.022	0.017	-	0.058	0.018	0.014	0.012	0.014	0.023	0.022	0.025	0.016	0.019	0.011
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.00012	<0.00010	0.00011	-	0.00013	0.00013	0.00012	0.00011	0.0001	0.00011	0.00012	0.00013	<0.00010	0.00011	0.0001
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0053	0.0055	0.0053	-	0.0065	0.0054	0.0053	0.0052	0.0052	0.0052	0.0061	0.0058	0.0052	0.0052	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.01	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.000005	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	18	18	-	18	18	18	18	18	17	17	18	18	16	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00052	0.00082	0.001	0.0013	-	0.0018	0.001	0.00063	0.00074	0.00075	0.00094	0.0013	0.0011	0.00059	0.00056	0.00069
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.03	<0.030	<0.030	<0.030	-	0.047	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.00005	0.00023	0.00036	0.000093	-	0.000069	0.00028	0.00014	0.00022	0.00032	0.00056	0.0021	0.00016	<0.000050	0.00012	0.00018
Lithium	mg/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.0	-	2.1	2.1	2.0	2.0	1.9	1.9	2.3	2.2	2.1	1.9	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00082	0.0011	0.0011	0.0013	-	0.0019	0.0015	0.0012	0.0011	0.0012	0.0013	0.0014	0.0013	0.0011	0.0014	0.00078
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00035	0.00043	0.00036	-	0.00037	0.00041	0.00039	0.00043	0.00039	0.00034	0.00039	0.00073	0.00037	0.00035	<0.00040
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.47	0.51	0.49	-	0.58	0.55	0.47	0.52	0.49	0.49	0.53	0.52	0.52	0.5	0.49
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000082	0.000091	0.000098	0.0001	-	0.00013	0.0001	0.00011	0.000093	0.00011	0.0001	0.00012	0.00016	0.000088	0.000088	0.00013
Silicon	mg/L	-	-	-	-	-	1.3	1.6	1.7	1.8	-	1.8	1.8	1.8	1.6	1.7	1.6	1.6	1.8	1.7	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.95	0.88	0.96	0.97	-	0.96	1.1	0.91	1.0	1.1	0.9	1.0	1.1	1.0	0.91	0.95
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	-	0.13	0.14	0.13	0.14	0.14	0.13	0.13	0.14	0.14	0.13	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a-0m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	0	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2025-09-17	2015-12-07	2016-01-20	2016-04-26	2016-05-16	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09	2017-06-19	2017-08-21
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00017	0.00016	-	0.00016	0.00017	0.00017	0.00015	0.00017	0.00016	0.00016	0.00017	0.00016	0.00016	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.003	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0091	0.0053	0.005	0.0061	-	0.0076	0.0065	0.0072	0.0072	0.006	0.0081	0.0077	0.0065	0.0055	0.0076	0.0069
Antimony	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00012	<0.00010	<0.00010	<0.00010	-	0.00013	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.0051	0.0051	0.0053	-	0.0057	0.0052	0.0052	0.0053	0.0053	0.0049	0.0054	0.0052	0.0052	0.0052	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.00005	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.000005	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00061	0.00055	0.00071[Bc]	0.0011[Bc]	-	0.00086[Bc]	0.00086[Bc]	0.00055	0.00077	0.00076[Bc]	0.00075[Bc]	0.00094[Bc]	0.0009[Bc]	0.001[Bc]	0.00052[Bc]	0.0017[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.03	<0.030	<0.030	<0.030	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.00005	0.00037	0.000095	0.00012	-	0.000092	0.00036	0.00026	0.00035	0.00034	0.00063	0.00074	0.00021	0.000073	0.00009	0.00032
Lithium	mg/L	-	-	-	-	-	<0.001	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00049	0.0003	0.00026	0.00041	-	0.00027	0.0003	0.00039	0.00027	0.00026	0.00022	0.00016	0.00033	0.00035	0.00011	0.00046
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00034	0.00034	0.0004	0.00034	-	0.00035	0.00038	0.00035	0.0004	0.00036	0.00032	0.0004	0.00068	0.00036	0.00033	0.00034
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000082	0.00008	0.000086	0.000095	-	0.00011	0.00011	0.000084	0.0001	0.000096	0.000081	0.000091	0.00014	0.000089	0.000078	0.00011
Silicon	mg/L	-	-	-	-	-	1.4	1.6	1.6	1.7	-	1.7	1.8	1.7	1.7	1.8	1.5	1.6	1.7	1.7	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.13	0.13	-	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.14	0.14	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.01	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00016	0.00015	-	0.00015	0.00016	0.00015	0.00015	0.00015	0.00015	0.00014	0.00017	0.00014	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.0005	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.003	<0.0030	<0.0030	<0.0030	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25	2019-08-20	2019-10-30	2020-06-16	2020-07-21
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.7	-	7.4	7.6	7.8	7.8	7.6	7.8	-	7.7	7.7	7.9	7.9	7.7	-
Temperature	°C	**15**[d]	-	-	-	-	-	8.6	5.8	4.2	5.5	5.3	6.7	8.1	4.3	-	5.1	5.2	7.1	7.8	7.3	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	11	12	12	11	11	10	10	12	-	12	11	10	11	12	-
Dissolved oxygen	%	-	-	-	-	-	-	94	95	89	98	86	85	87	89	-	93	84	85	91	96	-
Turbidity	NTU	**1.0**	-	-	-	-	-	0.21	0.05	0.37	0.47	0	0	0	0	-	0.52	0.35	0	0	0.13	-
Conductivity	µS/cm	-	-	-	-	-	-	113	107	112	106	108	103	108	110	-	108	110	109	108	111	-
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.8	7.9	8.0	7.9	7.9	7.8	8.0	8.0	7.9	8.0	7.9	7.8	7.3
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	49	53	53	51	49	50	50	55	56	54	50	49	50	50	50
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	49	50	51	49	49	49	48	49	49	48	48	50	49	48	46
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	75	58	66	73	69	68	69	67	72	68	65	66	67	66	73
Total suspended solids	mg/L	-	-	-	-	-	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	1.2	<1.1	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.8	1.3	4.4	2.1	1.8	1.5	1.7	1.7	1.7	1.7	2.0	1.8	2.0	2.4	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.33	0.32	0.23	0.35	0.32	0.21	0.18	0.31	0.24	0.22	0.15	0.14	0.23	0.19	0.6	0.69
Conductivity	µS/cm	-	-	-	-	-	103	102	105	108	107	107	109	107	107	114	109	106	105	111	105	107
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	52
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	16	18	18	17	17	17	17	18	19	18	17	16	17	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.029	0.033	0.035	0.039	0.033	0.031	0.032	0.034	0.034	0.036	0.042	0.038	0.034	0.035	0.035	0.036
Magnesium	mg/L	-	-	-	-	-	2.0	1.9	2.1	2.2	2.1	2.0	1.9	1.9	2.3	2.2	2.0	2.1	2.1	2.0	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.5	0.48	0.47	0.54	0.51	0.48	0.45	0.5	0.53	0.53	0.52	0.5	0.47	0.48	0.51	0.5
Sodium	mg/L	-	-	-	-	-	0.94	0.89	0.92	1.0	0.95	0.92	0.9	0.92	1.1	1.1	0.98	0.99	0.98	0.88	0.93	0.92
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.7	6.6	6.5	6.2	6.2	6.4	6.2	6.8	6.5	6.5	6.6	6.1	7.1	6.1	6.1
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.11	0.087	0.11	0.14	0.13	0.13	0.11	0.088	0.12	0.13	0.13	0.13	0.11	0.088	0.11	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.11	0.087	0.11	0.14	0.13	0.13	0.11	0.088	0.12	0.13	0.13	0.13	0.11	0.088	0.11	0.12
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0059	<0.0050	<0.0050	<0.0050	0.01	<0.0050	<0.0050	<0.0050	0.0066	0.013
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.14	0.17	0.18	0.18	0.18	0.17	0.17	0.17	0.18	0.22	0.2	0.18	0.2	0.2	0.21
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	0.0032[Bc]	0.0021[Bc]	0.0064	0.0031[Bc]	0.0051	0.0043[Bc]	0.0037[Bc]	0.0026[Bc]	0.0038[Bc]	0.0072	0.0026[Bc]	0.0029[Bc]	0.007	0.0068	0.0072
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	0.0021	0.0024	<0.0020	<0.0020	<0.0020	<0.0020	0.0033	<0.0020	0.0025	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.013	0.02	0.011	0.019	0.015	0.014	0.0099	0.0066	0.013	0.012	0.012	0.0099	0.0088	0.013	0.036	0.046
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00011	0.0001	0.00022	0.0001	0.00012	0.00011	0.00013	0.00015	<0.00010	0.0001	<0.00010	0.00011	0.00016	0.00013
Barium	mg/L	-	1.0	-	-	-	0.0055	0.0057	0.0056	0.0057	0.0056	0.0053	0.0054	0.0053	0.0052	0.0052	0.0049	0.0055	0.0049	0.0053	0.0057	0.006
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000066	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	16	17	16	17	16	17	17	17	17	17	17	17	17	16	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00054	0.0009	0.00066	0.00057	0.00071	0.00067	0.00054	0.00072	0.00061	0.00056	0.00056	0.0011	<0.00050	0.00062	0.00073	0.00076
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.045	0.05
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.00013	0.00055	0.00016	0.00045	0.00091	0.00051	0.00023	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.0	1.9	1.9	2.2	2.1	2.0	1.9	2.0	2.1	2.0	2.0	2.0	1.9	1.9	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0012	0.0013	0.001	0.0018	0.0017	0.00099	0.00093	0.0002	0.0011	0.0012	0.0012	0.0011	0.00066	0.0011	0.0021	0.0019
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00034	0.00031	0.00038	0.00032	0.00035	0.00039	0.00033	0.00035	0.00043	0.00039	0.00037	0.00041	0.00034	0.00037	0.00036	0.00033
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.47	0.44	0.5	0.52	0.48	0.43	0.47	0.51	0.48	0.47	0.48	0.47	0.44	0.51	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.000079	0.00014	0.00011	0.000099	0.00012	0.00012	0.000086	0.000097	0.00012	0.00014	0.000076	0.00011	0.00012	0.00011	0.00011	0.00012
Silicon	mg/L	-	-	-	-	-	1.7	1.6	1.6	1.9	1.8	1.7	1.6	1.5	1.8	1.7	1.6	1.8	1.6	1.6	1.9	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.96	0.89	0.9	1.0	1.0	1.0	0.84	0.9	1.1	1.0	0.94	1.0	0.91	0.91	0.92	0.98
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.14	0.14	0.14	0.13	0.14	0.13	0.13	0.13	0.13	0.14	0.13	0.12	0.12	0.13	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)							20	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25	2019-08-20	2019-10-30	2020-06-16	2020-07-21
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00014	0.00019	0.00016	0.00016	0.00017	0.00016	0.00015	0.00016	0.00016	0.00017	0.00016	0.00015	0.00014	0.00014	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	0.005	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0067	0.006	0.0054	0.0069	0.0067	0.0056	0.006	0.0067	0.0062	0.0054	0.0064	0.0057	0.0065	0.0081	0.012	0.0086
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	0.0001	<0.00010	<0.00010	0.00016	<0.00010	<0.00010	0.00012	0.0001	<0.00010	<0.00010	0.0001	0.00011	0.00013	0.00012	<0.00010
Barium	mg/L	-	-	-	-	-	0.005	0.0055	0.005	0.0056	0.0053	0.0056	0.0054	0.0049	0.0053	0.0054	0.0054	0.0052	0.0052	0.0051	0.0055	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00079[Bc]	0.0006[Bc]	0.00058	<0.00050	0.00057	0.00057	0.00069[Bc]	0.00053	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00056	<0.0005
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[q,f]	-	-	-	0.00013	0.00046	0.00014	0.00038	0.0005	0.00041	0.00023	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00025	0.00019	0.00018	0.00023	0.00024	0.00019	0.00023	0.00098	0.00016	0.0002	0.00015	0.00012	<0.00010	0.0002	0.00023	0.00021
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.0003	0.00028	0.00034	0.00032	0.00034	0.00035	0.00034	0.00036	0.00042	0.00038	0.00037	0.0004	0.00037	0.00037	0.00036	0.00034
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00009	0.00012	0.00011	0.00007	0.00012	0.00014	0.00011	0.000082	0.000092	0.000099	0.00011	0.00013	0.00013	0.00017	0.00013	0.00012
Silicon	mg/L	-	-	-	-	-	1.6	1.5	1.6	1.7	1.7	1.5	1.6	1.3	1.6	1.7	1.8	1.8	1.7	1.6	2.0	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.14	0.13	0.13	0.13	0.13	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00013	0.00015	0.00017	0.00015	0.00014	0.00016	0.00015	0.00016	0.00017	0.00017	0.00016	0.00015	0.00015	0.00014	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[q,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26	2023-09-11	2023-10-30
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	8.1	8.1	8.2	7.6	8.5	7.9	7.8	8.0	8.2	7.8	7.3	7.6	7.7	8.0	7.8
Temperature	°C	**15**[d]	-	-	-	-	5.5	5.3	6.3	4.5	5.7	5.8	9.0	4.1	5.2	5.7	9.6	3.8	5.6	6.9	9.0	6.1
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	12	11	11	11	12	11	11	9.9	-	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	88	87	87	92	90	86	91	92	90	87	87	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0	0.04	0.25	0.04	0.47	0.05	0.25	0	0.49	0	0	0.11	0	0	0.23	-
Conductivity	µS/cm	-	-	-	-	-	108	111	110	110	130	115	107	112	108	106	106	114	108	114	124	112
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	50	52	54	53	53	50	54	53	53	51	51	57	52	53	51	57
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	46	49	48	49	47	51	48	51	49	46	44	50	49	50	50	52
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	73	71	67	80	70	84	68	80	74	74	87	66	84	71	73	73
Total suspended solids	mg/L	-	-	-	-	-	<1.1	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	4.1	1.1	<1.0	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.2	2.0	13	2.0	2.0	1.7	1.7	1.9	2.5	2.2	2.1	2.2	2.1	2.5	2.2	2.0
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.26	0.15	0.14	0.15	0.11	<0.10	0.15	0.19	0.53	0.19	0.23	0.23	0.33	0.32	0.42	0.2
Conductivity	µS/cm	-	-	-	-	-	106	109	109	111	108	114	107	113	106	107	106	110	110	106	133	113
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	52	50	52	50	52	53	52	53	54	50	51	52	51	53	53	53
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	18	18	18	18	17	18	18	18	17	17	19	17	18	17	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.034	0.036	0.037	0.038	0.038	0.032	0.034	0.036	0.034	0.032	0.036	0.034	0.036	0.035	0.034	0.028
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.1	1.8	2.0	2.0	2.1	2.1	2.1	2.0	2.3	2.1	2.1	2.2	2.0
Potassium	mg/L	-	-	-	-	-	0.52	0.5	0.51	0.51	0.46	0.49	0.49	0.5	0.5	0.54	0.48	0.5	0.55	0.53	0.49	0.49
Sodium	mg/L	-	-	-	-	-	0.98	0.99	0.98	0.99	0.86	0.95	0.87	1.0	0.94	0.99	0.9	1.1	1.0	1.0	1.0	0.96
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.3	6.4	7.1	6.9	6.5	6.5	6.8	6.7	6.1	5.9	6.5	7.1	6.2	5.8	6.3	6.4
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.13	0.12	0.14	0.14	0.12	0.085	0.13	0.12	0.13	0.046	0.14	0.13	0.12	0.079	0.12
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.13	0.12	0.14	0.14	0.12	0.085	0.13	0.12	0.13	0.046	0.14	0.13	0.12	0.079	0.12
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.21	0.19	0.19	0.17	0.18	0.19	0.12	0.21	0.18	0.19	0.13	0.19	0.19	0.17	0.16	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0022[Bc]	0.0026[Bc]	0.0037[Bc]	<0.002[Bc]	0.0022[Bc]	0.0024[Bc]	<0.002[Bc]	0.0039[Bc]	0.0044[Bc]	0.002[Bc]	0.0034[Bc]	0.0028[Bc]	0.0029[Bc]	0.0042[Bc]	0.0027[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0031	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	0.0033	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.02	0.013	0.014	0.012	0.015	0.0099	0.011	0.018	0.021	0.013	0.012	0.013	0.016	0.022	0.012	0.009
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	<0.00010	<0.00010	0.0001	0.00014	<0.00010	0.00011	0.0001	0.00013	0.0001	0.00012	0.00011	0.00013	0.00013	0.00011	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0053	0.005	0.0052	0.0048	0.0054	0.0046	0.0049	0.0054	0.0055	0.0053	0.0052	0.0053	0.0052	0.006	0.0052	0.005
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000058	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	17	18	17	18	18	18	18	18	17	17	17	17	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0007	0.00073	0.00059	0.00058	0.00053	0.00058	0.00053	0.0007	0.0006	0.00054	0.00055	0.00066	0.00056	0.0014	0.00054	0.00051
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.0	2.1	2.0	1.9	2.0	1.9	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0015	0.0013	0.0011	0.0011	0.0012	0.00067	0.00093	0.0017	0.0019	0.0011	0.0012	0.0013	0.0013	0.0017	0.00092	0.00068
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00035	0.00036	0.00044	0.00037	0.00036	0.0004	0.00033	0.00044	0.00036	0.0004	0.00032	0.00065	0.00036	0.0004	0.00039	0.00046
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.46	0.49	0.46	0.51	0.48	0.49	0.5	0.5	0.51	0.49	0.5	0.55	0.51	0.49	0.48
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00013	0.00014	0.000092	0.00012	0.00011	0.0001	0.00019	0.0001	0.00013	0.000087	0.00014	0.00012	0.00014	0.00013	0.00013
Silicon	mg/L	-	-	-	-	-	1.9	1.7	1.7	1.9	1.8	1.7	1.6	1.8	2.0	1.9	1.5	1.9	2.0	1.8	1.3	1.6
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.95	0.9	0.98	0.95	0.98	0.94	0.88	1.0	0.95	0.97	0.88	1.0	0.98	0.94	0.99	0.98
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.13	0.14	0.13	0.14	0.14	0.13	0.14	0.14	0.14	0.13	0.14	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC
Depth (m)							20	20	20	20	20	20	20	20	20	20	20	20	20	20
Date Sampled							2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26	2023-09-11	2023-10-30
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00015	0.00016	0.00016	0.00017	0.00015	0.00017	0.00017	0.00015	0.00015	0.00015	0.00016	0.00015	0.00015	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0082	0.0078	0.0087	0.0064	0.0066	0.0063	0.0073	0.0058	0.0095	0.0078	0.0079	0.0074	0.0074	0.01	0.0068	0.0054
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.00011	0.0001	<0.00010	<0.00010	0.0001	<0.00010	0.0001	0.00011	0.00015	<0.00010	0.0001	0.00012	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0054	0.0054	0.005	0.005	0.0045	0.0053	0.0049	0.0051	0.0052	0.0051	0.0055	0.0051	0.0053	0.0053	0.0051	0.0048
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00051	0.00066	<0.00050	0.0006	<0.00050	0.00052	<0.00050	0.00066	0.00053	0.00077	0.00052	0.00058[Bc]	<0.00050	0.00084	<0.00050	0.00053
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00014	0.00027	0.00044	0.00021	0.0001	0.00017	0.00032	0.00032	0.00021	0.00027	0.00022	0.00037	0.00012	0.00025	0.00011	0.00014
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00035	0.00038	0.00047	0.00039	0.00039	0.00037	0.00034	0.00043	0.00035	0.00038	0.00033	0.00062	0.00035	0.0004	0.00038	0.00045
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000093	0.00014	0.0001	0.00011	0.00014	0.00011	0.00012	0.00012	0.00012	0.000099	0.00011	0.00017	0.000085	0.000098	0.0001	0.00016
Silicon	mg/L	-	-	-	-	-	1.8	1.6	1.6	1.8	1.7	1.7	1.4	1.7	1.9	1.8	1.4	1.8	1.9	1.9	1.2	1.5
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.15	0.14	0.15	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.13	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00016	0.00015	0.00017	0.00015	0.00016	0.00016	0.00015	0.00015	0.00015	0.00015	0.00016	0.00016	0.00016	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-20m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)							20	20	20	20	20	20	20	40	40	40	40	40	40	40	40
Date Sampled							2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-11	2015-03-18	2015-03-24	2015-04-01	2015-04-08	2015-04-14	2015-05-06	2015-06-03	2015-07-01
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	7.9	7.9	7.9	7.7	7.6	8.0	-	-	-	-	-	-	-	-	7.7
Temperature	°C	**15**[d]	-	-	-	-	4.8	6.0	6.6	8.7	5.2	5.0	8.3	-	-	-	-	-	-	-	-	5.1
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	12	11	10	12	12	10	-	-	-	-	-	-	-	-	10
Dissolved oxygen	%	-	-	-	-	-	92	93	90	89	92	90	88	-	-	-	-	-	-	-	-	81
Turbidity	NTU	**1.0**	-	-	-	-	0.31	-	0.71	-	0.23	0.16	0.74	-	-	-	-	-	-	-	-	0.63
Conductivity	µS/cm	-	-	-	-	-	111	110	109	109	119	115	111	-	-	-	-	-	-	-	-	125
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	8.0	8.0	7.9	8.0	7.9	7.9	8.0	8.0	7.8	8.0	8.0	7.8	8.0	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	56	52	50	51	54	51	52	53	55	54	54	57	53	52	55	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	49	50	50	50	50	49	47	52	55	51	43	53	51	49	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	69	74	70	70	67	69	63	64	71	61	80	65	68	70	72	62
Total suspended solids	mg/L	-	-	-	-	-	<1.0	1.5	12	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.8	2.0	1.4	1.8	1.8	1.7	2.1	2.1	2.0	2.6	2.1	2.1	2.0	2.2	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.36	0.15	0.24	0.19	0.21	0.16	0.29	0.51	0.65	0.62	0.59	0.46	0.44	0.46	0.22	0.19
Conductivity	µS/cm	-	-	-	-	-	116	113	114	110	111	112	107	112	113	111	113	110	112	113	113	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	55	55	54	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	17	17	18	17	18	18	19	18	18	19	18	17	19	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.029	0.032	0.028	0.037	0.039	0.034	0.036	0.035	0.034	0.035	0.033	0.033	0.034	0.035	0.035	0.033
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.49	0.51	0.5	0.46	0.49	0.55	0.50	0.51	0.51	0.51	0.49	0.49	0.46	0.51	0.52	0.47
Sodium	mg/L	-	-	-	-	-	0.98	0.96	0.94	0.85	0.95	0.98	0.90	1.1	1.1	1.0	0.94	1.0	0.97	1.0	1.0	0.94
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.6	6.5	6.2	6.8	6.8	6.2	7.1	6.7	6.7	6.6	6.4	6.5	6.5	6.7	6.7	6.4
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.12	0.13	0.089	0.13	0.13	0.11	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.12	0.13	0.089	0.13	0.13	0.11	0.14	0.14	-	0.13	0.14	0.14	0.14	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	0.0076	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.17	0.19	0.16	0.15	0.21	0.20	0.17	0.21	0.19	0.19	0.18	0.18	0.2	0.18	0.18	0.17
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0024[Bc]	0.0058	0.0024[Bc]	0.003[Bc]	0.0023[Bc]	0.0023[Bc]	0.0055	0.0022[Bc]	0.0021[Bc]	0.0025[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0041[Bc]	<0.002[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0044	<0.0020	<0.0020	0.0025	<0.0020	<0.002	<0.002	0.0027	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.01	0.011	0.01	0.011	0.01	0.013	0.0091	0.037	0.035	0.033	0.032	0.024	0.026	0.03	0.02	0.012
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00012	0.0001	0.0001	<0.00010	0.00012	<0.0001	0.00010	0.00014	0.00014	0.00013	0.00011	0.00015	0.00011	0.00014	0.00012	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0053	0.005	0.0048	0.0051	0.005	0.0054	0.0051	0.0064	0.0062	0.006	0.0053	0.0056	0.0054	0.0058	0.0056	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	0.0000055	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	17	17	17	19	19	18	18	18	18	19	19	18	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00066	0.00051	0.00053	<0.0005	0.0016	0.00085	0.00051	0.0013	0.0013	0.0011	0.0012	0.001	0.001	0.0017	0.001	0.00089
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.000099	0.000052	0.000083	0.000092	0.00014	0.00091	<0.000050	<0.00015
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00089	0.00066	0.00089	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0011	0.0013	0.0012	0.00086	0.00097	0.00057	0.00077	0.0014	0.0015	0.0014	0.0014	0.0013	0.0013	0.0015	0.0012	0.0013
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00046	0.00038	0.00035	0.00033	0.00037	0.00039	0.00037	0.00063	0.00057	0.00052	0.00049	0.00042	0.00045	0.00052	0.00049	0.00038
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.48	0.47	0.45	0.49	0.47	0.51	0.53	0.52	0.52	0.49	0.48	0.47	0.51	0.51	0.48
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00015	0.00013	0.00012	0.00011	0.00011	0.00011	0.00010	<0.00050	<0.00050	<0.00050	0.00011	0.000097	0.00011	0.000092	0.000083	0.000095
Silicon	mg/L	-	-	-	-	-	1.6	1.7	1.7	1.7	1.8	1.6	1.6	1.8	1.8	1.7	1.8	1.9	1.8	1.8	1.8	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.98	0.96	0.92	0.85	0.97	0.95	1.00	1.1	1.1	1.1	0.97	1.0	0.99	1.0	1.0	0.96
Strontium	mg/L	**7.0**	-	-	-	-	0.15	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.13	0.14	0.14	0.14	0.15	0.15	0.14	0.13
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	**Unit**	**BC ENV Drinking WQG**					**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-20m**	**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-20m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**	**QUL-2a-40m - QUL Between Cariboo Island and HAC**
Depth (m)			**Long-Term Chronic**	**Short-Term Acute**	**Long-Term Chronic**	**Short-Term Acute**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**
Date Sampled							**2024-05-29**	**2024-07-03**	**2024-09-04**	**2024-10-31**	**2025-06-02**	**2025-07-14**	**2025-09-17**	**2015-03-11**	**2015-03-18**	**2015-03-24**	**2015-04-01**	**2015-04-08**	**2015-04-14**	**2015-05-06**	**2015-06-03**	**2015-07-01**
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00015	0.00017	0.00017	0.00016	0.00017	0.00017	0.00017	0.00019	0.00018	0.00018	0.00017	0.00016	0.00017	0.00017	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0058	0.0088	0.0099	0.0063	0.007	0.0086	0.0055	0.0067	0.007	0.0077	0.006	0.0055	0.0057	0.0069	0.0064	0.01
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	0.00011	0.00011	<0.0001	<0.0001	0.00011	0.00013	0.00012	0.00011	0.00011	<0.00010	0.00011	0.00011	<0.00010
Barium	mg/L	-	-	-	-	-	0.0051	0.0055	0.0052	0.0049	0.005	0.0053	0.0051	0.0056	0.0056	0.0055	0.0048	0.0051	0.0052	0.0055	0.0054	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000005	<0.0000005	<0.0000010	<0.0000010	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00054[Bc]	0.00078[Bc]	0.00069	<0.0005	0.0026[Bc]	0.00061[Bc]	<0.0005	0.0011[Bc]	0.0009[Bc]	0.00084[Bc]	0.0012[Bc]	0.00072	0.00074	0.0011[Bc]	0.0009[Bc]	0.00098[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.000050	0.000068	0.000073	0.00013	0.000072	0.00011	0.00016	0.00013	0.00012
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00094	0.00056	0.00074	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00022	0.00041	0.00066	0.00025	0.00035	0.0011	0.00039	0.00044	0.00039	0.00036	0.00029	0.00032	0.00031	0.00036	0.00015	0.00058
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00041	0.00037	0.00033	0.00035	0.00036	0.00037	0.00036	0.00056	0.00049	0.00045	0.00041	0.0004	0.00038	0.00048	0.00042	0.00036
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00011	0.000091	0.000096	0.000098	0.0001	0.00012	0.00011	<0.00050	<0.00050	<0.00050	0.000093	0.000091	0.0001	0.000099	0.000089	0.00008
Silicon	mg/L	-	-	-	-	-	1.6	1.5	1.6	1.6	1.7	1.7	1.6	1.7	1.8	1.7	1.7	1.9	1.7	1.7	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.14	0.13	0.13	0.14	0.13	0.15	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.13	0.13
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00017	0.00017	0.00016	0.00017	0.00016	0.00018	0.00017	0.00016	0.00017	0.00016	0.00015	0.00016	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)							40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2015-08-26	2015-09-14	2015-10-28	2015-11-09	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09
Field Measured																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	7.8	7.9	7.8	7.7	7.4	8.0	7.8	-	7.8	7.7	7.6	-	7.4	7.6	7.8
Temperature	°C	**15**[d]	-	-	-	-	4.6	4.9	5.0	5.7	4.8	3.1	4.3	4.5	-	4.8	4.8	5.1	5.8	6.6	3.1	4.0
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	11	10	11	11	12	11	-	11	10	10	10	10	11	12
Dissolved oxygen	%	-	-	-	-	-	82	83	82	82	84	83	89	86	-	85	78	82	82	83	82	90
Turbidity	NTU	**1.0**	-	-	-	-	0.19	0.5	0.6	0.28	0.39	0.43	0.2	0.03	-	0.13	0.28	0.26	0.12	0.26	**1.49**[DW]	0.32
Conductivity	µS/cm	-	-	-	-	-	150	184	145	152	150	108	101	104	-	106	104	106	109	113	111	110
Conventional Parameters																					
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.7	7.9	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	54	57	56	54	55	53	54	53	54	54	51	52	53	53	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	51	51	50	49	48	50	49	46	51	52	50	50	49	50	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	74	69	77	68	66	64	70	66	76	81	70	80	78	68	72	94
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.7	1.7	1.8	1.5	1.5	1.6	1.8	2.1	1.7	1.6	2.0	1.6	1.6
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.22	0.25	0.39	0.53	0.31	0.34	0.47	**3.48**[DW]	0.39	0.29	0.24	0.19	0.54	0.3	**1.05**[DW]	0.32
Conductivity	µS/cm	-	-	-	-	-	111	111	113	112	111	112	113	107	107	112	110	110	113	105	119	111
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	19	19	18	19	18	18	18	18	18	17	18	18	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.033	0.033	0.034	0.036	0.033	0.035	0.035	0.032	0.035	0.036	0.033	0.034	0.034	0.035	0.033	0.032
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	1.9	2.0	2.2	2.1
Potassium	mg/L	-	-	-	-	-	0.5	0.51	0.47	0.47	0.47	0.49	0.48	0.55	0.5	0.51	0.54	0.53	0.53	0.51	0.59	0.51
Sodium	mg/L	-	-	-	-	-	1.0	0.95	0.95	0.98	0.89	0.94	0.95	0.96	0.96	1.0	1.1	1.0	1.1	0.94	1.2	0.97
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.6	6.4	6.4	6.5	6.6	6.8	6.4	6.3	6.6	7.5	6.6	6.6	8.3	6.9	8.4	6.7
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.15	0.13	0.11	0.12	0.13	0.13	0.14	0.15	0.14	0.14	0.17	0.095	0.15	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.15	0.13	0.11	0.12	0.13	0.13	0.14	0.15	0.14	0.14	0.17	0.095	0.15	0.13
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.19	0.2	0.19	0.16	0.17	0.19	0.18	0.2	0.2	0.19	0.18	0.23	0.15	0.2	0.19
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0029[Bc]	0.0072	0.0046[Bc]	0.0021[Bc]	0.0046[Bc]	0.0029[Bc]	0.0035[Bc]	<0.002[Bc]	0.0058	<0.002[Bc]	<0.002[Bc]	0.0028[Bc]	<0.002[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0019	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0025	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0031	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.014	0.021	0.025	0.028	0.018	0.023	0.017	0.051	0.014	0.017	0.015	0.015	0.028	0.02	0.058	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00013	0.00014	0.00011	0.00013	0.00011	0.0001	0.00011	0.00015	0.00012	0.00011	0.00012	0.00013	0.0001	0.00013	0.00013	<0.00010
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0054	0.0061	0.0056	0.0053	0.0054	0.0053	0.0066	0.0053	0.0053	0.0054	0.0053	0.0057	0.006	0.0067	0.0054
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	18	18	18	18	18	18	18	18	18	18	18	17	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0008	0.0011	0.0012	0.0011	0.00091	0.00097	0.0011	0.0017	0.00094	0.00086	0.00089	0.0011	0.0014	0.0012	0.0019	0.00061
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	0.03	<0.030	<0.030	0.043	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.035	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000059	0.00018	0.000051	0.0003	0.00016	0.000072	0.000081	0.00012	0.00017	0.000088	0.00017	0.0002	0.00027	0.00072	0.0001	0.00021
Lithium	mg/L	-	-	-	-	-	0.0013	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.0013
Magnesium	mg/L	-	-	-	-	-	1.9	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.3	2.2	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0012	0.0013	0.0013	0.0014	0.0013	0.0011	0.0013	0.002	0.0014	0.0013	0.0013	0.0013	0.0014	0.0014	0.0019	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00045	0.00035	0.00047	0.00045	0.00036	0.00044	0.00037	0.00037	0.00035	0.00064	0.00045	0.00041	0.00095	0.00042	0.00097	0.00041
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.52	0.48	0.5	0.49	0.5	0.48	0.59	0.52	0.49	0.53	0.5	0.56	0.52	0.57	0.52
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00013	0.000086	0.00011	0.000098	0.000096	0.000096	0.00008	0.0001	0.00011	0.00013	0.00011	0.00011	0.00022	0.00011	0.00021	0.000092
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.8	1.6	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.8	1.6	1.9	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.0	0.98	0.94	1.0	0.92	0.95	0.97	0.99	0.99	1.0	1.1	0.91	1.1	1.0	1.2	1.0
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2015-08-26	2015-09-14	2015-10-28	2015-11-09	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21	2017-04-10	2017-05-09
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00018	0.00017	0.00016	0.00017	0.00016	0.00016	0.00016	0.00017	0.00016	0.00017	0.00017	0.00016	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																					
Aluminum	mg/L	-	-	-	-	-	0.0053	0.0057	0.0055	0.0057	0.0049	0.0042	0.0058	0.0057	0.0053	0.0091	0.0057	0.0057	0.0049	0.0076	0.0063	0.0056
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	0.00011	0.00023	<0.00010	<0.00010	0.0001	<0.00010	0.00011	<0.00010	<0.00010	0.00011	<0.00010	0.0001	<0.00010	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.005	0.0057	0.0051	0.0051	0.0051	0.0052	0.0056	0.0051	0.0054	0.0053	0.0054	0.0052	0.0055	0.0053	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00072[Bc]	0.00074[Bc]	0.00078[Bc]	0.00077[Bc]	0.00054	0.00072[Bc]	0.00082[Bc]	0.00077[Bc]	0.0011[Bc]	0.00071[Bc]	0.00075[Bc]	0.0011[Bc]	0.00088[Bc]	0.00089[Bc]	0.00087[Bc]	0.00055
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	0.000058	0.00012	0.000097	0.00026	0.00021	0.000085	0.000086	0.000087	0.00034	0.00021	0.00026	0.00024	0.0003	0.00048	0.00014	0.000088
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00024	0.00029	0.00018	0.00019	0.00017	0.00025	0.00031	0.00023	0.00029	0.00021	0.00025	0.00024	0.00027	<0.00010	0.00022	0.00028
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00038	0.00035	0.00048	0.0004	0.00034	0.00039	0.00033	0.00035	0.00036	0.00061	0.00045	0.00036	0.00087	0.00043	0.00091	0.00038
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0001	0.000082	0.000097	0.000099	0.000071	0.000089	0.000087	0.0001	0.000082	0.00013	0.00013	0.0001	0.00019	0.00015	0.00019	0.000066
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.7	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.8	1.6	1.6	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.13	0.14	0.13	0.14	0.13	0.13	0.13	0.14	0.14	0.13	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00018	0.00016	0.00016	0.00016	0.00015	0.00015	0.00016	0.00017	0.00016	0.00015	0.00015	0.00015	0.00016	0.00014
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25	2019-08-20	2019-10-30
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.5	8.0	-	7.6	-	7.5	7.4	7.6	7.6	7.5	7.8	-	7.6	7.6	7.6	7.8
Temperature	°C	**15**[d]	-	-	-	-	4.9	4.9	-	6.1	5.7	4.0	4.4	4.4	4.8	5.0	4.3	-	4.3	4.5	4.7	5.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	-	11	12	12	12	11	11	11	12	-	12	11	11	11
Dissolved oxygen	%	-	-	-	-	-	88	87	-	91	95	89	96	85	86	83	89	-	92	85	85	88
Turbidity	NTU	**1.0**	-	-	-	-	0.89	0.22	-	0.17	0	0.66	0.64	0	0	0	0	-	0.51	0.46	0	0
Conductivity	µS/cm	-	-	-	-	-	109	115	-	117	107	112	108	109	106	112	110	-	110	111	112	111
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.9	8.0	7.9	7.9	7.8	7.9	8.0	8.0	7.9	7.8	8.0	8.0	7.9	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	52	52	48	52	55	53	49	52	53	57	55	52	52	53	52
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	48	48	50	50	50	51	50	50	51	49	50	49	49	49	51	52
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	77	73	73	72	72	60	73	73	67	79	64	68	71	69	73	66
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	14	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	1.1	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	1.9	1.8	1.8	1.4	2.0	2.0	1.7	1.6	1.7	1.7	1.8	1.7	1.9	1.7	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.34	0.19	0.18	0.27	0.2	0.35	0.34	0.25	0.21	0.21	0.27	0.25	0.13	<0.10	0.12	0.17
Conductivity	µS/cm	-	-	-	-	-	108	108	105	104	103	108	108	111	114	112	107	115	111	109	111	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	17	17	16	17	18	18	17	17	18	19	19	18	18	17	17
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.033	0.032	0.03	0.034	0.035	0.036	0.033	0.032	0.034	0.036	0.036	0.037	0.04	0.039	0.035	0.037
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.1	2.0	2.2	2.2	2.2	2.0	2.1	2.0	2.3	2.2	2.1	2.1	2.3	2.0
Potassium	mg/L	-	-	-	-	-	0.52	0.52	0.51	0.49	0.49	0.55	0.53	0.48	0.49	0.55	0.55	0.53	0.52	0.51	0.49	0.49
Sodium	mg/L	-	-	-	-	-	1.0	1.0	1.0	1.0	0.96	1.1	1.0	0.96	1.1	1.1	1.1	1.1	1.0	1.1	1.1	0.91
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.7	6.7	6.6	7.0	6.6	6.4	6.3	6.5	7.4	7.2	6.7	6.8	6.9	7.1	7.1	7.2
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.14	0.13	0.12	0.14	0.14	0.14	0.15	0.15	0.12	0.13	0.14	0.14	0.15	0.13
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.14	0.13	0.12	0.14	0.14	0.14	0.15	0.15	0.12	0.13	0.14	0.14	0.15	0.13
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0075
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.19	0.2	0.18	0.18	0.17	0.19	0.19	0.2	0.21	0.24	0.19	0.2	0.21	0.22	0.22
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0031[Bc]	0.0044[Bc]	0.0031[Bc]	0.0032[Bc]	0.0043[Bc]	0.002[Bc]	0.0024[Bc]	0.0035[Bc]	0.0054	0.0067	0.0033[Bc]	0.0034[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	0.0039	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.019	0.01	0.01	0.015	0.013	0.021	0.017	0.014	0.012	0.013	0.013	0.013	0.012	0.012	0.012	0.016
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00011	0.00013	0.00012	0.00011	0.00011	0.00013	0.00011	0.00013	0.00011	0.00012	0.00012	0.0001	0.00011	<0.00010	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0053	0.0055	0.0055	0.0056	0.005	0.0056	0.0055	0.0052	0.0056	0.0055	0.0051	0.0052	0.0051	0.0056	0.0053	0.0055
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	17	18	18	17	17	18	17	17	18	18	17	18	18	17	16	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00081	0.00063	0.00059	0.0012	0.00064	0.00076	0.00076	0.0039	0.00078	0.00074	0.00063	0.00064	0.0006	0.00071	0.00072	0.001
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000056	<0.000050	0.000073	0.00064	0.00012	0.00038	0.00052	0.00044	0.00019	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001
Magnesium	mg/L	-	-	-	-	-	2.0	2.2	2.0	2.0	2.0	2.1	2.1	2.0	1.9	2.1	2.1	2.0	2.0	2.0	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0013	0.0011	0.0013	0.0011	0.001	0.002	0.0014	0.0013	0.001	0.001	0.0012	0.0013	0.001	0.0012	0.001	0.0012
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	-	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00047	<0.00040	0.00042	0.00048	0.00039	0.00035	0.00035	0.00049	0.00068	0.00075	0.0004	0.00048	0.00047	0.00055	0.00048	0.00043
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.5	0.5	0.53	0.49	0.43	0.49	0.53	0.48	0.47	0.51	0.52	0.48	0.48	0.49	0.48	0.45
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00011	0.00012	0.00012	0.00015	0.000095	0.00012	0.000094	0.00013	0.00018	0.0002	0.00013	0.00014	0.00012	0.00013	0.00017	0.00011
Silicon	mg/L	-	-	-	-	-	1.7	1.8	1.8	1.8	1.6	1.9	1.8	1.7	1.7	1.8	1.7	1.8	1.7	1.7	1.7	1.7
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.99	0.96	1.0	0.99	0.99	0.99	1.0	1.0	1.0	1.1	1.0	1.1	0.99	1.1	1.0	0.94
Strontium	mg/L	**7.0**	-	-	-	-	0.13	0.13	0.13	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.13	0.12	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25	2019-08-20	2019-10-30
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00016	0.00017	0.00014	0.00018	0.00017	0.00016	0.00018	0.00017	0.00015	0.00016	0.00016	0.00017	0.00016	0.00014	0.00015
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	0.0039	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0063	0.0057	0.0061	0.0054	0.0053	0.0061	0.0075	0.0057	0.0066	0.0069	0.0061	0.0054	0.0059	0.006	0.0059	0.0065
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	0.0001	0.0001	<0.00010	<0.00010	0.0001	0.00011	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.005	0.005	0.0056	0.0053	0.0057	0.0057	0.0054	0.0055	0.0053	0.0055	0.0053	0.0054	0.0055	0.005	0.005
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00061[Bc]	0.00063	0.00054	0.00085[Bc]	0.00056[Bc]	0.00053	0.00051[Bc]	0.00058[Bc]	0.00075[Bc]	0.00057[Bc]	0.00057	<0.00050	<0.0005	0.00052	0.00051	<0.00050
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[q,f]	-	-	-	0.00007	0.0001	0.000092	0.00015	0.0001	0.0003	0.0004	0.00034	0.00016	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00013	0.00032	0.00024	0.00016	0.00015	0.00026	0.0002	0.00029	0.00025	0.0002	0.00019	0.00015	<0.00010	0.00016	0.00015	0.00022
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00044	0.00033	0.0004	0.00044	0.00034	0.00033	0.00033	0.00046	0.00069	0.0007	0.00039	0.00049	0.00047	0.00052	0.00058	0.0004
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00013	0.000097	0.000094	0.00012	0.000096	0.000091	0.000092	0.0001	0.00018	0.00016	0.000098	0.00017	0.00013	0.00016	0.00016	0.000079
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.7	1.7	1.6	1.7	1.8	1.5	1.7	1.6	1.6	1.7	1.9	1.8	1.8	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.13	0.13	0.13	0.14	0.13	0.14	0.13	0.13	0.14	0.14	0.14	0.14	0.13	0.13	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00014	0.00015	0.00013	0.00015	0.00017	0.00016	0.00015	0.00016	0.00017	0.00017	0.00018	0.00016	0.00016	0.00016	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[q,k,l]	**0.021 - 0.046[q,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)							40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.7	-	7.8	7.8	8.0	8.2	7.5	8.5	7.6	7.8	7.9	7.8	7.6	7.4	7.5	7.5
Temperature	°C	**15**[d]	-	-	-	-	4.8	-	4.6	4.6	5.2	4.3	4.9	4.8	5.6	4.1	4.5	4.6	4.8	3.8	4.7	4.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	12	-	12	11	11	12	12	11	11	12	12	11	11	-	-	-
Dissolved oxygen	%	-	-	-	-	-	94	-	90	89	86	92	90	88	86	92	91	88	86	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0	-	0	0.08	0.21	0	0.42	0.06	0.18	0	0.43	0	0	0.14	0	0.04
Conductivity	µS/cm	-	-	-	-	-	118	-	110	113	114	112	132	114	114	113	110	108	112	114	108	109
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.8	7.5	7.9	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	52	52	54	55	52	53	51	56	54	52	51	57	59	52	56
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	49	48	47	49	48	48	48	53	49	51	50	47	46	50	50	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	72	72	71	74	79	84	82	71	79	71	70	86	68	82	69
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.1	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	<1.1	<1.0	<1.0	<1.0	<1.1
Dissolved organic carbon	mg/L	-	-	-	-	-	2.1	2.0	2.2	1.9	13	2.0	1.9	1.7	1.8	2.1	2.4	2.1	2.0	2.3	1.8	2.4
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.34	0.35	0.19	0.16	0.14	0.14	0.19	<0.10	0.1	0.18	0.26	0.13	<0.10	0.27	0.3	0.18
Conductivity	µS/cm	-	-	-	-	-	112	111	110	113	112	112	111	117	113	112	108	110	112	112	111	102
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	53	57	54	52	53	45	52	58	54	52	50	50	52	50	52	52
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	17	18	18	19	18	18	17	19	18	17	17	19	20	18	19
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.035	0.041	0.036	0.036	0.038	0.036	0.039	0.033	0.038	0.036	0.034	0.033	0.038	0.034	0.037	0.04
Magnesium	mg/L	-	-	-	-	-	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.52	0.51	0.53	0.51	0.52	0.5	0.51	0.53	0.51	0.47	0.49	0.53	0.51	0.49	0.52	0.55
Sodium	mg/L	-	-	-	-	-	0.98	0.97	1.0	1.1	1.1	0.99	0.96	1.0	1.0	0.92	0.95	1.0	1.1	1.1	0.99	1.1
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.7	6.5	6.6	7.1	7.9	7.1	6.9	6.8	8.4	6.7	6.2	6.2	7.5	7.3	6.2	7.1
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.13	0.13	0.14	0.15	0.15	0.14	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.13	0.13	0.14	0.15	0.15	0.14	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	0.0093	0.0055	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.022	<0.0050	0.0066	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.21	0.2	0.22	0.2	0.2	0.17	0.2	0.19	0.18	0.22	0.17	0.19	0.21	0.17	0.19	0.2
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.007	0.0052	0.0022[Bc]	<0.002[Bc]	0.0025[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]	0.0029[Bc]	<0.002[Bc]	0.002[Bc]	0.0025[Bc]	0.0033[Bc]	0.0031[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	0.0032	<0.0020	0.0029	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.021	0.026	0.015	0.013	0.016	0.01	0.013	0.0099	0.013	0.03	0.012	0.012	0.011	0.014	0.016	0.015
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00011	0.0001	0.00012	0.00011	0.00011	0.00011	0.00011	0.00012	0.00012	<0.00010	0.0001	0.00013	0.00012	0.00013	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0054	0.0058	0.0051	0.0052	0.0053	0.0043	0.0052	0.0048	0.005	0.0053	0.005	0.0052	0.0053	0.0052	0.0053	0.0056
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000051	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	18	17	18	15	17	20	18	18	17	17	17	17	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00068	0.00071	0.00062	0.00066	0.00076	0.00056	0.00063	0.00056	0.00067	0.0011	<0.00050	0.00057	0.00057	0.0006	0.00052	0.00064
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.038	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.2	2.2	2.1	2.2	1.8	2.2	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.2
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0014	0.0013	0.0012	0.0013	0.0013	0.00078	0.0011	0.00098	0.0008	0.0026	0.001	0.0012	0.0011	0.0013	0.0014	0.0013
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	-	<0.0000050
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00044	0.00041	0.00039	0.0005	0.00064	0.00041	0.00048	0.00042	0.00083	0.00044	0.00034	0.00043	0.00066	0.00071	0.00036	0.00061
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.56	0.5	0.48	0.49	0.41	0.52	0.5	0.5	0.48	0.44	0.51	0.51	0.5	0.54	0.51
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00012	0.000082	0.00011	0.00013	0.00019	0.00015	0.00015	0.00013	0.00023	0.00015	0.0001	0.00011	0.00018	0.00019	0.0001	0.00012
Silicon	mg/L	-	-	-	-	-	2.0	1.9	1.8	1.8	1.8	1.9	1.8	1.7	1.8	1.8	1.9	1.9	1.9	1.8	2.0	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	0.98	1.1	0.98	0.99	1.1	0.89	1.0	1.0	1.0	1.0	0.89	1.0	1.0	1.0	1.0	0.99
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.15	0.14	0.14	0.12	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Date Sampled							2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11	2023-06-19	2023-06-26
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00016	0.00016	0.00016	0.00016	0.00015	0.00016	0.00017	0.00016	0.00015	0.00016	0.00016	0.00016	0.00015	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0076	0.0061	0.0064	0.0066	0.0084	0.007	0.0082	0.0066	0.0082	0.0054	0.0082	0.0064	0.0067	0.0079	0.0068	0.007
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00011	0.00017	0.0001	0.00011	0.00012
Barium	mg/L	-	-	-	-	-	0.0056	0.005	0.0054	0.0055	0.0055	0.0049	0.0049	0.0053	0.0051	0.0051	0.0053	0.0051	0.0054	0.005	0.005	0.0052
Beryllium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00059	0.00051	<0.00050	0.00064	0.0006	0.00063	0.00066[Bc]	0.00055	0.00064[Bc]	0.00053	0.00051	0.00065	0.00055	0.00056	<0.0005	0.00066
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00017	0.00016	0.00018	0.00025	0.00028	0.00019	0.0002	0.00016	0.0002	0.00033	0.00016	0.0003	0.00014	0.0003	0.00016	0.0002
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00042	0.00039	0.00036	0.00053	0.00066	0.00041	0.0005	0.0004	0.00076	0.00044	0.00031	0.00043	0.00069	0.00067	0.00034	0.00059
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00012	0.00012	0.0001	0.00016	0.00015	0.00016	0.00015	0.00011	0.0002	0.000095	0.00011	0.00012	0.00021	0.00019	0.000072	0.00013
Silicon	mg/L	-	-	-	-	-	1.9	1.9	1.8	1.7	1.7	1.7	1.8	1.9	1.6	1.7	2.0	1.8	1.8	1.8	2.0	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.13	0.14	0.15	0.14	0.14	0.14	0.14	0.15	0.13	0.13	0.14	0.15	0.13	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00016	0.00015	0.00015	0.00016	0.00015	0.00017	0.00015	0.00017	0.00016	0.00015	0.00015	0.00015	0.00015	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	60	60	60	60	60	60	60
Date Sampled							2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-11	2015-03-18	2015-03-24	2015-04-01	2015-04-08	2015-04-14	2015-05-06
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	7.6	7.5	7.7	7.7	7.7	7.8	7.6	7.6	-	-	-	-	-	-	-
Temperature	°C	**15**[d]	-	-	-	-	4.8	5.2	4.7	5.0	5.2	5.6	4.7	4.6	5.2	-	-	-	-	-	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	12	12	11	11	12	12	11	-	-	-	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	-	-	91	92	90	85	90	89	88	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.03	-	0.25	-	0.7	-	0.2	0.17	0.91	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	112	112	111	112	110	112	120	117	111	-	-	-	-	-	-	-
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	8.0	8.0	7.8	8.0	7.9	7.9	8.0	8.0	7.9	8.0	8.0	7.9	8.0
Hardness, as CaCO3	mg/L	-	-	-	-	-	53	54	54	53	50	52	56	53	53	54	55	54	54	57	53	53
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	52	50	50	50	51	51	51	50	48	52	45	51	45	52	52
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	74	73	74	73	71	70	71	62	72	75	69	69	81	71	65	73
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.1	1.9	1.8	1.8	1.7	1.9	2.1	1.9	1.7	1.9	2.3	1.9	2.5	2.1	2.1	2.2
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.16	<0.10	0.22	0.18	0.13	0.13	0.15	<0.1	0.19	0.85	0.57	0.64	0.61	0.72	0.59	0.59
Conductivity	µS/cm	-	-	-	-	-	113	115	116	114	115	111	114	115	111	111	113	111	113	111	114	114
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	54	53	-	-	-	-	54	54	56	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	18	18	17	18	19	18	18	18	19	18	18	19	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.036	0.028	0.028	0.031	0.028	0.038	0.041	0.034	0.037	0.036	0.034	0.036	0.034	0.033	0.034	0.036
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.2	2.0	2.0
Potassium	mg/L	-	-	-	-	-	0.5	0.49	0.48	0.5	0.48	0.48	0.5	0.54	0.51	0.52	0.5	0.51	0.47	0.48	0.48	0.54
Sodium	mg/L	-	-	-	-	-	1.1	0.99	0.99	0.94	0.93	0.91	1.0	1.00	0.98	1.1	1.0	1.1	0.93	1.0	1.0	1.1
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	7.1	6.7	6.6	6.5	6.2	6.8	7.6	6.4	7.5	7.1	6.6	6.7	6.4	6.6	6.6	7.0
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.15	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.13	0.13	0.14	0.13	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.15	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.14	0.14	-	0.13	0.14	0.13	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	0.012	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.19	0.16	0.19	0.16	0.19	0.19	0.19	0.20	0.2	0.19	0.19	0.21	0.18	0.18	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0023[Bc]	0.002[Bc]	0.0022[Bc]	0.0023[Bc]	0.0025[Bc]	0.0026[Bc]	0.0023[Bc]	0.0023[Bc]	<0.002[Bc]	0.0022[Bc]	0.0027[Bc]	0.0028[Bc]	0.0022[Bc]	0.0022[Bc]	0.0022[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0025	<0.002	<0.002	0.0026	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.0095	0.0088	0.018	0.011	0.0095	0.0079	0.011	0.0094	0.0084	0.053	0.048	0.042	0.024	0.042	0.036	0.049
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00012	0.00011	0.00011	0.0001	<0.00010	0.00012	0.00011	0.00011	0.00017	0.00015	0.00014	0.00011	0.00017	0.00011	0.00018
Barium	mg/L	-	1.0	-	-	-	0.005	0.005	0.0052	0.005	0.005	0.0051	0.005	0.0053	0.0051	0.0071	0.0065	0.0062	0.0051	0.0061	0.0058	0.0065
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	17	18	17	17	18	18	19	18	18	18	18	19	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00056	0.00056	0.00065	0.00057	0.00051	0.00057	0.0026	0.00076	0.00062	0.0019	0.0014	0.0014	0.0016	0.0015	0.0012	0.0016
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	0.04	<0.030	<0.030	0.036	<0.030	0.034
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000082	0.000077	<0.000050	0.000059	0.0001	0.0006	0.00013
Lithium	mg/L	-	-	-	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00085	0.00074	0.00092	<0.0010	<0.0010	0.0011	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.0	2.0	2.0	2.2	2.0	2.0
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.00072	0.00062	0.001	0.0013	0.0012	0.00079	0.0011	0.0012	0.00090	0.0021	0.0029	0.0016	0.0013	0.002	0.0016	0.002
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.0006	0.00056	0.00044	0.00038	0.00038	0.0004	0.00065	0.00046	0.00049	0.00084	0.00053	0.00058	0.00047	0.00052	0.00052	0.00063
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00082	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	0.0028	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.49	0.49	0.48	0.49	0.48	0.46	0.5	0.48	0.52	0.56	0.51	0.52	0.49	0.49	0.48	0.53
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00018	0.00017	0.00014	0.00012	0.00011	0.00013	0.00017	0.00015	0.00012	<0.00050	<0.00050	<0.00050	0.00011	0.00012	0.0001	0.00012
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.6	1.7	1.7	1.7	1.6	1.7	1.8	1.8	1.8	1.8	1.7	2.0	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	0.97	0.97	1.0	0.94	0.92	1.0	0.97	1.1	1.1	1.0	1.1	0.98	1.1	1.0	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.15	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.13	0.14	0.14	0.14	0.15	0.15
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location							QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-40m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	40	40	40	40	40	40	40	40	40	60	60	60	60	60	60
Date Sampled							2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17	2015-03-11	2015-03-18	2015-03-24	2015-04-01	2015-04-08	2015-04-14	2015-05-06
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00017	0.00016	0.00016	0.00017	0.00016	0.00018	0.00017	0.00017	0.0002	0.00017	0.00018	0.00017	0.00018	0.00018	0.00018
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0073	0.0059	0.004	0.006	0.0053	0.0051	0.006	0.0062	0.0063	0.0078	0.0062	0.0078	0.0059	0.0063	0.0057	0.0078
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.0001	0.00010	0.00015	0.00011	0.00011	0.0001	0.00012	0.00011	0.00013
Barium	mg/L	-	-	-	-	-	0.0052	0.0046	0.0049	0.0052	0.0048	0.0051	0.005	0.0054	0.0051	0.006	0.0056	0.0056	0.0048	0.0053	0.0054	0.006
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000005	<0.0000005	<0.0000010	<0.0000010	<0.0000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00059	0.00051	0.0022[Bc]	0.00054	0.00056	0.00054	0.0035[Bc]	0.00074[Bc]	0.00067[Bc]	0.0012[Bc]	0.00084[Bc]	0.00095[Bc]	0.0016[Bc]	0.00085[Bc]	0.00081[Bc]	0.0012[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	<0.000050	<0.000050	0.000058	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	0.000052	<0.000050	<0.000050	0.000085	0.000094	0.000073	0.00013
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	0.00077	0.00075	0.00075	<0.0010	<0.0010	0.0011	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00015	0.00013	0.00017	0.00024	0.00036	0.00013	0.00032	0.00042	0.00068	0.0007	0.00041	0.0004	0.00027	0.00027	0.00034	0.0004
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00061	0.00057	0.00043	0.00039	0.00033	0.0004	0.0006	0.00043	0.00050	0.00075	0.00044	0.00049	0.00039	0.00046	0.00044	0.00062
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00017	0.00015	0.00011	0.00012	0.000096	0.0001	0.00014	0.00012	0.00012	<0.00050	<0.00050	<0.00050	0.000093	0.000089	0.0001	0.00011
Silicon	mg/L	-	-	-	-	-	1.8	1.6	1.6	1.5	1.7	1.7	1.7	1.7	1.8	1.7	1.8	1.7	1.7	1.9	1.7	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.15	0.15	0.14	0.14	0.13	0.14	0.14	0.13	0.14	0.15	0.13	0.14	0.13	0.14	0.14	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00017	0.00016	0.00016	0.00017	0.00016	0.00017	0.00017	0.00017	0.00019	0.00016	0.00017	0.00016	0.00016	0.00016	0.00017
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0010	<0.0010	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2015-06-03	2015-07-01	2015-08-26	2015-09-14	2015-10-28	2015-11-09	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	-	7.6	7.6	7.7	7.6	7.8	7.6	7.4	8.0	7.7	-	-	7.5	7.3	-	7.3
Temperature	°C	**15**[d]	-	-	-	-	-	4.4	4.5	4.5	4.7	4.8	4.8	3.1	4.2	4.5	-	-	4.8	4.7	5.2	5.5
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	11	11	11	10	10	11	11	11	11	-	-	10	11	10	9.9
Dissolved oxygen	%	-	-	-	-	-	-	81	81	82	81	80	83	82	88	86	-	-	78	82	81	78
Turbidity	NTU	**1.0**	-	-	-	-	-	0.72	0.21	0.64	0.64	0.69	0.37	0.5	0.36	0.15	-	-	0.23	0.3	0.24	0.44
Conductivity	µS/cm	-	-	-	-	-	-	127	151	185	145	152	150	108	103	105	-	-	107	108	111	117
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	7.9	7.8	7.8	7.9	7.8	7.8	7.8	7.9	7.8	7.8	7.8	7.8	7.9	7.7	7.8
Hardness, as CaCO3	mg/L	-	-	-	-	-	55	54	56	55	56	55	55	55	54	54	54	55	54	50	53	54
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	47	51	49	50	51	50	48	48	51	49	47	51	53	51	50	51
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	68	65	73	68	75	75	64	69	65	68	78	84	65	80	74	73
Total suspended solids	mg/L	-	-	-	-	-	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<1.0	2.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	1.9	1.7	1.8	1.7	1.8	1.5	1.7	1.5	1.7	1.6	1.9	1.8	1.6	1.6	1.8
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.18	0.26	0.24	0.19	0.31	0.84	0.31	0.37	0.4	**1.39**[DW]	0.26	0.34	0.31	0.18	0.62	0.4
Conductivity	µS/cm	-	-	-	-	-	113	113	113	110	112	114	110	111	115	108	107	113	113	108	115	115
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	19	18	19	19	19	19	19	19	18	18	18	18	18	17	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.035	0.034	0.035	0.032	0.034	0.035	0.032	0.034	0.034	0.032	0.035	0.035	0.034	0.037	0.035	0.037
Magnesium	mg/L	-	-	-	-	-	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.2	2.0	2.0	2.2
Potassium	mg/L	-	-	-	-	-	0.52	0.48	0.53	0.52	0.49	0.48	0.47	0.49	0.47	0.57	0.5	0.49	0.58	0.52	0.54	0.56
Sodium	mg/L	-	-	-	-	-	1.0	1.0	1.1	0.98	0.97	1.0	0.89	0.94	0.98	1.0	0.96	1.0	1.2	1.0	1.2	1.2
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.7	6.6	6.8	6.4	6.3	6.6	6.6	6.9	6.7	6.6	6.6	7.5	7.5	6.5	8.7	8.6
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.14	0.15	0.14	0.15	0.15	0.11	0.12	0.13	0.13	0.14	0.15	0.15	0.14	0.18	0.17
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.14	0.15	0.14	0.15	0.15	0.11	0.12	0.13	0.13	0.14	0.15	0.15	0.14	0.18	0.17
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.18	0.17	0.19	0.19	0.2	0.21	0.15	0.17	0.19	0.2	0.19	0.2	0.2	0.2	0.24	0.23
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0021[Bc]	0.004[Bc]	0.0022[Bc]	0.0082	<0.002[Bc]	**0.013**[DW]	0.0046[Bc]	0.0061	<0.002[Bc]	0.0032[Bc]	**<0.02**[Bc, DW]	0.0029[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0022	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.022	0.015	0.019	0.013	0.026	0.052	0.018	0.026	0.024	0.14	0.016	0.021	0.019	0.011	0.028	0.028
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	0.00014	0.00014	0.00014	0.00014	0.00014	0.00011	0.0001	0.00011	0.00021	0.00012	0.00011	0.00013	0.00011	0.00012	0.00012
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0055	0.0059	0.0051	0.0056	0.0063	0.0052	0.0057	0.0055	0.0089	0.005	0.0053	0.0056	0.0053	0.0059	0.0069
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	18	19	18	18	19	18	18	18	18	17	18	18	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0011	0.0011	0.0011	0.00072	0.0013	0.0018	0.0008	0.001	0.0013	0.0033	0.00087	0.0011	0.0011	0.00086	0.0013	0.0016
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	0.035	<0.030	<0.030	<0.030	0.11	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000083	<0.00010	0.000057	<0.000050	0.000073	0.00016	0.0001	0.000054	0.000089	0.00011	0.00016	0.000095	0.0001	0.00016	0.00013	0.00019
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.0011	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.2	2.0	2.1	2.2	2.0	2.1	2.5
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0013	0.0012	0.0016	0.0011	0.0014	0.0021	0.0021	0.0012	0.0014	0.0033	0.0014	0.0014	0.0014	0.0012	0.0015	0.0015
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	<0.0000050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00055	0.0005	0.00056	0.00036	0.00044	0.00058	0.00034	0.00047	0.00044	0.00045	0.00036	0.00064	0.00076	0.00034	0.001	0.00096
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00074	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.52	0.5	0.54	0.51	0.49	0.51	0.47	0.49	0.48	0.64	0.5	0.49	0.55	0.49	0.58	0.6
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0001	0.00013	0.00013	0.000084	0.0001	0.0001	0.000091	0.00012	0.00012	0.00012	0.000091	0.00016	0.00018	0.00011	0.00023	0.00022
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.8	1.7	1.7	2.0	1.6	1.7	1.8	2.0	1.7	1.8	1.7	1.8	1.8	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.0	1.1	0.98	1.0	1.1	0.9	0.96	1.0	1.0	0.97	1.0	1.2	0.89	1.2	1.3
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.13	0.14	0.14	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2015-06-03	2015-07-01	2015-08-26	2015-09-14	2015-10-28	2015-11-09	2015-12-07	2016-01-20	2016-04-26	2016-05-19	2016-06-28	2016-07-20	2016-08-15	2016-09-12	2016-10-26	2016-11-21
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00018	0.00018	0.00019	0.00016	0.00017	0.00018	0.00016	0.00017	0.00017	0.00016	0.00016	0.00017	0.00016	0.00017	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00069	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0068	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.006	0.007	0.0061	0.0057	0.0057	0.0055	0.0051	0.0053	0.0058	0.0064	0.0053	0.0062	0.0065	0.0052	0.0051	0.0064
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00012	0.00011	0.0001	0.00024	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0054	0.0055	0.0057	0.0053	0.0057	0.0055	0.0051	0.0051	0.0052	0.0057	0.0051	0.0052	0.0054	0.0053	0.0054	0.0058
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00088[Bc]	0.00099[Bc]	0.001[Bc]	0.00069[Bc]	0.00083[Bc]	0.00096[Bc]	0.00054[Bc]	0.0007[Bc]	0.00099[Bc]	0.00086[Bc]	0.00093[Bc]	0.00074[Bc]	0.00088[Bc]	0.0009[Bc]	0.00096[Bc]	0.0011[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	0.000086	0.000098	0.000069	0.000057	0.000086	0.00015	0.00012	0.000062	0.00008	0.000081	0.00025	0.00017	0.00022	0.00018	0.00026	0.00032
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00014	0.0002	0.00054	0.00025	0.00015	0.00031	0.00012	0.00023	0.00031	0.00023	0.00027	0.00022	0.00021	0.00023	0.00035	0.0002
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00044	0.00048	0.00052	0.00034	0.00045	0.00051	0.00034	0.00042	0.0004	0.00043	0.00036	0.00059	0.00074	0.00031	0.001	0.00091
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.000098	0.0001	0.00011	0.000081	0.000069	0.000082	0.000087	0.00011	0.000099	0.00012	0.0001	0.00014	0.00014	0.000093	0.00022	0.00022
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.8	1.7	1.7	1.8	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.6	1.7
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.13	0.14	0.14	0.13	0.14	0.13	0.14	0.14	0.13	0.13	0.14	0.14	0.13	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00016	0.00018	0.00016	0.00017	0.00016	0.00016	0.00016	0.00015	0.00016	0.00016	0.00016	0.00016	0.00015	0.00015	0.00015
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)							60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2017-04-10	2017-05-09	2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25
Field Measured																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.6	7.8	7.5	-	-	7.4	-	7.5	7.3	7.6	7.4	7.3	7.8	-	-	7.6
Temperature	°C	**15**[d]	-	-	-	-	3.2	4.0	4.6	-	-	5.2	5.6	4.0	4.1	4.3	4.6	4.7	4.4	-	-	4.2
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	12	11	-	-	11	12	12	12	11	11	11	12	-	-	11
Dissolved oxygen	%	-	-	-	-	-	79	89	87	-	-	90	94	89	96	86	86	83	89	-	-	85
Turbidity	NTU	**1.0**	-	-	-	-	**1.99**[(DW)]	0.35	0.95	-	-	0.16	0.07	0.72	0.71	0	0.07	0	0	-	-	0.53
Conductivity	µS/cm	-	-	-	-	-	111	110	110	-	-	118	108	112	108	111	109	115	110	-	-	115
Conventional Parameters																						
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.9	8.0	7.9	7.9	7.8	7.9	8.0	8.0	7.9	7.8	8.0	8.0	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	54	53	52	54	52	49	54	55	52	50	53	55	55	59	54	52
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	50	47	49	51	50	49	51	49	50	51	49	49	49	49	49
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	69	75	73	72	74	80	60	63	68	74	65	76	67	65	74	63
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.6	1.6	1.7	1.8	1.9	1.9	1.2	2.0	2.0	4.7	1.7	1.7	1.6	2.0	1.6	1.9
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	**1.3**[(DW)]	0.37	0.39	0.28	0.18	0.29	0.21	0.42	0.37	0.2	0.15	0.19	0.22	0.34	0.16	0.14
Conductivity	µS/cm	-	-	-	-	-	120	112	108	108	107	105	103	107	109	112	116	113	106	116	113	112
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Major Ions																						
Calcium	mg/L	-	-	-	1000[c,f]	-	18	18	17	18	17	16	18	18	17	17	18	19	18	20	18	18
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.032	0.032	0.033	0.032	0.03	0.035	0.035	0.036	0.034	0.032	0.035	0.036	0.033	0.037	0.039	0.039
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.3	2.1	2.0	2.2	2.0	2.3	2.3	2.1	2.1
Potassium	mg/L	-	-	-	-	-	0.58	0.52	0.53	0.51	0.51	0.51	0.47	0.56	0.51	0.48	0.51	0.57	0.51	0.57	0.51	0.51
Sodium	mg/L	-	-	-	-	-	1.2	0.99	1.1	1.0	1.0	1.1	0.93	1.1	0.98	1.0	1.2	1.1	1.0	1.2	1.1	1.1
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	8.3	6.7	6.9	6.8	6.7	7.3	6.7	6.4	6.3	6.7	8.2	7.9	6.7	7.2	7.4	8.0
Nutrients																						
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.15	0.13	0.14	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.16	0.16	0.12	0.13	0.14	0.15
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.15	0.13	0.14	0.15	0.15	0.15	0.13	0.14	0.14	0.14	0.16	0.16	0.12	0.13	0.14	0.15
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0064	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.2	0.18	0.2	0.19	0.2	0.19	0.17	0.17	0.19	0.19	0.21	0.21	0.22	0.19	0.23	0.22
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0026[Bc]	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	<0.002[Bc]	0.0026[Bc]	0.0053	0.0027[Bc]	0.0028[Bc]	0.0044[Bc]	0.0042[Bc]	0.0022[Bc]	0.0034[Bc]	0.0053	0.0062
Orthophosphate	mg-P/L	-	-	-	-	-	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	0.0032	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0023	<0.0020	<0.0020	0.002	<0.0020	0.0038	<0.0020	0.0023
Total Metals																						
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.061	0.017	0.02	0.013	0.011	0.012	0.015	0.02	0.017	0.021	0.015	0.01	0.013	0.018	0.015	0.017
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00014	<0.00010	0.00012	<0.00010	0.00013	0.0001	0.00011	0.00011	0.00014	0.00012	0.00013	0.00014	0.0001	0.00013	<0.00010	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0066	0.0052	0.0053	0.0057	0.0054	0.0056	0.0053	0.0054	0.0055	0.0057	0.0058	0.0054	0.0051	0.0054	0.005	0.0059
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	19	18	17	18	18	18	18	17	17	19	18	19	17	18	18	18
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0019	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.0021	0.00066	0.00083	0.00066	0.00066	0.00092	0.00076	0.00062	0.0011	0.0014	0.0014	0.00071	0.0006	0.00081	0.00073	0.0012
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	0.037	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	0.000076	0.000052	0.000071	<0.000050	0.00015	0.000096	0.0001	0.0003	0.00038	0.00025	0.00019	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	0.0013	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.2	2.1	2.0	2.2	2.1	2.1	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.002	0.0012	0.0014	0.0011	0.0012	0.0012	0.001	0.0019	0.0014	0.0019	0.0013	0.001	0.0011	0.0015	0.0011	0.0011
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00092	0.00043	0.0005	<0.00045	0.00047	0.00055	0.00046	0.00034	0.00033	0.0012	0.00093	0.00088	0.00043	0.00058	0.00058	0.00076
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0013	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.58	0.51	0.49	0.5	0.52	0.49	0.44	0.48	0.53	0.5	0.49	0.51	0.51	0.5	0.49	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0002	0.000086	0.00012	0.0001	0.000086	0.00018	0.00012	0.00011	0.000085	0.00014	0.00022	0.00019	0.00012	0.0002	0.00017	0.00022
Silicon	mg/L	-	-	-	-	-	1.9	1.8	1.7	1.8	1.8	1.9	1.7	1.9	1.9	1.7	1.8	1.8	1.8	1.8	1.7	1.8
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.3	1.0	0.99	0.99	1.1	1.0	1.0	0.96	1.0	1.1	1.1	1.1	1.0	1.2	1.0	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.14	0.13	0.14	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2017-04-10	2017-05-09	2017-06-19	2017-08-21	2017-09-12	2017-10-26	2017-11-20	2018-05-22	2018-06-27	2018-07-25	2018-09-04	2018-10-18	2018-12-18	2019-05-08	2019-06-18	2019-07-25
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00017	0.00016	0.00016	0.00015	0.00016	0.00014	0.00018	0.00016	0.00017	0.00018	0.00017	0.00015	0.00016	0.00016	0.00017	0.00017
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	0.0044	<0.0030	<0.0030	0.003	0.0041	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.006	0.0052	0.0067	0.0052	0.0051	0.0053	0.0049	0.0066	0.0057	0.0076	0.0084	0.0064	0.0058	0.0067	0.0055	0.0062
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.00015	<0.00010	<0.00010	0.0001	0.0001	0.00011	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	0.0053	0.0053	0.0055	0.0051	0.0049	0.0059	0.005	0.0057	0.0054	0.0055	0.0057	0.0053	0.0051	0.0057	0.0055	0.0053
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0012	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.0009[Bc]	0.00068[Bc]	0.00067[Bc]	0.00058	0.00059	0.00076[Bc]	0.00061[Bc]	0.00054	0.00065[Bc]	0.00063	0.00086[Bc]	0.00063[Bc]	0.00052	0.00054	<0.00050	0.00064[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,f]	-	-	-	0.00011	0.000075	0.000055	0.000093	0.000085	0.00011	0.00011	0.00028	0.00034	0.00033	0.00019	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Manganese	mg/L	-	-	-	-	-	0.00018	0.00026	0.00011	0.0003	0.00026	0.00022	0.00017	0.00025	0.00018	0.00035	0.00032	0.00021	0.00015	0.00018	<0.00010	0.00013
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00087	0.00037	0.00049	0.00035	0.0004	0.0005	0.00041	0.00032	0.00033	0.00053	0.0009	0.00079	0.0004	0.0006	0.00059	0.00076
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.0002	0.000081	0.00012	0.00009	0.00012	0.00016	0.00014	0.00011	0.00011	0.00012	0.00019	0.0002	0.0001	0.00015	0.00016	0.00019
Silicon	mg/L	-	-	-	-	-	1.7	1.7	1.8	1.7	1.7	1.8	1.6	1.8	1.7	1.6	1.7	1.5	1.5	1.6	1.8	1.9
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00016	0.00014	0.00015	0.00014	0.00016	0.00013	0.00016	0.00017	0.00015	0.00016	0.00016	0.00017	0.00016	0.00019	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.0063[Bc]	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2019-08-20	2019-10-30	2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11
Field Measured																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.5	7.7	7.7	-	7.7	7.8	8.0	8.2	7.5	8.5	7.6	7.7	7.8	7.7	7.5	7.4
Temperature	°C	**15**[d]	-	-	-	-	4.5	5.0	4.4	-	4.5	4.5	4.9	4.2	4.6	4.5	5.2	4.0	4.4	4.4	4.6	3.7
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	11	11	12	-	12	12	11	12	12	11	11	12	12	11	11	-
Dissolved oxygen	%	-	-	-	-	-	85	87	94	-	90	89	85	91	90	88	86	92	91	88	86	-
Turbidity	NTU	**1.0**	-	-	-	-	0	0	0	-	0	0.12	0.24	0	0.44	0.07	0.12	0	0.43	0	0	0.2
Conductivity	µS/cm	-	-	-	-	-	115	115	121	-	117	116	116	113	135	115	115	113	112	109	114	115
Conventional Parameters																				
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	8.0	7.9	7.8	7.4	7.9	8.0	7.8	7.9	7.8	7.9	7.9	7.9	7.9	7.8	7.9	7.9
Hardness, as CaCO3	mg/L	-	-	-	-	-	52	52	55	52	54	54	57	51	52	52	57	54	55	51	56	58
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	52	59	51	48	48	49	49	48	48	53	49	51	50	48	46	50
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	72	66	70	70	78	72	72	79	104	74	70	78	68	75	90	83
Total suspended solids	mg/L	-	-	-	-	-	1.1	<1.0	1.1	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.2	<1.0	<1.0
Dissolved organic carbon	mg/L	-	-	-	-	-	1.8	1.7	2.0	2.1	2.3	1.9	13	2.1	2.0	1.8	1.9	2.0	2.4	2.1	2.0	2.1
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.17	0.18	0.26	0.18	0.17	0.13	0.12	0.18	0.11	0.11	<0.10	0.2	0.25	0.12	<0.10	0.27
Conductivity	µS/cm	-	-	-	-	-	114	116	115	112	117	113	115	113	111	117	115	112	110	112	113	110
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	-	-	54	57	57	52	54	52	52	56	55	53	53	51	55	52
Major Ions																				
Calcium	mg/L	-	-	-	1000[c,f]	-	17	18	18	17	18	18	19	17	18	17	19	18	18	17	19	20
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.036	0.038	0.037	0.037	0.04	0.037	0.04	0.038	0.039	0.032	0.04	0.036	0.034	0.033	0.039	0.035
Magnesium	mg/L	-	-	-	-	-	2.3	2.1	2.2	2.1	2.2	2.1	2.3	2.0	1.9	2.0	2.1	2.1	2.2	2.2	2.1	2.2
Potassium	mg/L	-	-	-	-	-	0.49	0.52	0.51	0.52	0.53	0.51	0.55	0.49	0.48	0.49	0.52	0.47	0.49	0.53	0.52	0.5
Sodium	mg/L	-	-	-	-	-	1.1	1.0	1.0	0.97	1.2	1.1	1.1	1.0	0.91	0.96	1.1	0.94	0.97	1.0	1.1	1.1
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	7.8	7.9	7.6	6.5	8.7	7.3	8.6	7.4	6.9	6.7	8.7	6.7	6.5	6.3	7.9	7.4
Nutrients																				
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.16	0.15	0.14	0.14	0.15	0.14	0.17	0.13	0.14	0.14	0.16	0.13	0.13	0.14	0.16	0.14
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.16	0.15	0.14	0.14	0.15	0.14	0.17	0.13	0.14	0.14	0.16	0.13	0.13	0.14	0.16	0.14
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	0.01	<0.0050	<0.0050	0.035	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.23	0.29	0.22	0.2	0.22	0.22	0.22	0.17	0.19	0.2	0.19	0.22	0.18	0.18	0.22	0.18
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0023[Bc]	0.0042[Bc]	0.0081	0.0035[Bc]	<0.002[Bc]	0.0028[Bc]	<0.002[Bc]	<0.002[Bc]	0.0023[Bc]	<0.002[Bc]	<0.002[Bc]	0.0027[Bc]	0.0034[Bc]	<0.002[Bc]	0.0028[Bc]	0.0026[Bc]
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0024
Total Metals																				
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.012	0.018	0.019	0.02	0.017	0.011	0.015	0.013	0.012	0.0097	0.014	0.014	0.012	0.013	0.013	0.014
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00013	0.00012	<0.00010	0.00012	0.0001	<0.00010	0.00012	<0.00010	<0.00010	0.00014	0.00012	0.00012	0.00011	0.00012	0.00011
Barium	mg/L	-	1.0	-	-	-	0.0056	0.0053	0.0054	0.0059	0.0054	0.0052	0.0057	0.005	0.005	0.0051	0.0054	0.0053	0.0052	0.0052	0.0054	0.0053
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000091	0.000006	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	18	19	18	19	19	18	18	17	17	19	19	18	18	17	18	17
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00078	0.0009	0.00078	0.00074	0.00085	0.00072	0.00075	0.00072	0.00054	0.0006	0.00069	0.0018	0.00054	0.00058	0.00062	0.00064
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	0.001	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	0.001	0.001	<0.0010	0.001	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	2.1	2.0	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0011	0.0013	0.0012	0.0013	0.0014	0.0012	0.0012	0.0011	0.0012	0.001	0.00097	0.0015	0.0012	0.0013	0.0013	0.0014
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00071	0.00063	0.00061	0.00039	0.00094	0.00057	0.00079	0.00052	0.00047	0.00038	0.00098	0.00044	0.00042	0.00045	0.00078	0.00072
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium	mg/L	-	-	-	-	-	0.51	0.47	0.51	0.57	0.5	0.47	0.5	0.47	0.51	0.52	0.53	0.5	0.48	0.51	0.51	0.5
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.00021	0.00018	0.00014	0.00011	0.00026	0.00015	0.00024	0.00015	0.00014	0.00013	0.00026	0.00014	0.00012	0.00014	0.00021	0.00024
Silicon	mg/L	-	-	-	-	-	1.8	1.8	1.9	1.9	1.9	1.7	1.8	1.9	1.8	1.8	1.9	1.9	2.0	2.0	1.9	1.9
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	1.1	1.0	1.0	1.1	1.1	0.95	1.1	1.0	1.0	1.0	1.1	1.0	0.95	1.0	1.0	1.1
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.14	0.14	0.14	0.15	0.14	0.14	0.13	0.14	0.14	0.15	0.14	0.14	0.14	0.15	0.14
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC
Depth (m)							60	60	60	60	60	60	60	60	60	60	60	60	60	60
Date Sampled							2019-08-20	2019-10-30	2020-06-16	2020-07-21	2020-08-11	2020-09-16	2020-11-04	2021-05-19	2021-07-21	2021-09-15	2021-10-27	2022-05-09	2022-06-27	2022-08-15	2022-10-19	2023-05-11
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00018	0.00015	0.00016	0.00017	0.00016	0.00016	0.00015	0.00017	0.00015	0.00016	0.00018	0.00016	0.00016	0.00016	0.00016	0.00016
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	0.0067	0.0063	0.0077	0.0059	0.008	0.0068	0.0076	0.012	0.006	0.0062	0.011	0.0084	0.0072	0.0068	0.0084	0.011
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	<0.00010	<0.00010	0.0001	<0.00010	0.0001	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	0.0001	0.00015	<0.00010
Barium	mg/L	-	-	-	-	-	0.0052	0.0052	0.0055	0.0049	0.0054	0.0055	0.0053	0.0048	0.0047	0.005	0.0051	0.0052	0.0052	0.0051	0.0057	0.0051
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	-	0.00011 - 0.00014[q]	**0.00025 - 0.00034[q]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt	mg/L	-	0.00039 - 0.00041[q]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	0.00062[Bc]	<0.00050	0.00066	0.00059	0.00061	0.00078[Bc]	0.00052	0.00061	<0.0005	0.00052	0.00062[Bc]	0.00053	0.00052	0.00054	0.00055	0.00063[Bc]
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001
Manganese	mg/L	-	-	-	-	-	0.00015	0.00021	0.00015	0.00015	0.00019	0.00021	0.00018	0.00013	0.00026	0.0002	0.00022	0.00035	0.00012	0.00032	0.00025	0.00036
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00075	0.0006	0.00063	0.00039	0.0009	0.00057	0.00086	0.0005	0.00047	0.00035	0.00091	0.00044	0.00044	0.00046	0.00075	0.00067
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Selenium	mg/L	-	-	-	-	-	0.00025	0.00013	0.00017	0.000096	0.00023	0.00019	0.00016	0.00013	0.00017	0.00012	0.00018	0.00011	0.00012	0.00011	0.0002	0.00017
Silicon	mg/L	-	-	-	-	-	1.8	1.7	1.8	1.9	1.9	1.7	1.8	1.7	1.7	1.8	1.7	1.8	1.9	1.9	1.8	1.8
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Strontium	mg/L	-	1.3	-	-	-	0.14	0.14	0.14	0.14	0.14	0.14	0.16	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.15	0.15
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	mg/L	-	-	-	-	-	0.00015	0.00015	0.00015	0.00016	0.00016	0.00016	0.00016	0.00015	0.00017	0.00015	0.00017	0.00016	0.00015	0.00016	0.00016	0.00016
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a				Samples Above Guideline (%)				
Station ID	Unit	BC ENV Drinking WQG					QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	Count	Non-detects	Non Detects (%)					
Depth (m)			Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	60	60	60	60	60	60	60	60	60	60	60				DW	Bc	Ba	Wc	Wa
Date Sampled							2023-06-19	2023-06-26	2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17								
Field Measured																									
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.4	7.4	7.5	7.5	7.5	7.6	7.7	7.6	7.8	7.6	7.5	368	0	0%	-	-	-	-	-
Temperature	°C	**15**[d]	-	-	-	-	4.3	4.0	4.5	4.8	4.2	4.3	4.7	5.3	4.5	4.5	4.7	376	0	0%	**10%**	-	-	-	-
Dissolved oxygen	mg/L	-	8[e]	**5**[e]	-	-	-	-	-	-	12	12	11	11	12	12	11	355	0	0%	-	-	-	-	-
Dissolved oxygen	%	-	-	-	-	-	-	-	-	-	90	91	89	84	90	89	87	355	0	0%	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0	0.11	0.07	-	0.23	-	0.75	-	0.18	0.14	**1.09**[(DW)]	357	0	0%	**5.0%**	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	109	116	114	113	112	113	110	113	121	118	112	376	0	0%	-	-	-	-	-
Conventional Parameters																									
pH	-	-	6.5 - 9.0	**6.5 - 9.0**	5 - 9.5[b,c]	-	7.9	7.8	7.9	7.8	7.9	8.0	8.0	7.8	7.9	7.9	7.9	451	0	0%	-	-	-	-	-
Hardness, as CaCO3	mg/L	-	-	-	-	-	51	58	53	54	55	53	51	54	55	54	53	452	0	0%	-	-	-	-	-
Total alkalinity, as CaCO3	mg/L	-	20[e]	-	-	-	50	51	50	52	50	50	50	50	51	51	51	452	0	0%	-	-	-	-	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	83	75	76	64	74	69	69	73	67	68	71	452	0	0%	-	-	-	-	-
Total suspended solids	mg/L	-	-	-	-	-	<1.0	<1.0	<1.0	<1.1	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	452	412	91%	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	2.0	2.5	2.3	1.9	1.7	1.6	1.6	1.6	2.0	1.8	1.7	452	0	0%	-	-	-	-	-
Colour	TCU	**15**[d]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0%	-	-	-	-	-
Turbidity	NTU	**1.0**	-	-	-	-	0.3	0.1	0.1	<0.10	0.14	0.22	0.14	0.15	0.13	0.13	0.12	451	49	11%	**2.0%**	-	-	-	-
Conductivity	µS/cm	-	-	-	-	-	113	110	115	113	116	115	115	113	115	116	111	452	0	0%	-	-	-	-	-
Hardness, as CaCO3, from total Ca/Mg	mg/L	-	-	-	-	-	52	56	54	55	-	-	-	-	59	54	58	159	0	0%	-	-	-	-	-
Major Ions																									
Calcium	mg/L	-	-	-	1000[c,f]	-	17	19	18	18	18	18	17	18	19	18	18	452	0	0%	-	-	-	-	-
Chloride	mg/L	**250**[d]	150	**600**	600	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	452	451	100%	-	-	-	-	-
Fluoride	mg/L	**1.5**	-	**1.00 - 1.1**[g]	1.0	**1.5**	0.036	0.035	0.035	0.028	0.029	0.035	0.028	0.033	0.041	0.034	0.036	452	0	0%	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	2.1	2.3	2.2	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	452	0	0%	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.53	0.56	0.5	0.48	0.5	0.51	0.48	0.48	0.5	0.53	0.53	452	0	0%	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	1.0	1.3	1.1	0.96	1.0	0.96	0.94	0.93	1.1	1.0	1.0	452	0	0%	-	-	-	-	-
Sulphate	mg/L	**500**[d]	218[g]	-	1000[c]	-	6.4	9.6	7.8	6.7	6.8	6.6	6.2	6.9	7.9	6.9	7.6	452	0	0%	-	-	-	-	-
Nutrients																									
Nitrate	mg-N/L	**10**	3.0	**33**	-	**100**	0.14	0.16	0.15	0.16	0.13	0.14	0.14	0.15	0.14	0.14	0.15	452	0	0%	-	-	-	-	-
Nitrite	mg-N/L	**1.0**	0.020[h]	**0.060**[h]	-	**10**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	452	451	100%	-	-	-	-	-
Nitrate + nitrite	mg-N/L	-	-	-	-	-	0.14	0.16	0.15	0.16	0.13	0.14	0.14	0.15	0.14	0.14	0.15	444	1	0%	-	-	-	-	-
Total ammonia	mg-N/L	-	0.15 - 2.0[i]	**0.85 - 26**[i]	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	452	413	91%	-	-	-	-	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0%	-	-	-	-	-
Total nitrogen (calculated)	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0%	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	0.19	0.24	0.2	0.19	0.16	0.19	0.17	0.2	0.19	0.19	0.20	452	0	0%	-	-	-	-	-
Total phosphorus	mg-P/L	**0.01**[d]	0.005 - 0.015[j]	-	-	-	0.0031[Bc]	0.0026[Bc]	0.0023[Bc]	<0.002[Bc]	<0.002[Bc]	0.0022[Bc]	0.0022[Bc]	<0.002[Bc]	0.0024[Bc]	0.0022[Bc]	0.0022[Bc]	452	0	0%	**0.4%**	89%	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	452	415	92%	-	-	-	-	-
Chlorophyll a	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	0	0%	-	-	-	-	-
Total dissolved phosphorus	mg-P/L	-	-	-	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0028	<0.0020	<0.002	<0.002	452	374	83%	-	-	-	-	-
Total Metals																									
Aluminum	mg/L	**9.5**	0.050 - 0.74[g,k,l]	-	-	**5**	0.019	0.015	0.015	0.009	0.0099	0.0096	0.0086	0.0098	0.0097	0.0094	0.0081	452	0	0%	-	0.2%	-	-	-
Antimony	mg/L	**0.006**	0.074	**0.25**	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	440	97%	-	-	-	-	-
Arsenic	mg/L	**0.01**	0.0050	-	0.025	-	0.00011	0.00013	0.00011	0.00012	0.0001	0.0001	0.00011	0.00011	0.00013	0.00011	0.00011	452	77	17%	-	-	-	-	-
Barium	mg/L	-	1.0	-	-	-	0.0053	0.006	0.0052	0.005	0.0053	0.0049	0.005	0.0053	0.0053	0.0053	0.0051	452	0	0%	-	-	-	-	-
Beryllium	mg/L	-	0.00013	-	0.1[b,c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	451	100%	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	452	450	100%	-	-	-	-	-
Boron	mg/L	**5.0**	1.2	-	5.0	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	452	451	100%	-	-	-	-	-
Cadmium	mg/L	**0.005**	-	-	-	**0.08**[c,f]	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	452	435	96%	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	17	18	18	19	17	17	17	17	20	18	20	452	0	0%	-	-	-	-	-
Chromium	mg/L	**0.05**	0.0025[m]	-	0.05[c,f,m]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	449	99%	-	-	-	-	-
Cobalt	mg/L	**0.001**	-	-	1.0[c,f]	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	450	100%	-	-	-	-	-
Copper	mg/L	**1.0 / 2.0**[n]	-	-	-	**0.3**	0.00065	0.00083	0.00062	0.00054	0.00072	0.00053	0.00054	0.0006	0.0012	0.00084	0.00079	452	9	2%	-	-	-	-	-
Iron	mg/L	**0.3**[d]	-	**1.0**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	452	410	91%	-	-	-	-	-
Lead	mg/L	**0.005**	-	-	-	**0.1**	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	451	305	68%	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	0.001	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	452	364	81%	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	2.1	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	452	0	0%	-	-	-	-	-
Manganese	mg/L	**0.02 / 0.12**[o]	0.80 - 0.86[g]	**1.0 - 1.2**[g]	-	-	0.0016	0.0014	0.00081	0.00062	0.001	0.0012	0.0013	0.00095	0.0011	0.0010	0.00095	452	0	0%	-	-	-	-	-
Mercury	mg/L	**0.001**	0.000010	-	-	**0.003**[c]	-	-	-	-	-	-	-	-	-	-	-	59	59	100%	-	-	-	-	-
Molybdenum	mg/L	**0.088**	7.6	**46**	0.034 / 0.284[p]	-	0.00042	0.0015	0.00077	0.00057	0.0005	0.00038	0.00037	0.00041	0.00078	0.00061	0.00057	452	4	1%	-	-	-	-	-
Nickel	mg/L	**0.08**	-	-	1.0[c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	432	96%	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	0.53	0.54	0.5	0.49	0.5	0.48	0.49	0.48	0.51	0.48	0.52	452	1	0%	-	-	-	-	-
Selenium	mg/L	**0.01**	0.0020	-	0.0020	-	0.0001	0.00038	0.00021	0.00016	0.00014	0.00011	0.00008	0.00014	0.0002	0.00016	0.00015	452	15	3%	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	2.0	1.9	1.9	1.8	1.5	1.7	1.8	1.7	1.7	1.7	1.8	452	0	0%	-	-	-	-	-
Silver	mg/L	-	0.00012	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	452	450	100%	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	1.0	1.2	1.1	0.99	1.0	0.99	0.95	0.96	1.1	1.0	1.1	452	0	0%	-	-	-	-	-
Strontium	mg/L	**7.0**	-	-	-	-	0.14	0.16	0.15	0.14	0.15	0.14	0.15	0.14	0.15	0.14	0.14	452	0	0%	-	-	-	-	-
Thallium	mg/L	-	0.000030	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	452	451	100%	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	448	99%	-	-	-	-	-

Location			BC WLRS WQG for the Protection of Freshwater Aquatic Life:		BC WLRS WQG for the Protection of Wildlife[a]:		QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a	QUL-2a								
Station ID	Unit	BC ENV Drinking WQG	Long-Term Chronic	Short-Term Acute	Long-Term Chronic	Short-Term Acute	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m	QUL-2a-60m - QUL Between Cariboo Island and HAC	QUL-2a-60m - QUL Between Cariboo Island and HAC	Count	Non-detects	Non Detects (%)	Samples Above Guideline (%)				
Depth (m)							60	60	60	60	60	60	60	60	60	60	60				DW	Bc	Ba	Wc	Wa
Date Sampled							2023-06-19	2023-06-26	2023-09-11	2023-10-30	2024-05-29	2024-07-03	2024-09-04	2024-10-31	2025-06-02	2025-07-14	2025-09-17								
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	452	450	100%	-	-	-	-	-
Uranium	mg/L	**0.02**	0.0075	**0.017**	0.2[c,f]	-	0.00016	0.00017	0.00017	0.00017	0.00016	0.00017	0.00016	0.00015	0.00018	0.00017	0.00017	452	0	0%	-	-	-	-	-
Vanadium	mg/L	-	0.060	-	0.1[b,c,f]	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	449	99%	-	-	-	-	-
Zinc	mg/L	**3.0**	-	-	2.0[c]	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	452	439	97%	-	-	-	-	-
Dissolved Metals																									
Aluminum	mg/L	-	-	-	-	-	0.0067	0.01	0.0081	0.0066	0.0039	0.0082	0.015	0.0036	0.0064	0.0067	0.0059	452	0	0%	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	452	100%	-	-	-	-	-
Arsenic	mg/L	-	-	-	-	-	0.00011	0.00013	0.00011	<0.00010	<0.00010	0.0001	0.0001	<0.00010	<0.00010	<0.0001	0.00010	452	282	62%	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	0.0052	0.0054	0.0052	0.0045	0.0053	0.0054	0.005	0.0051	0.005	0.0053	0.0051	452	0	0%	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	452	100%	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	452	452	100%	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	452	452	100%	-	-	-	-	-
Cadmium	mg/L	-	0.00011 - 0.00014[g]	**0.00025 - 0.00034[g]**	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.000005	<0.000005	452	447	99%	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	450	100%	-	-	-	-	-
Cobalt	mg/L	-	0.00039 - 0.00041[g]	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	452	100%	-	-	-	-	-
Copper	mg/L	-	0.0002 - 0.0058[q]	**0.0007 - 0.0349[q]**	-	-	<0.00050	0.00078[Bc]	0.00061	0.0005	0.00054[Bc]	0.00072[Bc]	0.00072[Bc]	0.00052[Bc]	0.0015[Bc]	0.00068[Bc]	0.00066[Bc]	452	70	15%	-	44%	**1.3%**	-	-
Iron	mg/L	-	-	**0.35**	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.03	<0.03	452	451	100%	-	-	-	-	-
Lead	mg/L	-	0.0015 - 0.0068[g,l]	-	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	452	294	65%	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.001	<0.001	452	423	94%	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	0.00016	0.00025	0.00017	0.00012	0.00011	0.0003	0.00043	0.00014	0.00018	0.00028	0.00028	452	23	5%	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	100%	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	0.00041	0.0015	0.00077	0.00055	0.00048	0.0004	0.00031	0.00041	0.00075	0.00057	0.00054	452	0	0%	-	-	-	-	-
Nickel	mg/L	-	0.0011 - 0.0094[q]	**0.0249 - 0.0798[q]**	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	445	98%	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	0.000088	0.00035	0.00021	0.00015	0.00014	0.00012	0.000093	0.000095	0.00018	0.00014	0.00018	452	15	3%	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	2.0	2.0	1.8	1.7	1.5	1.6	1.7	1.7	1.7	1.7	1.8	452	0	0%	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	452	452	100%	-	-	-	-	-
Strontium	mg/L	-	1.3	-	-	-	0.14	0.15	0.15	0.14	0.14	0.14	0.13	0.14	0.15	0.13	0.14	452	0	0%	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.00001	<0.00001	452	452	100%	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	452	450	100%	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	452	452	100%	-	-	-	-	-
Uranium	mg/L	-	-	-	-	-	0.00016	0.00017	0.00016	0.00017	0.00016	0.00016	0.00017	0.00016	0.00017	0.00017	0.00016	452	0	0%	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	452	452	100%	-	-	-	-	-
Zinc	mg/L	-	0.0033 - 0.011[g,k,l]	**0.021 - 0.046[g,l]**	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.003	<0.003	452	443	98%	-	1.3%	-	-	-

Source: Annual Water Quality Excel Files provided by Mount Polley Mine.
BC ENV (British Columbia Ministry of Environment and Climate Change Strategy). 2020. B.C. Source Drinking Water Quality Guidelines: Guideline Summary. Water Quality Guideline Series, WQG-01. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture - Guideline Summary.* Water Quality Guideline Series, WQG-20. Prov. B.C., Victoria B.C.
BC WLRS (British Columbia Ministry of Water, Land, and Resource Stewardship). 2025. *Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture.* Water Quality Guideline Series, WQG-08-01. Prov. B.C., Victoria B.C.

Notes:
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Water quality screening against long-term chronic guidelines is presented for reference only; long-term chronic guidelines apply to the average value of five measurements taken within
In cases where toxicity-modifying factors (e.g., DOC, chloride, hardness) were below detection limits, 0.5 times the detection limit was used to calculate the sample specific guideline.
(a) When BC WLRS WQGs for the protection of wildlife were not available or inapplicable, livestock guidelines were used for comparison purposes. If wildlife and livestock guidelines were unavailable, irrigation guidelines were applied.
(b) The guideline value is for irrigation. The water quality guidelines recommend levels of waterborne chemicals and pathogens for irrigating crops, which may be consumed.
(c) The guideline value is for livestock. The guideline is designed to ensure safe drinking water for livestock.
(d) The guideline is based on an aesthetic objective rather than a health-based objective.
(e) The guideline is a minimum value.
(f) The guideline is a working guideline.
(g) The guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (44 to 59 mg/L). The guideline is calculated based on the individual hardness value for each sample. If no hardness value was available, a monthly station average was used for guideline calculation. If no monthly station average for hardness could be calculated, a station average was used for guideline calculation.
(h) The guideline is chloride dependent. The guideline range shown is based on the chloride concentration observed in the dataset (<0.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(i) The ammonia guideline is pH and temperature dependent. Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample. If no pH or temperature value was available, monthly averages were used for guideline calculation.
(j) The total phosphorus guideline is a range, with the objective of protecting salmonid productivity. The guideline is applied only to lakes with salmonids as the predominant fish species.
(k) The guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (6.7 to 8.9). The guideline is calculated based on the individual pH for each sample. If no pH value was available, a monthly station average was used for guideline calculation. If no monthly station average for pH could be calculated, a station average was used for guideline calculation.
(l) The guideline is DOC dependent. The guideline range shown is based on the DOC concentration range observed in the dataset (0.67 to 4.7 mg/L). The guideline is calculated based on the individual DOC concentration in each sample. If no DOC value was available, a monthly station average was used for guideline calculation. If no monthly station average for DOC could be calculated, a station average was used for guideline calculation.
(m) The guideline is for chromium VI.
(n) The total copper drinking water screening criteria has an aesthetic objective (1.0 mg/L) and a maximum acceptable concentration for short and long-term exposure (2.0 mg/L).
(o) The total manganese drinking water screening criteria has an aesthetic objective (0.02 mg/L) and a maximum acceptable concentration (0.12 mg/L).
(p) The molybdenum guideline for wildlife is specific to wildlife physiology, ruminant (0.034 mg/L) and non-ruminant (0.284 mg/L) wildlife.
(q) The guideline is pH, hardness, DOC, and temperature dependent. Sample specific guidelines were generated using a parameter specific British Columbia Biotic Ligand Model which is available from BC WLRS. The guideline is calculated based on the individual pH, hardness and DOC concentrations in each sample. If no pH, hardness, or DOC values were available, a monthly station average was used for guideline calculation. If no monthly station averages for pH, hardness, and DOC could be calculated, a station average was used for guideline calculation.
(DW) = concentration is higher than the BC ENV drinking WQG.
(Bc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Ba) = concentration is higher than the maximum BC WLRS WQG for the protection of aquatic life or outside the recommended pH, DO, or total alkalinity range.
(Wc) = concentration is higher than the 30-day mean BC WLRS WQG for the protection of wildlife.
(Wa) = concentration is higher than the maximum BC WLRS WQG for the protection of wildlife.
(DL>Bc) = analytical detection limit is higher than the long-term chronic BC WLRS guideline.
BC ENV = British Columbia Ministry of Environment and Climate Change Strategy; BC WLRS = British Columbia Ministry of Water, Land, and Resource Stewardship; CaCO3 = calcium carbonate; °C = degrees celsius; DOC = dissolved organic carbon; NTU = nephelopmetric turbidity unit; - = no guideline or no data; m = metres; µg/L = micrograms per litre; µS/cm = microsiemens per centimetre; mg-N/L = milligrams of nitrogen per litre; mg-P/L = milligrams of phosphorus per litre; mg/L = milligrams per litre; % = percent; TCU = true colour unit; WQG = Water Quality Guidelines.

APPENDIX 3-7: SEDIMENT AND AQUATIC LIFE MONITORING REPORT

Mount Polley Mine Comprehensive Environmental Monitoring Program 2024 – Sediment and Aquatic Life

Prepared for:
Mount Polley Mining Corporation
Likely, British Columbia

Prepared by:
Minnow Environmental Inc.
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March 2025

Mount Polley Mine Comprehensive Environmental Monitoring Program 2024 – Sediment and Aquatic Life

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Statistical Analyses

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ACRONYMS AND ABBREVIATIONS

AFDM – Ash Free Dry Mass
ANCOVA – Analysis of Covariance
ANOVA – Analysis of Variance
APHA – American Public Health Association
BC – British Columbia
BCMOE – British Columbia Ministry of Environment
BCMOECCS – British Columbia Ministry of Environment and Climate Change Strategy
BCMOWLRS – British Columbia Ministry of Water, Land and Resource Stewardship
BCWQG – British Columbia Water Quality Guidelines
BCWSQG - British Columbia Working Sediment Quality Guidelines
BCF – Bioconcentration Factor
BLM – Biotic Ligand Model
CA – Correspondence Analysis
CABIN – Canadian Aquatic Biomonitoring Network
CALA – Canadian Association for Laboratory Accreditation
CASQO – California Sediment Quality Objectives
CCME – Canadian Council of Ministers of the Environment
CEMP – Comprehensive Environmental Monitoring Plan
CES – Critical Effect Size
CFIA – Canadian Food Inspection Agency / Health Canada
CPUE – Catch-per-Unit-Effort
CRC-ICP-MS – Collision Reaction Cell Inductively Coupled Plasma – Mass Spectrometry
CRFD – Cumulative Relative Frequency Distributions
CSR – Contaminated Sites Regulation
CVAAS – Cold Vapour Atomic Absorption Spectrophotometry
DFO – Department of Fisheries and Oceans Canada
DI – Depth-Integrated
DO – Dissolved Oxygen
DOC – Dissolved Organic Carbon
DQO – Data Quality Objectives
DQR – Data Quality Review
DW – dry weight
EC10 – 10th Percentile Effect Concentrations
EEM – Environmental Effects Monitoring

EMA – Environmental Management Act
EPT – Ephemeroptera, Plecoptera, and Trichoptera
ERA – Ecological Risk Assessment
FOV – Field of View
GEF – Guideline Exceedance Factor
GPS – Global Positioning System
ha – Hectares
HHRA – Human Health Risk Assessment
HRWG – Habitat Remediation Working Group
ICP-MS – Inductively Coupled Plasma – Mass Spectrometry
IP – Indicator Parameter
K-B – Kajak-Brinkhurst
K-M – Kaplan-Meier
K-S – Kolmogorov-Smirnov
LCS – Laboratory Control Samples
LOR – Limit of Reporting
LPL – Lowest Practicable Level
LRL – Laboratory Reporting Limit
MAD – Median Absolute Deviation
MB – Method Blank
MCE – Mixed Cellulose Ester
MCT – Measure of Central Tendency
MDMER – Metal and Diamond Mining Effluent Regulations
MLE – Maximum Likelihood Estimation
MOD – Magnitude of Difference
MPMC – Mount Polley Mining Corporation
m/s – Metres Per Second
n – Replication
PETBP – Perimeter Embankment Till Borrow Pond
PC – Principal Component
PCA – Principal Component Analysis
PDF – Portable Document Format
PNAMP – Pacific Northwest Aquatic Monitoring Partnership
POIs – Parameters of Interest
QA/QC – Quality Assurance / Quality Control
RM – Reference Material

SAFIT – Southwest Association of Freshwater Invertebrate Taxonomists

SALM – Strong Acid Leachable Metals

SD – Standard Deviation

SCCWRP – Southern California Coastal Water Research Project

SPIN – Summer Profundal Index Netting

SRN – Sample Receipt Notification

TOC – Total Organic Carbon

TOR – Terms of Reference

TSF – Tailings Storage Facility

TTF – Trophic Transfer Factor

UER – Upper Edney

ug/L – Micrograms Per Litre

UHC – Upper Hazeltine Creek

USEPA – United States Environmental Protection Agency

YOY – Young-of-the-Year

WTP – Water Treatment Plant

WW – wet weight

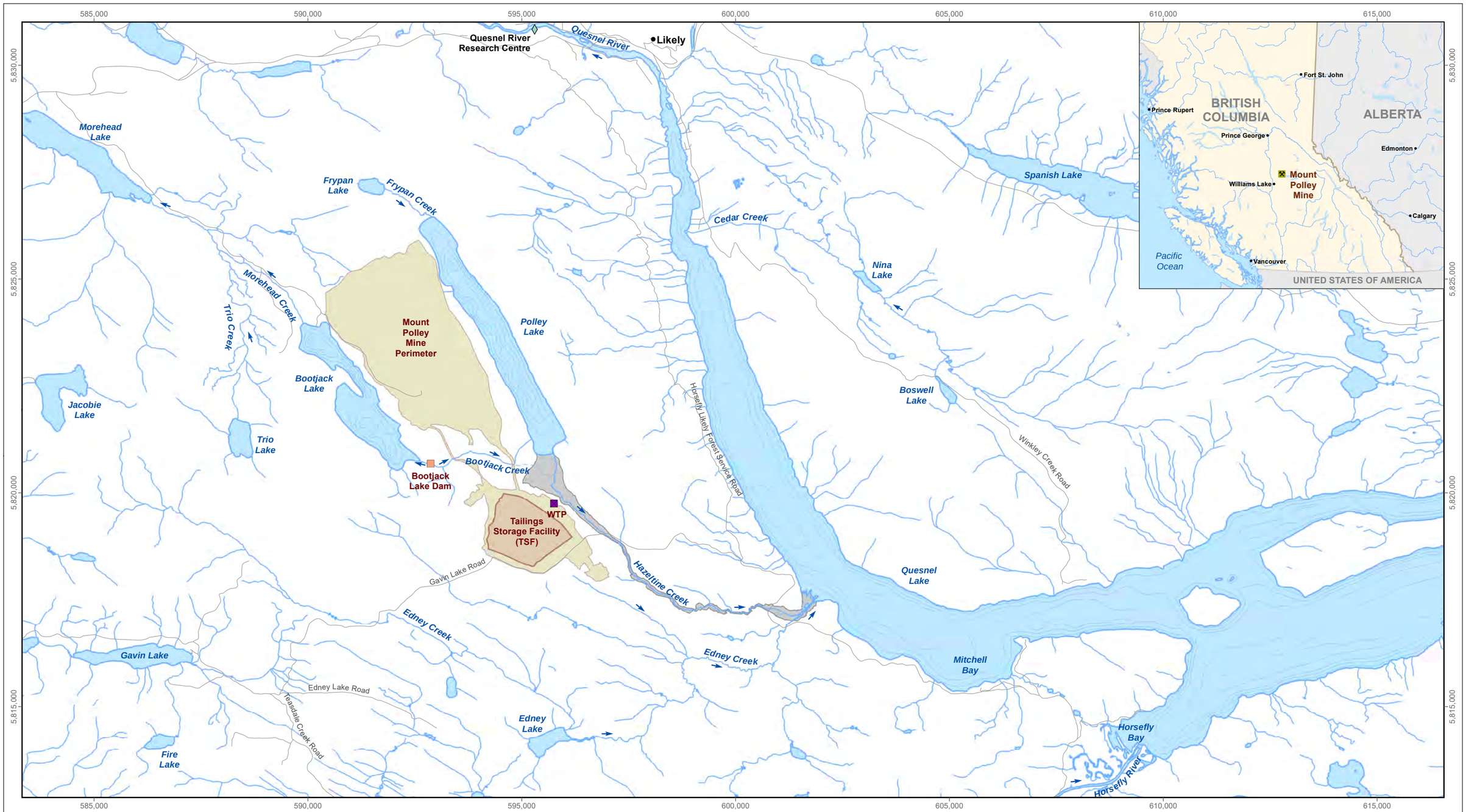
1 INTRODUCTION

1.1 Site Description and Background

Mount Polley Mining Corporation (MPMC), a subsidiary of Imperial Metals, owns and operates the Mount Polley copper-gold mine (Mount Polley) located approximately 9 kilometers southwest of Likely, British Columbia (BC) and 56 km (100 km by road) northeast of Williams Lake, BC (Figure 1.1). Infrastructure at the Mount Polley Mine site includes open pits, an underground mine, a crusher, a mill and office spaces, a Tailings Storage Facility (TSF), a Water Treatment Plant (WTP), waste rock disposal areas, collection and settling ponds, a surface water collection system, haul roads, access roads, and storage facilities (Figure 1.2). The total lease area associated with the mine is 24,096 hectares (ha).

Mount Polley began operating in 1997 and operated from 1997 to 2001, when it entered care and maintenance. The discovery of new ore reserves at the site and improved commodity prices prompted MPMC to reopen the mine in 2005 (MPMC 2009). Mount Polley continued operating until August 4, 2014, when a foundation failure at the perimeter embankment of the TSF resulted in a breach (Ministry of Energy and Mines 2015; Province of British Columbia 2015). The TSF perimeter embankment breach ("the breach") resulted in the release of approximately 25 million cubic meters of water, tailings slurry, and dam construction material into nearby Polley Lake, Hazeltine Creek, Edney Creek, and Quesnel Lake (Figure 1.1).

Mount Polley ceased operations immediately after the breach to focus on impact assessment, cleanup, and remediation. Restricted operations were permitted to commence on August 5, 2015. During restricted operations, all tailings were placed under water in the Springer Pit (Figure 1.2). Approval for discharge of treated mine effluent to Quesnel Lake was granted under the BC *Environmental Management Act* (EMA) on November 29, 2015, and Mount Polley initiated discharge of treated effluent to Quesnel Lake on December 1, 2015 (Figure 1.2). Restrictions on operations were lifted on June 23, 2016, and the mine began operating at full capacity on June 27, 2016 (MPMC 2017). On January 7, 2019, MPMC announced that Mount Polley operations would be suspended in May 2019 due to declining copper prices. Mount Polley was placed under care and maintenance on May 31, 2019, and remained so until August 25, 2021, when Mount Polley resumed pit mining and initiated a transition back to active operations. Full active operations at Mount Polley, including milling, copper concentration production, and tailings deposition, resumed in June 2022. The discharge of treated effluent to Quesnel Lake has been ongoing since 2015 (including during care and maintenance) and is currently permitted until June 30, 2025.



LEGEND

- Water Treatment Plant (WTP)
- Remediation Zone for Hazeltine Creek
- Historic Watercourse
- Active Mine Operation
- Tailings Storage Facility

0 1 2 4 km

N W E S

Projection: North American Datum 1983 UTM Zone 10 U

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Location and General Layout of the Mount Polley Mine

Date: March 2025
Project 247202.0004

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Figure 1.1

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LEGEND

- Central Collection Sump
- Effluent Mixing Tank
- Water Treatment Plant (WTP)
- Diffuser (Treated Effluent Discharge, December 2015 to present)
- Discharge to Diffusers (2015 to present)
- Discharge to Hazeltine Creek (Apr 10 2014 to Aug 14 2014 and Nov 29 2015 to Sept 30 2017)
- Effluent Discharge Pipeline (January 2018 to present)
- Mine Infrastructure
- Historic Watercourse

0 0.5 1 2 km

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Mount Polley Mine Site Operations and Infrastructure

Date: March 2025
Project 247202.0004

minnow environmental inc.

Figure 1.2

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Overview\24-04 Figure 1.2 Project Overview.mxd

1.2 Regulatory Environment

Mount Polley is required to comply with Permit 11678, which was first issued under the BC EMA on May 30, 1997. Conditions of the permit include criteria for effluent quality and non-lethality, water quality monitoring, and biological monitoring. Permit 11678 was amended on November 7, 2012, to allow for effluent discharge from the TSF to Hazeltine Creek, which began on April 10, 2014. Discharges were halted in response to the August 4, 2014, breach.

Following extensive clean-up and remediation efforts, the British Columbia Ministry of Environment and Climate Change Strategy (BCMOECCS; currently the British Columbia Ministry of Environment and Parks) issued an amendment to Permit 11678 on November 29, 2015, which allowed Mount Polley to discharge treated effluent into Quesnel Lake via Hazeltine Creek as part of a short-term water management strategy. Permit 11678 was amended again on April 7, 2017, allowing for the use of a pipeline to convey treated water from the WTP to diffusers in Quesnel Lake (see Figure 1.2). Permit 11678 was most recently amended on December 1, 2022, and included an update to the permitted date for the direct discharge of treated effluent to Quesnel Lake via the pipeline and diffusers, which is now allowed under Permit 11678 until June 30, 2025.

Section 3.2 of the amended Permit 11678 requires MPMC to develop and implement a Comprehensive Environmental Monitoring Plan (CEMP) for the Mount Polley site and surrounding receiving environment that combines pre-existing monitoring programs into an integrated plan:

> *3.2.1 "The Permittee must continue to develop, submit, and implement an ongoing Comprehensive Environmental Monitoring Plan to evaluate the effects of mining-related activities on the physical, chemical, and biological characteristics of Hazeltine Creek, Edney Creek, Bootjack Lake, Morehead Creek, Polley Lake, Quesnel Lake, Quesnel River, and associated riparian and upland areas."*
>
> *3.2.4 "The CEMP must meet all the following requirements:*
>
> *(a) Consolidate and integrate all of the monitoring programs that are being conducted in the vicinity of the mine site and include, at minimum, surface water (quality and quantity), groundwater (characterization and interactions with surface water), sediments, soils, periphyton, phytoplankton, benthic invertebrates, zooplankton, fish, floodplain and upland vegetation, and wildlife.*
>
> *(b) At a minimum address, a three-year time span.*
>
> *(c) At a minimum include all sampling sites, frequency of sampling, variables to be analyzed, method detection limits, sampling methods, sample analysis methods, and data analysis methods.*

(d) The updated CEMP must be approved by the Director"

In accordance with this requirement, the CEMP (MPMC 2019) covers the 2018 to 2020 period and was developed based on an approved updated Terms of Reference (TOR) provided by BCMOECCS. The 2019 CEMP (MPMC 2019) was submitted to BCMOECCS on October 31, 2019, and was approved by BCMOECCS on February 10, 2021, subject to additional monitoring requirements (BCMOECCS 2021). Monitoring in 2024 was completed in accordance with the approved CEMP (MPMC 2019) and the additional CEMP requirements (outlined in BCMOECCS 2021), although the CEMP covers the 2018 to 2020 period. Based on the requirements of Permit 11678, an updated 2023 CEMP (MPMC 2023) was submitted to BCMOECCS on March 31, 2023, and is currently under review.

The CEMP is an integrated monitoring plan that has been developed to capture, in one document, several independent and interdependent monitoring programs, including: site monitoring, water discharge monitoring, Metal and Diamond Mining Effluent Regulations (MDMER) monitoring, breach response monitoring, and monitoring following completion of remediation efforts. The CEMP has been developed through an extensive consultative process that encompasses several permitting and other regulatory processes. This integrated monitoring plan offers the additional benefit of facilitating more efficient monitoring plan review by regulatory agencies, First Nations, and other stakeholders.

1.3 Scope of this Report

This report covers a subset of the CEMP. It includes monitoring of the aquatic receiving environment adjacent to, and downstream of Mount Polley over the three-year period from 2022 to 2024. The three-year period covered in the present report (2022 to 2024) serves to meet the requirement outlined in Section 3.2.6 of the amended Permit 11678, which stipulates that the permittee (MPMC) must:

"Submit a three-year detailed monitoring program interpretive report to the Director by March 31, 2022, and every three years thereafter."

To fulfill the dual requirements of both annual reporting and three-year integrative reporting, all raw data collected in 2024 are provided within this report whereas data collected in 2022 and 2023 are discussed and presented in reference to previous reports that have provided raw data. Where relevant, data collected prior to 2022 (as far back as baseline data collected in 1995) are used in data interpretation in reference to the previous reports that provided the raw data.

This report specifically includes lakes, creeks, and rivers with the potential to have been influenced by Mount Polley through effluent discharge, the breach, or general mine operations, including Polley Lake, Hazeltine Creek, Edney Creek, Quesnel Lake, and the Quesnel River

(Figure 1.1). Additional areas were also evaluated as references for the potentially affected areas to facilitate interpretation of potential effects (as outlined in the Study Design Overview; Section 2). This report is focused on sediment, periphyton, plankton, benthic invertebrates, and fish. Additional supporting data (e.g., physical habitat characteristics, water quality) are used in the interpretation of the key monitoring components.

1.4 Monitoring Objectives

The overarching objective of the monitoring undertaken under the CEMP is to support the evaluation of the potential for effects of mine-related activities on the physical, chemical, and biological characteristics of the environment surrounding Mount Polley (i.e., the receiving environment). Monitoring under the CEMP is completed to:

1. Evaluate if pollution[1] is occurring in the receiving environment as a result of the existing water discharge or mine-related activities;
2. Evaluate the environmental impacts of the August 2014 TSF embankment breach and to evaluate the effects of mitigation measures that are implemented as part of the remediation strategy; and
3. Inform management decisions, including reclamation and closure.

General objectives of the CEMP elements reported herein (i.e., sediment, periphyton, plankton, benthic invertebrates, and fish) are to:

1. Evaluate the influence of mine activities on the receiving environments in comparison to baseline/pre-breach and/or reference conditions;
2. Determine potential implications to aquatic life; and
3. Provide data to support exposure assessment as part of Ecological Risk Assessment (ERA) and Human Health Risk Assessment (HHRA).

Specific questions being addressed under these objectives are:

1. Are there differences in conditions at exposed areas relative to baseline/pre-breach and/or reference conditions?
2. If yes, are the differences mine-related?

[1] Pollution as defined in the BC EMA (S.1(1)) means "*…the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment*".

3. Does the weight-of-evidence indicate that the usefulness of the aquatic environment is impaired?

Specific objectives associated with the CEMP elements herein are provided in Table 1.1.

1.5 Report Organization

This report is presented in eight sections, the first of which is this introduction (Section 1). Section 2 provides an overview of the approach and study design for the CEMP elements reported herein (i.e., sediment, periphyton, plankton, benthic invertebrates, and fish). Section 3 provides the methods used for data collection, treatment, and interpretation applicable to lake habitat. Section 4 provides the same for creek habitat. Sections 5 and 6 provide the results, assessment, and interpretation of data collected in lake and creek habitat, respectively. Section 7 provides an integrated summary of the key findings. All references cited throughout the report are provided in Section 8.

Table 1.1: Objectives of the Mount Polley CEMP Sediment and Aquatic Life Monitoring Components

Component	Objectives	Sub-Components
Sediment	1. Evaluate the influence of mine activities on depositional receiving environments (e.g., Polley Lake, Quesnel Lake, and limited locations in Hazeltine Creek) in comparison to baseline and/or reference conditions; 2. Determine potential implications to aquatic life (e.g., relative to available sediment quality guidelines); 3. Provide supporting information for benthic invertebrate community monitoring; and 4. Provide data to support exposure assessment as part of ERA and HHRA[a].	1. Sediment Quality 2. Sediment Toxicity
Periphyton[b]	1. Evaluate the influence of mine activities on erosional receiving environments (e.g., Hazeltine Creek and Edney Creek) in comparison to baseline and/or reference conditions; 2. Serve as supporting information for the determination of potential effects to aquatic life at higher trophic levels (benthic invertebrates and fish); 3. Provide supporting information for the assessment of benthic invertebrate tissue quality, benthic invertebrate community condition, and fish habitat productivity; and 4. Provide data to support exposure assessment as part of ERA and HHRA[a].	1. Community Composition 2. Productivity 3. Tissue Quality
Plankton	1. Evaluate the influence of mine activities on lake environments (Polley Lake and Quesnel Lake) in comparison to baseline and/or reference conditions; 2. Serve as supporting information for the determination of potential effects to aquatic life at higher trophic levels (fish); 3. Provide supporting information for the assessment of fish habitat productivity and fish tissue quality; and 4. Provide data to support exposure assessment as part of ERA and HHRA[a].	1. Phytoplankton Community Composition 2. Phytoplankton Productivity 3. Zooplankton Community Composition 4. Zooplankton Productivity 5. Zooplankton Tissue Quality
Benthic Invertebrates	1. Evaluate the influence of mine activities on receiving environments (e.g., Hazeltine Creek, Edney Creek, Polley Lake, and Quesnel Lake) in comparison to baseline and/or reference conditions; 2. Determine potential implications to aquatic life (e.g., through assessment of benthic invertebrate community and productivity endpoints, and comparison of benthic tissue quality results to available guidelines); 3. Provide supporting information for the assessment of potential effects to higher trophic levels (e.g., fish); and 4. Provide data to support exposure assessment as part of ERA and HHRA[a].	1. Community Composition 2. Productivity[b] 3. Tissue Quality[b]
Fish	1. Evaluate the influence of mine activities on receiving environments (e.g., Hazeltine Creek, Edney Creek, Polley Lake, Quesnel Lake, and Quesnel River) in comparison to baseline and/or reference conditions; 2. Determine potential implications to aquatic ecosystem health and human health (e.g., relative to available fish tissue quality guidelines); 3. Document fish habitat utilization in creek and lake areas that were physically impacted by the TSF breach (most notably Hazeltine Creek and lower Edney Creek), thereby documenting the effectiveness of fish habitat rehabilitation efforts; and 4. Provide data to support exposure assessment as part of ERA and HHRA[a].	1. Fish Habitat and Usage[b] 2. Community Composition 3. Fish Population Health 4. Tissue Quality

[a] Ecological Risk Assessment (ERA) and Human Health Risk Assessment (HHRA).
[b] Denotes a component or sub-component that only applies to creeks.

2 STUDY DESIGN OVERVIEW

2.1 Conceptual Overview

The overall study design for the Mount Polley CEMP, including rationale for the design, is provided in the approved 2019 CEMP study design document (MPMC 2019). That document provides an overview of the mine site and its surrounding environment, an overview of environmental management on the mine site, and a detailed description of each monitoring component of the CEMP. The latter includes the monitoring objective, a summary of historical findings, a study design overview and rationale, and methodology associated with quality assurance/ quality control (QA/QC), sample collection, laboratory analyses, data quality review (DQR), data handling, data interpretation, and reporting (MPMC 2019).

This report covers a subset of Mount Polley's CEMP and is specifically focused on sediment and aquatic biological monitoring under the CEMP (i.e., sediment, periphyton, plankton, benthic invertebrate, and fish components of the CEMP). Briefly, sediment and aquatic biological monitoring under the CEMP was developed in consideration of:

1. Pathways of potential effects (MPMC 2019);
2. Accepted biological monitoring tools and measurement endpoints sensitive to mine-related influences (Table 2.1; MPMC 2019);
3. The availability of baseline and/or pre-breach data (MPMC 2019);
4. The findings of previous studies (MPMC 2019);
5. Statistical considerations for comparisons of exposed-area data to reference, baseline, and/or over time (MPMC 2019);
6. Needs of the ERA and HHRA (Golder 2017a,b); and
7. Consultation (MPMC 2019).

Key pathways of potential effects to the aquatic environment include diffuse influences of the mine footprint and mining operations, the direct influence of the breach on Polley Lake, Hazeltine Creek, Edney Creek, and Quesnel Lake, and the direct discharge of treated mine water to Quesnel Lake. Sediment and aquatic biological monitoring endpoints used under the CEMP include chemical tools that address key questions and biological monitoring endpoints that are typically recognized as being the most sensitive to metals and to the potential influence of mine operations in general (Table 2.1; ESG 1999; Environment Canada 2012b; British Columbia Ministry of Environment [BCMOE] 2013, 2016; Arche et al. 2016; Simpson and Batley 2016). Baseline and/or pre-breach data are available for lakes and creeks immediately adjacent to

Table 2.1: Mount Polley CEMP Sediment and Aquatic Life Monitoring Components and Measurement Endpoints, 2022 to 2024[a]

Monitoring Component	Habitat Type	Sub-Component	Measurement Endpoints
Sediment	Lake and Creek[b]	Sediment Texture	moisture particle size distribution total organic carbon
		Sediment Quality	metals (CRC-ICP-MS scan[d]) total nitrogen total sulphur mercury
		Sediment Toxicity	14-day test of *Hyalella azteca* survival and growth 10-day test of *Chironomus dilutus* survival and growth
Periphyton	Creek	Productivity	chlorophyll-a biomass (ash free dry mass)
		Community Composition	density (organisms/surface area) taxon richness[e] diatom taxon richness Simpson's index of diversity Simpson's index of evenness density and proportions of major taxon groups
		Tissue Quality	moisture metals (CRC-ICP-MS scan[d]) mercury
Phytoplankton	Lake	Productivity	chlorophyll-a
		Community Composition	density (cells/volume) taxon richness[e] Simpson's index of diversity Simpson's index of evenness density and proportions of major taxon groups
Zooplankton	Lake	Productivity	biomass
		Community Composition	density (organisms/volume) taxon richness[e] Simpson's index of diversity Simpson's index of evenness density and proportions of major taxon groups
		Tissue Quality	moisture metals (CRC-ICP-MS scan[d]) mercury
Benthic Invertebrates	Lake and Creek	Productivity[c]	biomass
		Community Composition	density (organisms/surface area) taxon richness[e] Simpson's index of diversity Simpson's index of evenness density and proportions of major taxon groups Correspondence analysis
		Tissue Quality	moisture metals (CRC-ICP-MS scan[d]) mercury
Fish	Lake and Creek	Habitat[f]	water depth and velocity wetted and bankfull width substrate characteristics riparian vegetation and canopy cover instream cover
		Habitat Usage[f]	repeated observation counts fish collection counts and catch-per-unit-effort[g]
		Catchability	fish collection counts and catch-per-unit-effort[g]
		Population Health[h]	size-at-age condition size-frequency distribution
		Tissue Quality	moisture metals (CRC-ICP-MS scan[d]) mercury

[a] A number of additional supporting measures were collected to assist in the interpretation of results associated with the core measurement endpoints displayed. Not all measurement endpoints were evaluated annually between 2022 to 2024. See Minnow 2023a, 2024a for details of monitoring in 2022 and 2023, respectively.

[b] Due to the predominantly erosional habitat of the creek habitats assessed, measurement endpoints for sediment collected from these creek habitats were limited to the sub-components texture and quality.

[c] Benthic invertebrate biomass as a measure of secondary productivity was limited to creek habitats only.

[d] Metal scans by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) or Collision Reaction Cell ICP-MS (CRC-ICP-MS). "Metals" includes non-metallic parameters, such as phosphorus, which are common in CRC-ICP-MS analysis packages.

[e] Taxa reported at the lowest practicable level of taxonomy.

[f] Fish habitat and fish habitat usage were monitored in creek habitats only.

[g] Fish collection and catch-per-unit-effort using a variety of techniques: minnow trapping and backpack electrofishing in creek habitats; hoop netting, minnow trapping, angling, and gill netting in lake habitats.

[h] Fish population health was monitored in lake habitats only (Polley Lake).

the mine (Polley Lake, Hazeltine Creek, Edney Creek, Bootjack Lake, and Quesnel Lake). To the extent possible, monitoring is designed to make the best use of baseline and/or pre-breach data in interpretation. Findings of previous studies (reviewed in the CEMP; MPMC 2019) also informed the study design, with the design focused on areas of greatest potential impact and on addressing key questions of effect or of recovery.

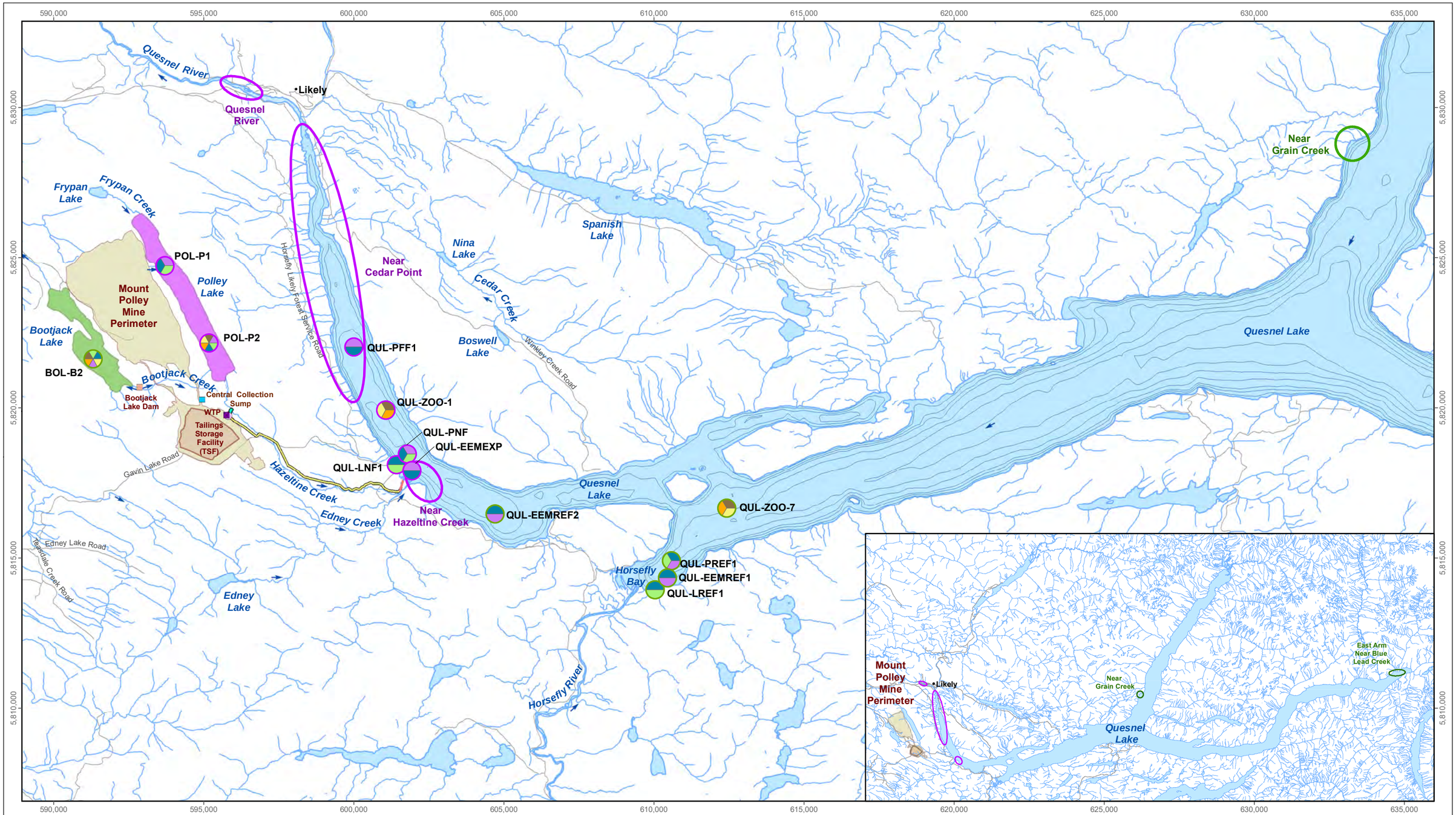
The assessment of potential mine-related effects is predicated on the detection of differences between exposed areas and baseline, pre-breach, or reference areas, or over time. Therefore, the study design was driven by considering statistical requirements (e.g., the number of reference areas and replication [n] within each exposed and reference area) to support sufficiently powerful comparisons among areas and over time (replication level is typically n=5 to n=8). The design was also developed in consideration of data needs to support potential future iterations of ERA and HHRA.

2.2 Lake Habitat

Monitoring of lake habitat in the vicinity of the Mount Polley Mine between 2022 and 2024 focused on two lakes: Polley Lake, which is located to the immediate east of the mine and Quesnel Lake, which is located further to the east of Polley Lake and approximately 3.7 kilometers from the mine at its nearest point (Figure 2.1). As indicated above, Polley Lake was influenced by the breach in August 2014 and may be influenced by mining operations. Quesnel Lake was influenced by the breach in August 2014 (via Hazeltine Creek) and is currently also influenced by the direct discharge of treated mine water to Quesnel Lake (as of January 8, 2018[2]; Figure 2.1). Bootjack Lake serves as reference for Polley Lake, and unexposed/unimpacted areas within Quesnel Lake serve as references for exposed/impacted areas of the lake (Figures 1.2 and 2.1).

CEMP monitoring in lakes is outlined in detail in the CEMP study design document (MPMC 2019), including detailed description of each monitoring component and associated rationale for the study design and for the selected measurement endpoints. This section provides a general overview of the sediment and aquatic biological monitoring of lakes completed over the 2022 to 2024 period (see Figure 2.1, Table 2.2). Briefly, CEMP monitoring of lakes from 2022 to 2024 included the following components: sediment quality, sediment toxicity, phytoplankton community and productivity, zooplankton community and productivity, zooplankton tissue quality, benthic invertebrate community, fish community/ population, and fish tissue quality. Not all monitoring components were completed at every area each year (Figure 2.1, Table 2.2).

[2] Discharge of treated mine water to Quesnel Lake via Hazeltine Creek was initiated on December 1, 2015. Direct discharge to Quesnel Lake (via a pipe) was initiated on January 8, 2018.



LEGEND

- Reference Area
- Exposed Area
- Benthic Invertebrate Community
- Zooplankton Community and Productivity
- Zooplankton Tissue Quality
- Phytoplankton Community and Productivity
- Sediment Quality
- Sediment Toxicity

Fish Collection Area

- Exposed Lake
- Reference Lake
- Exposed Area
- Reference Area

- Historic Watercourse

Note: Quesnel Lake bathymetry lines are an approximate representation only and may not precisely delineate accurate depths at larger scales.

0 1.5 3 6 km

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Monitoring Areas on Polley, Bootjack, and Quesnel Lakes, and Quesnel River, 2024

Date: March 2025
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Figure 2.1

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Overview\24-04 Figure 2.1 Monitoring Areas on Polley, Bootjack, and Quesnel Lakes, and Quesnel River, 2024.mxd

Table 2.2: General Overview of Mount Polley CEMP Sediment and Aquatic Life Monitoring in Lakes, 2022 to 2024[a]

Waterbody		Area Type	Sampling Area	Sediment Quality			Sediment Toxicity			Phytoplankton Productivity and Community			Zooplankton Productivity and Community			Zooplankton Tissue Quality			Benthic Invertebrate Community			Fish Community / Population[b]			Fish Tissue Quality[c]		
			Year:	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024
Polley Lake	Deep	Exposed	POL-P1	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓
			POL-P2	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓						
	Shallow	Exposed	POL-S	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Bootjack Lake	Deep	Reference	BOL-B2	-	-	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓
	Shallow	Reference	BOL-S	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Quesnel Lake	Deep	Exposed (Effluent-Exposed)	QUL-EEMEXP	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓
		Reference (Unimpacted)	QUL-EEMREF1	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓						
		Reference (Impacted)	QUL-EEMREF2	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓						
		Exposed (Near-Field)	QUL-PNF	✓	✓	✓	-	-	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓						
		Exposed (Far-Field)	QUL-PFF1	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓						
		Reference	QUL-PREF1	-	-	✓	-	-	✓	-	-	-	-	-	-	-	-	-	-	-	✓						
		Exposed	QUL-ZOO-1	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-						
		Reference	QUL-ZOO-7	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-						
	Shallow	Exposed (Near-Field)	QUL-LNF1	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-						
		Reference	QUL-LREF1	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-						
Quesnel River		Exposed	QUR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓

Notes: Checkmarks indicate sampling was completed at the area indicated. Dashes indicate sampling was not completed at the area indicated. Quesnel River is grouped with lake habitats for this report because of its close association with Quesnel Lake monitoring.

[a] Detailed descriptions of each monitoring element and associated rationale based on historical findings are provided in the CEMP (MPMC 2019); detailed methods are provided in Section 3 of this report.

[b] Fish community / population monitoring in Bootjack Lake and Quesnel Lake is associated with sampling efforts undertaken for the purpose of fish tissue quality monitoring. In Polley Lake, fish population health monitoring is undertaken in addition to sampling efforts for the purpose of fish tissue quality monitoring.

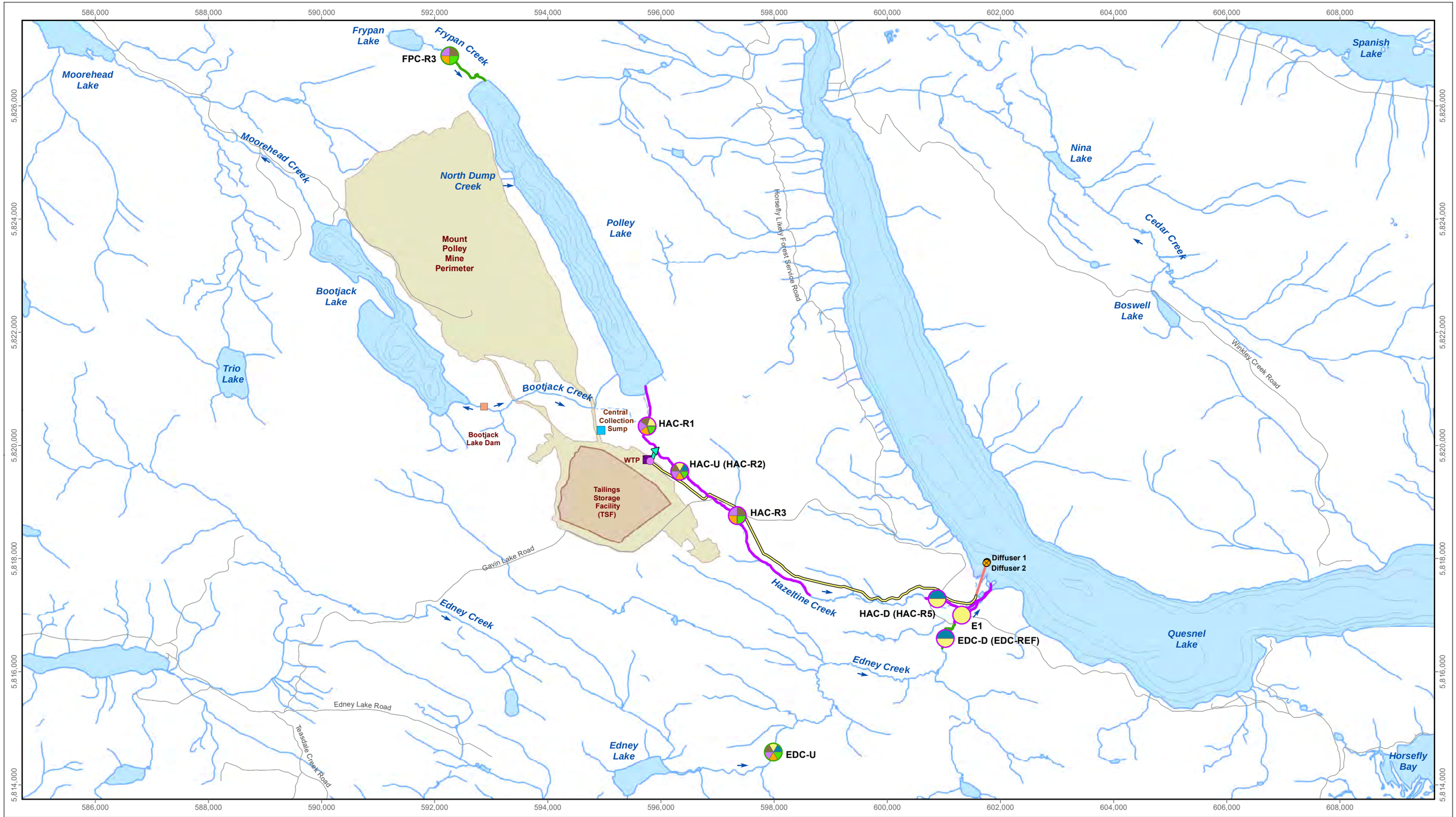
[c] Fish tissue quality monitoring includes multiple species (rainbow trout and longnose sucker in Polley and Bootjack Lakes; lake trout, northern pikeminnow, and peamouth chub in Quesnel Lake; rainbow trout in Quesnel River).

Detailed descriptions of monitoring conducted in lake habitats from 2022 to 2024 are provided in Section 3.

2.3 Creek Habitat

Monitoring of creek habitat in the vicinity of the Mount Polley Mine between 2022 and 2024 focused on two creeks: Hazeltine Creek, which flows from Polley Lake to Quesnel Lake, and Edney Creek which conflows with Hazeltine Creek before entering Quesnel Lake (Figure 2.2). Hazeltine Creek was impacted by the breach in August 2014, has conveyed Mount Polley mine water over two periods (April 11 to August 4, 2014, and November 29, 2015, to September 30, 2017), and is influenced by mining operations. The lower 775 m of Edney Creek was also impacted by the breach. Remediation efforts of Hazeltine Creek and lower Edney Creek following the breach were initiated in 2014. Edney Creek conflowed with Hazeltine prior to the breach, but remediation efforts separated the two creeks (Edney Creek near Quesnel Lake flowed adjacent to Hazeltine Creek) from 2014 until September 2020 when the creeks were rejoined. Two creeks (Edney Creek upstream of the impacted area and Frypan Creek) serve as references for Hazeltine Creek and the impacted area of Edney Creek (Figure 2.2).

CEMP monitoring in creeks is outlined in detail in the CEMP study design document (MPMC 2019), including detailed description of each monitoring component and associated rationale for the study design and for the selected measurement endpoints. This section provides a general overview of the sediment and aquatic biological monitoring of creeks completed over the 2022 to 2024 period (see Figure 2.2, Table 2.3). Briefly, CEMP monitoring of creeks over the 2022 to 2024 period included the following components: sediment quality, periphyton community and productivity, benthic invertebrate community and productivity, periphyton and benthic invertebrate tissue quality, fish habitat usage and community, and fish tissue quality. Not all components were completed at each area in each year (Figure 2.2, Table 2.3). Fish tissue quality monitoring was completed in creeks in 2024 although this is not a monitoring requirement of the approved CEMP (MPMC 2019) nor a requirement of the 2019 CEMP approval conditions (BCMOECCS 2021). Methods and results of the fish tissue monitoring completed in creeks in 2024 are included in the present report because this monitoring is complimentary to that required under the CEMP. Fish habitat characterization and fish usage monitoring (for spawning and rearing purposes) in upper and lower Hazeltine Creek and lower Edney Creek is part of the CEMP (Table 2.3); however, this monitoring focuses on a set of objectives identified and reviewed by



LEGEND

- Reference
- Exposed
- Sediment Quality
- Periphyton and Benthic Invertebrate Tissue Quality
- Periphyton Community
- Benthic Invertebrate Community
- Benthic Invertebrate Productivity
- Periphyton Productivity

Fish Collection Creek

- Exposed Creek
- Reference Creek
- Historic Watercourse

0 1 2 4 km

N W E S

Projection: North American Datum 1983 UTM Zone 10 U

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Monitoring Areas on Hazeltine, Edney, and Frypan Creeks, 2024

Date: March 2025
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Figure 2.2

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Overview\24-04 Figure 2.2 Monitoring Areas on Hazeltine, Edney, and Frypan Creeks, 2024.mxd

Table 2.3: General Overview of Mount Polley CEMP Sediment and Aquatic Life Monitoring in Creeks, 2022 to 2024[a]

Waterbody		Area Type	Sampling Area[b]	Sediment Quality			Periphyton									Benthic Invertebrate									Fish Habitat Assessment[c]			Fish Usage and Community[c]			Fish Tissue Quality[d]		
							Community			Productivity			Tissue Quality			Community			Productivity			Tissue Quality											
Year:				2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024	2022	2023	2024
Hazeltine Creek	Upper	Exposed	HAC-R1 (Reach 1)	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
		Exposed	HAC-U (HAC-R2; Reach 2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓
		Exposed	HAC-R3 (Reach 3)	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	-	-	-
	Lower	Exposed	HAC-D (HAC-R5; Reach 5)	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	-	-	✓
Edney Creek	Upper	Reference	EDC-U	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-
	Lower	Reference	EDC-D (EDC-REF)	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	✓
		Exposed	E1 (EDC-EXP)	-	-	-	-	✓	-	-	✓	-	✓	✓	✓	-	✓	-	-	✓	-	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-
Frypan Creek		Reference	FPC-R2 (Reach 2)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	✓
		Reference	FPC-R3 (Reach 3)	-	-	-	-	-	-	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-

Notes: Checkmarks indicate sampling was completed at the area indicated. Dashes indicate sampling was not completed at the area indicated.

[a] Detailed descriptions of each monitoring element and associated rationale based on historical findings are provided in the CEMP (MPMC 2019); detailed methods are provided in Section 4 of this report.

[b] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[c] Fish habitat assessment monitoring included documentation of fish habitat conditions. Fish usage and community monitoring included documentation of the usage of fish habitat by any / all fish species for Edney and Hazeltine Creeks.

[d] Fish tissue quality monitoring was completed in association with sampling efforts undertaken for the purpose of fish usage and community monitoring.

the Habitat Remediation Working Group[3] (HRWG). As such, results of this monitoring between 2022 and 2024, and prior years, are summarized in a separate report (i.e., HRWG report, Minnow 2025). Detailed descriptions of sediment, periphyton, and benthic invertebrate, and fish tissue monitoring conducted in creek habits from 2022 to 2024 are provided in Section 4.

2.4 Interpretive Approach

The interpretation of sediment and aquatic biological data collected under the CEMP (i.e., data reported herein) is based on several key interpretive tools. The approach to data interpretation is outlined in the CEMP (MPMC 2019) and detailed methods are provided in Sections 3 and 4 of this report. Briefly, chemical data collected at potentially impacted areas are evaluated in comparison to environmental quality guidelines (as available), and based on statistical comparison to reference, to baseline and/ or pre-breach, and over time (replication [n] = 5 to 8).

Presentation of chemical data incorporates results for all analytes reported by the laboratory; however, detailed analyses and discussion are focused on "primary" and "secondary" analytes (Table 2.4).[4] Primary and secondary analytes are constituents that have been identified in previous monitoring as being indicative of a mine influence on the receiving environment. Specifically, primary analytes are those that were previously identified as strongly indicative of a mine influence for most monitoring components and for which environmental quality guidelines are available. Secondary analytes are those that were previously identified as potentially indicative of a mine influence in only a subset of monitoring components. Evaluation of primary and secondary analytes was completed for all chemical data in the present report (i.e., water, sediment, and tissue quality data). To focus the interpretation of primary and secondary analyte results, discussion was limited to those analytes for which differences were reported temporally (at the exposed areas relative to prior post-breach data and/or baseline/pre-breach data) and/ or spatially (between the exposed and reference areas in the present year). Biological data for potentially impacted areas are evaluated based on the measurement endpoints presented in Table 2.1 and are based on statistical comparison to reference, to baseline and/ or pre-breach, and over time (n = 5 to 8).

[3] The HRWG was established at the request of Fisheries and Oceans Canada (DFO; April 9, 2015), in response to regulatory requirements set out in Section 38(6) of the *Fisheries Act*. Members of the initially assembled working group included: DFO, BCMOECCS (currently British Columbia Ministry of Environment and Parks), British Columbia Ministry of Forest Lands and Natural Resource Operations and Rural Development (currently British Columbia Ministry of Water, Land, and Resource Stewardship [BCMOWLRS]), Soda Creek Indian Band, Williams Lake Indian Band, and Mount Polley Mining Company.

[4] Primary and secondary analytes are analytes that were classified as POIs (parameters of interest) and IPs (indicator parameters) for monitoring components in previous evaluations (see Minnow 2019a for details).

Table 2.4: Primary and Secondary Analytes used in the Evaluation of Chemical Data for the Mount Polley CEMP Sediment and Aquatic Life Monitoring Components, 2022 to 2024[a]

Category	Analyte
Primary	Arsenic
	Copper
	Iron
	Selenium
Secondary	Barium
	Cadmium
	Calcium
	Cobalt
	Manganese
	Mercury
	Molybdenum
	Nickel
	Phosphorus
	Silver
	Sodium
	Strontium
	Tin
	Titanium
	Uranium
	Vanadium
	Zinc

[a] See Section 2.4 and Minnow (2019a) for the rationale associated with selection of these analytes.

Relationships between chemical and physical features (e.g., sediment chemistry and particle size distribution) and relationships between biological measurement endpoints and chemistry (e.g., benthic invertebrate community taxon richness and water or sediment chemistry) are evaluated using correlation or regression analysis to enhance understanding of potential cause. Although it is recognized that a significant correlation does not indicate cause, it can be useful in identifying potential causes and/or in distinguishing among different potential causes (e.g., Shipley 2000; Suter 2015). Lastly, data interpretation includes a step to bring the sediment and aquatic biological data together to identify consistencies (or inconsistencies) in the findings and to assist in the derivation of conclusions in consideration of all lines of evidence and relationships among them.

3 METHODS – LAKE HABITAT

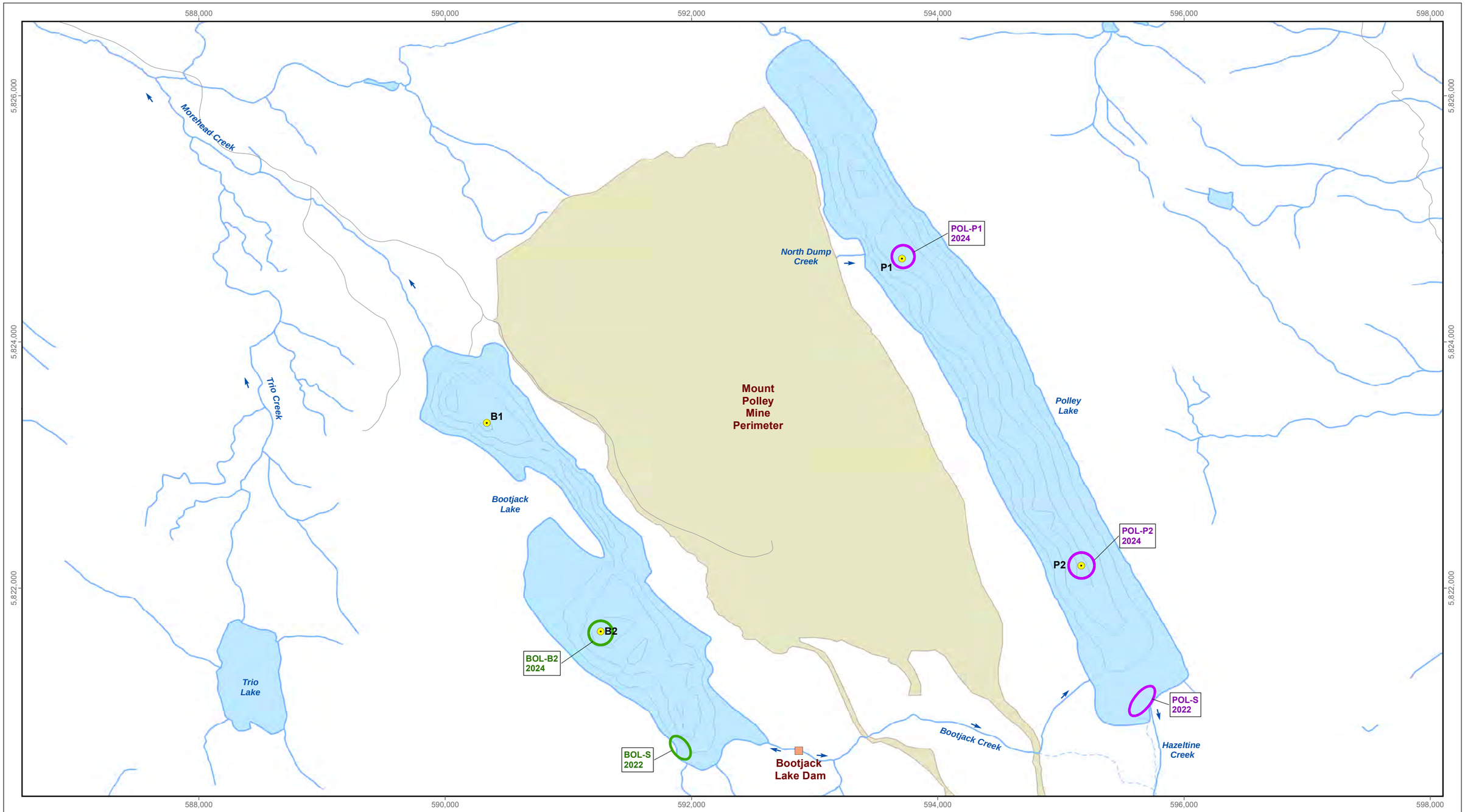
3.1 Sediment Quality

Sediment quality monitoring was completed at shallow and deep exposed areas of Quesnel Lake and Polley Lake (and associated reference areas) between 2022 and 2024. In deep exposed areas of Quesnel Lake and Polley Lake (and associated references), post-breach sediment quality monitoring was initiated in 2014 and has been completed at least every three years since 2018 (Figures 3.1 and 3.2, Tables 3.1 and 3.2), in accordance with the CEMP (MPMC 2019). In shallow Quesnel Lake habitats, sediment quality monitoring was initiated in 2014 and has been completed annually since 2019 (Figure 3.2, Table 3.2). In shallow Polley Lake habitats (and associated reference; Bootjack Lake), sediment quality monitoring was initiated in 2019 and has been completed every three years since then (Figure 3.1, Table 3.1). The monitoring of shallow lake habitats is in accordance with Condition 9 of the CEMP approval conditions dated February 10, 2021 (BCMOECCS 2021). Although not a requirement of the CEMP (MPMC 2019), sediment has been collected annually from the deep near-field area of Quesnel Lake (QUL-PNF) since 2018 to support the evaluation of monitored natural recovery (Table 3.2; see Section 3.5). Sediment quality monitoring in the shallow and deep lake habitats supports sediment toxicity testing (Section 3.2) and/or benthic invertebrate community monitoring (Section 3.5) that is also completed at these areas.

In Polley Lake, sediment quality monitoring in 2024 included two deep monitoring areas (POL-P1 and POL-P2) and an associated deep reference area in Bootjack Lake (BOL-B2), where sampling last occurred in 2021 (Figure 3.1, Table 3.1). Sediment quality monitoring of shallow areas (1.5 to 3.5 meters depth) located in Polley Lake (POL-S) and Bootjack Lake (BOL-S; reference) was last completed in 2022 (Figure 3.1, Table 3.1).

In Quesnel Lake, sediment quality monitoring in 2024 included three deep areas (approximately 80 to 100 meters depth), with one near-field area (QUL-PNF), one far-field area (QUL-PFF1), and one reference area (QUL-PREF1). Sediments from QUL-PNF have been monitored annually for the past seven years (2018 to 2024) for the evaluation of monitored natural recovery. Prior to 2024, the other deep areas (QUL-PREF1 and QUL-PFF1) were last monitored in 2021 (Figure 3.2, Table 3.2). Sediment quality monitoring of shallow sediments in 2024 included two areas (1 to 2 meters depth), with one near-field area (QUL-LNF1) and one reference area (QUL-LREF1); these areas have been monitored annually for the last six years (2019 to 2024; Figure 3.2, Table 3.2).

Sediment quality was also monitored in deep areas of Quesnel Lake in 2024 as part of Environmental Effects Monitoring (EEM; Phase 4) under the MDMER of the federal *Fisheries Act*.



LEGEND

- Exposed Area
- Reference Area
- Historic Watercourse

[a] Not all monitoring components were completed at all areas shown. Monitoring included at least one of: sediment quality, sediment toxicity, and benthic invertebrate community. See Tables 3.1, 3.3, and 3.7 for details of monitoring components.

0 0.5 1 2 km

N W E S

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Sediment Quality, Sediment Toxicity, and Benthic Invertebrate Community Monitoring Areas, Polley and Bootjack Lakes, 2022 to 2024 [a]

Date: March 2025
Project 247202.0004

minnow environmental inc.

Figure 3.1

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 7\24-04 Figure 3.1 Sed Lakes Polley.mxd

590,000 595,000 600,000 605,000 610,000 615,000

5,825,000 5,820,000 5,815,000

Frypan Lake
North Dump Creek
Mount Polley Mine Perimeter
Polley Lake
Bootjack Lake
Bootjack Creek
Bootjack Lake Dam
WTP
Tailings Storage Facility (TSF)
Gavin Lake Road
Hazeltine Creek
Horsefly Lake Forest Service Road
QUL-PFF1 2024
QUL-LNF1 2022, 2023, 2024
QUL-18
QUL-PNF 2022, 2023, 2024
QUL-EEMEXP 2024
QUL-58
Nina Lake
Cedar Creek
Spanish Lake
Boswell Lake
Winkley Creek Road
QUL-120A
QUL-2A
Quesnel Lake
Edney Creek
Edney Lake Road
Teasdale Creek Road
Edney Lake
QUL-EEMREF2 2024
Horsefly Bay
QUL-PREF1 2024
QUL-EEMREF1 2024
QUL-LREF1 2022, 2023, 2024
Horsefly River

LEGEND

- Exposed Area
- Reference Area
- Exposed Area - MDMER EEM
- Reference Area - MDMER EEM
- Routine Water Monitoring Station
- Effluent Mixing Tank
- Water Treatment Plant (WTP)
- Diffuser (Treated Effluent Discharge, December 2015 to present)
- Effluent Discharge Pipeline (January 2018 to present)
- Discharge to Diffusers (2015 to present)
- Historic Watercourse

[a] Not all monitoring components were completed at all areas shown. Monitoring included at least one of: sediment quality, sediment toxicity, and benthic invertebrate community. See Tables 3.2, 3.3, and 3.7 for details of monitoring components.

0 1 2 4 km

Projection: North American Datum 1983 UTM Zone 10U

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N W E S

Sediment Quality, Sediment Toxicity, and Benthic Invertebrate Community Monitoring Areas, Quesnel Lake, 2022 to 2024[a]

Date: March 2025
Project 247202.0004

minnow environmental inc.

Figure 3.2

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 7\24-04 Figure 3.2 Seds Lake Quesnel.mxd

Table 3.1: Overview of Sediment Quality Monitoring in Polley Lake and Bootjack Lake, 1989 to 2024[a]

Waterbody		Area Type	Area Codes	Baseline				Pre-Breach		Post-Breach							
				1989 (Imperial Metals 1990)	1995 (HKP 1996)	1996 (HKP 1997)	1999 (Beak 2000)	2009 (Minnow 2011)	2012 (Minnow 2013a)	2014 (Minnow 2015a)	2015 (Minnow 2015b)	2016 (Minnow 2016c)	2018 (Minnow 2019a)	2019 (Minnow 2021a)	2021 (Minnow 2022a)	2022 (Minnow 2023a)	2024
Polley Lake	Deep	Exposed	POL-P1 (P1 in 1995 to 2012)	-	3	6[b]	3	1	1	3	-	5	5	-	5	-	5
			POL-P2 (P2 in 1989 to 2009, P2a in 2012)	1	3	6[b]	3	1	1	3	5	5	5	-	5	-	5
	Shallow	Exposed	POL-S	-	-	-	-	-	-	-	-	-	-	5	-	5	-
Bootjack Lake	Deep	Reference	BOL-B2 (B2 in 1989 to 2009, B2a in 2012)	1	3	6[b]	3	1	1	3	5	5	5	-	5	-	5
	Shallow	Reference	BOL-S	-	-	-	-	-	-	-	-	-	-	5	-	5	-

Notes: "-" = not applicable. Sediment Quality analyses included: metals and Total Organic Carbon (TOC) in < 63 µm fraction, moisture, particle size, pH, total nitrogen, and total sulphur for sampling completed between 2014 and 2024 (post-breach sampling).

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] Three stations were sampled in spring 1996 and in fall 1996.

Table 3.2: Overview of Sediment Quality Monitoring in Quesnel Lake, 2007 to 2024[a]

Waterbody		Area Type	Area Code	Pre-Breach	Post-Breach												
							2016		2018				2021				
				2007 (Minnow 2009)	2014 (Minnow 2015a)	2015 (Minnow 2015b)	(Minnow 2016d)	(Minnow 2016c)	(Minnow 2019a)	(Minnow 2019d)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	(Minnow 2022a)	(Minnow 2022c)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Quesnel Lake	Deep	Exposed (Effluent-Exposed)	QUL-EEMEXP[b]	-	-	-	5	-	-	5	-	-	-	5	-	-	5
		Reference (Unimpacted)	QUL- EEMREF1[b]	-	-	-	5	-	-	5	-	-	-	5	-	-	5
		Reference (Impacted)	QUL-EEMREF2[b]	-	-	-	-	-	-	5	-	-	-	5	-	-	5
		Exposed (Near-Field)	QUL-PNF	-	5	5	-	5	5	-	5	5	5	-	5	5	5
		Exposed (Far-Field)	QUL-PFF1	-	5	-	-	5	5	-	-	-	5	-	-	-	5
		Reference	QUL-PREF1	-	5	5	-	5	5	-	5	-	5	-	-	-	5
	Shallow	Exposed (Near-Field)	QUL-LNF1 (QUL in 2007)	5	5	3	-	5	-	-	5	5	5	-	5	5	5
		Reference	QUL-LREF1	-	5	5	-	5	-	-	5	5	5	-	5	5	5

Notes: "-" = not sampled/not applicable. Sediment Quality analyses included: metals and Total Organic Carbon (TOC) in < 63 µm fraction, moisture, particle size, pH, total nitrogen, and total sulphur for sampling completed between 2014 and 2024 (post-breach sampling).

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] Areas are associated with effluent discharged-related monitoring under the Metal and Diamond Mining Effluent Regulations [MDMER] Environmental Effects Monitoring [EEM]). QUL-EEMEXP represents and effluent-exposed area, QUL-EEMREF1 represents a non-breach-influenced reference area, and QUL-EEMREF2 represents a breach-influenced reference area.

Three deep areas were evaluated as part of EEM; one exposed (QUL-EEMEXP) and two reference areas (QUL-EEMREF1 [non-breach-influenced], and QUL-EEMREF2 [breach-influenced]). Results for the Phase 4 EEM are due in a separate report in October 2025, therefore methods and results for this monitoring are not included in the present report. Prior to 2024, sediment quality monitoring in support of the Phase 3 EEM was last completed in 2021 (Table 3.2; Minnow 2022c).

Sample collection and analysis methods for 2024 are described herein (excluding those related to the Phase 4 EEM) and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historical sampling areas, refer to the references listed in Tables 3.1 and 3.2.

3.1.1 Sample Collection

Sediment samples were collected from Polley Lake (and the associated reference, Bootjack Lake) between August 19 and August 24, 2024 (Appendix Table A.1.1). Five replicate stations were sampled to represent each monitoring area (Figure 3.1, Table 3.1). One sediment sample was collected at each replicate station, and each sample was a homogenized composite of multiple sub-samples. Sediment samples for metals[5] analysis from deep areas of Polley Lake and Bootjack Lake have historically been collected using gravity coring methods (1999 to 2021). Accordingly, gravity coring methods were employed in 2024 to collect sediments for the analysis of total organic carbon (TOC), total sulphur, total nitrogen, and metal concentrations. Gravity coring was conducted in accordance with provincial (BCMOE 2013) and federal (Environment Canada 2012b) technical guidance, the CEMP (MPMC 2019), and was consistent with previous sampling years (1999 to 2021; Table 3.1).

A Ball corer, which is a gravity corer that collects samples in 3” (7.62 cm) diameter core tubes, was used to collect sediments from each replicate station in Polley Lake and Bootjack Lake in 2024. In previous years, a Kajak-Brinkhurst (K-B) or Tech Ops corer was used for sediment core sample collection (e.g., Minnow 2022a), and use of a Ball corer in 2024 was implemented to improve sample collection efficiency and success. Consistent gravity coring methods and sample collection techniques were applied in all years regardless of which gravity corer was used (i.e., K-B, Tech Ops, or Ball). Sediment core collection relies on a combination of surface tension within the core and suction (supplied by a ball in a Ball corer or an automatic seal in a K-B or Tech Ops corer) that seals the top of the core tube after being deployed by a messenger.

Gravity coring methods were implemented at each replicate station in Polley Lake and Bootjack Lake as follows. The Ball corer was lowered to the sediment surface, taking care to control the

[5] For ease of discussion, metals, metalloids, and non-metals are collectively referred to as metals throughout this report.

rate and vertical position of the corer during deployment to minimize disturbance of the sediment-water interface. The corer was then carefully retrieved to the surface and an extruder head was inserted into the bottom of the core tube to prevent sediment slippage. Core samples were rejected if there was evidence of slippage, if the corer did not penetrate the substrate vertically, or if the sediment-water interface was disturbed within the core. The core tube was then removed from the corer and the extruder head was used to push the sediment upwards towards the top of the core tube in a controlled fashion with care taken to minimize suspension of fines. In the event of suspension, momentum was stopped, allowing the solids to re-settle. Once the sediment was extruded to near the top of the tube, an extrusion collar marked with 1 cm intervals was carefully aligned on the top of the tube and the sediment extruded upwards into the collar. A core slicer was carefully inserted between the tube and the collar at the 3 cm interval, to collect the top 3 cm of sediment. The sediment was then transferred into one or more pre-labelled 250 mL glass sampling jars. The procedure was repeated at least twice more to provide a composite sample with sufficient volume for the required analyses. All sampling equipment was rinsed between stations using site water.

Sediment samples for the analysis of particle size were collected from each replicate station in Polley Lake and Bootjack Lake using a stainless-steel Petite Ponar grab sampler (Appendix Table A.1.1). Grab sampling was completed in accordance with provincial (BCMOE 2013) and federal (Environment Canada 2012b) technical guidance, the CEMP (MPMC 2019), and was consistent with previous monitoring which has typically employed grab sampling to collect sediments for physical analysis (particle size distribution[6]) from Polley Lake and Bootjack Lake (1999 to 2021; Table 3.1). The Petite Ponar grab sampler is a 6” x 6” (15.24 cm x 15.24 cm) grab sampler with jaws that can be held open by shear-pressure on a spring-loaded pin. At each sampling station, the Petite Ponar was lowered to the substrate at which point the shear-pressure was eliminated and the pin released. As with gravity coring, care was taken to control the rate at which the ponar was lowered to allow appropriate sediment penetration and to minimize disturbance of the sediment-water interface. Surficial sediment was collected by pulling upwards on the sampler, which triggered the spring pin and caused the jaws to close. The Petite Ponar was then carefully retrieved to surface, where the sediment grab was placed in a plastic bin and observed for completeness and unusual characteristics. If the sample was deemed acceptable (i.e., the sampler was full to each end and was representative of surface sediment), material to a depth of 3 cm was transferred to a second tote using a stainless-steel spoon, and the remaining sediment was discarded. This procedure was repeated

[6] Grab sampling was also used for the collection of sediment for total organic carbon chemical analysis in 1999 (Beak 2000), 2007 (Minnow 2009), and 2014 (Minnow 2015a).

at each station for a minimum of five successful grabs. At that point, the composite material within the tote was homogenized using a stainless-steel spoon and transferred into two or more pre-labelled 250 mL glass sampling jars. All sampling equipment was rinsed between stations using site water.

Sediment samples were collected from shallow and deep areas of Quesnel Lake from August 19 to August 24, 2024 (Appendix Table A.1.1). Five replicate stations were sampled to represent each monitoring area (Figure 3.2, Table 3.2). Samples were collected using a stainless-steel Petite Ponar for the analysis of TOC, total sulphur, total nitrogen, particle size, and metal concentrations. Sampling was conducted in accordance with provincial (BCMOE 2013) and federal (Environment Canada 2012b) guidance and with previous monitoring (Table 3.2). Grab sampling at each station was completed as described above for Polley and Bootjack lakes, except that samples from deep areas (i.e., QUL-PREF1, QUL-PFF1, and QUL-PNF; Figure 3.2, Table 3.2) were collected with the assistance of a commercial line hauler (Ace Line Hauler Brutus Plus 40).

Duplicate (split) sediment samples were collected at a target frequency of 10% for QA/QC purposes. Immediately after collection, samples were stored in a cooler with ice packs until they were placed in a refrigerator at the field laboratory, where they were held until shipment (on ice) to the analytical laboratory.

Supporting measures were collected at each sampling station to support data interpretation (see Section 3.8.1 for details).

3.1.2 Laboratory Analysis

Laboratory analysis of sediment quality samples from lake habitats was completed by ALS Environmental in Burnaby BC, a laboratory that is accredited by the Canadian Association for Laboratory Accreditation (CALA). Upon receipt of the sample shipment(s), ALS Environmental measured temperature in each cooler to verify the maintenance of cold samples, logged each sample, and assigned each sample a unique sample identification code. A sample receipt notification (SRN) was then sent to Mount Polley and Minnow for verification.

Laboratory analysis included moisture content, pH, particle size distribution, TOC, total nitrogen, total sulphur, and total metal concentrations for all samples. Analysis methods for all parameters were consistent with previous post-breach sampling years (Tables 3.1 and 3.2). Analyses of TOC and metals concentrations were completed on the silt/ clay fraction (<63 µm diameter) in accordance with recommendations (BCMOE 2016) and consistent with previous methods (2014 to 2023; Tables 3.1 and 3.2). Analyses of the remaining parameters (moisture, pH, total nitrogen, total sulphur, and particle size distribution) were completed on bulk sediment.

Analysis of pH was completed by electrode, particle size analysis was completed by sieve and pipette, TOC was completed by combustion and titration (total carbon minus total inorganic carbon), and total nitrogen and total sulphur were completed by combustion. Analysis of metals was based on the BC Strong Acid Leachable Metals digestion (SALM; BCMOE 2016), with total metals analysis completed by Collision Reaction Cell Inductively Coupled Plasma – Mass Spectrometry (CRC-ICP-MS; United States Environmental Protection Agency [USEPA] Method 6020B; USEPA 2014]), and mercury analysis completed by Cold Vapour Atomic Absorption Spectrophotometry (CVAAS; USEPA Methods EPA 200.2/1631; USEPA 1994, 2001).

QA/QC sampling completed by the laboratory included method blank (MB) samples, laboratory replicates, and laboratory accuracy measures (i.e., laboratory control samples [LCS], and/ or reference materials [RMs]). Upon completion of the analyses, a data report was provided by ALS Environmental to Mount Polley and Minnow in Adobe Acrobat Portable Document Format (PDF) and Microsoft Excel files (Appendix G).

3.1.3 Data Analysis

3.1.3.1 Data Screening and Analytes of Interests

Upon receipt of the initial analytical data, a DQR was completed, including an examination of data completeness, laboratory reporting limits (LRLs) achieved, laboratory precision, laboratory accuracy, and field precision (Appendix B). Following completion of the DQR, raw data were summarized by area by calculating mean, median, standard deviation (SD), minimum, and maximum. Summary statistics were calculated using the Kaplan-Meier (K-M) method as described in Section 3.8.3.1.

Data were evaluated in comparison to British Columbia Working Sediment Quality Guidelines for the protection of aquatic life (British Columbia Ministry of Water, Land, and Resources Stewardship [BCMOWLRS] 2024) and the British Columbia Approved Water Quality Guideline for selenium in sediment (BCMOWLRS 2024, 2025), collectively termed British Columbia Working Sediment Quality Guidelines (BCWSQG) in this report. The BCWSQGs are numerical criteria that are protective of sediment-dwelling organisms based on long-term exposure. Most BCWSQGs have been adopted from the Canadian Council of Ministers of the Environment (CCME; CCME 1999) or from Ontario (OMOE 1993) and have two levels: a lower BCWSQG and an upper BCWSQG. The lower BCWSQG is intended to represent a concentration that will protect aquatic life from adverse effects of a toxic substance in most situations. The upper BCWSQG is intended to represent a concentration that, if exceeded, will likely cause severe effects on aquatic life (BCMOWLRS 2024, 2025). However, BCWSQGs (even the

upper BCWSQGs) are often naturally exceeded in mineralized areas. In addition, BCWSQGs were developed based on co-occurring bulk surficial sediment data and biological effect data (CCME 1995), as bulk sediment chemistry can differ substantially from the <63 µm fraction. This discrepancy between measurement (<63 µm fraction) and exposure (to bulk sediment [to which BCWSQGs are most applicable]) should be considered in interpretation, as "caution should be used in interpreting the biological significance of chemical concentrations in sediments for different types based on these guidelines" (CCME 1995).

Sediment quality data from exposed areas were also evaluated relative to 1) "reference data", and 2) "pre-breach data". Reference data included all available post-breach data (2014 to 2024) from reference areas that were sampled in 2024. Reference and pre-breach data were compiled separately and used to calculate reference and pre-breach 95th percentile screening values, respectively. Reference 95th percentile screening values were calculated from each post-breach reference dataset (i.e., separately for Quesnel Lake shallow [QUL-LREF1], Quesnel Lake deep [QUL-PREF1], and Bootjack Lake [BOL-B2] reference areas). Pre-breach 95th percentile screening values were calculated from each available pre-breach dataset (i.e., Polley Lake deep areas [1989 to 2012], Bootjack Lake deep areas [1989 to 2012], and Quesnel Lake shallow area QUL-LNF1 [2007]). Pre-breach 95th percentile screening values were calculated from each available pre-breach dataset (i.e., and Quesnel Lake shallow area QUL-LNF1 [2007]). Once calculated, the 95th percentile reference and pre-breach screening values were compared, and the highest of these values for each analyte was then used to screen the associated exposed data. If pre-breach data were not available, as is the case for the deep monitoring areas of Quesnel Lake, only the 95th percentile reference values were used. The reference and pre-breach data used in the calculation of the 95th percentiles and used in data screening are presented in Appendix Tables C.2.1 to C.2.3 and C.2.9.

All analytes (including primary and secondary analytes) were screened against BCWSQGs and applicable reference and pre-breach 95th percentile values. Analytes at exposed areas with mean concentrations that exceeded all the following criteria were termed "Analytes of Interest": 1) the BCWSQG; 2) the associated reference 95th percentile value; and 3) the associated pre-breach 95th percentile value (if available). Analytes of Interest were determined separately for each monitoring area (i.e., separately for deep areas of Polley Lake, and deep and shallow areas of Quesnel Lake). Concentrations of the Analytes of Interest, along with TOC, were the focus of more detailed interpretation which included graphical plots, formal statistical contrasts of temporal and spatial differences in concentrations, and examination of relationships to physical and chemical sediment variables.

3.1.3.2 Statistical Analyses

Statistical analyses of Analyte of Interest concentrations and TOC content of lake sediments were conducted using post-breach data (i.e., 2014 to 2024) to answer one or more of the following questions:

1. Have mean analyte concentrations at the exposed area changed relative to the reference area?
2. Were there differences in mean analyte concentrations between exposed and reference areas, and does the difference depend on year?
3. Have mean analyte concentrations at the exposed area changed over time since the breach?

To answer these questions, data were grouped into three categories for separate tabular and graphical presentation and statistical analyses:

1. Deep Polley Lake (POL-P1 and POL-P2; exposed) compared to a deep reference area (Bootjack Lake; BOL-B2).
2. Deep exposed area of Quesnel Lake (QUL-PNF and PFF1) compared to an un-impacted deep reference area (QUL-PREF1)
3. Shallow exposed area of Quesnel Lake (QUL-LNF1) compared to an un-impacted shallow reference area (QUL-LREF1).

Questions 1 and 2 were answered by conducting a two-way Analysis of Variance (ANOVA) assessing the relative differences between exposed and reference areas, with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year.* The two-way ANOVA included all data with paired exposed and reference results. Except for TOC, the data used in the two-way ANOVA model were $\log_{10}$ transformed. As such, differences between the exposed and reference areas were multiplicative when testing the significance of the interaction between *Area* and *Year* (i.e., if the concentration in the reference area decreases by 50%, then the null hypothesis would be that the concentration in the exposed area also decreases by 50%). Values below the LRL were replaced with the highest LRL when present. If the *Area*×*Year* interaction term was significant ($\alpha = 0.05$), then the ratios of the concentrations from the exposed area to the reference area differed among years. In this case, pairwise contrasts among years were completed to compare the relative difference in means (in $\log_{10}$ units) between areas among years. The hypotheses tested were:

$$H_0: \left(\mu_{\text{Exposed}} - \mu_{\text{Reference}}\right)_i = \left(\mu_{\text{Exposed}} - \mu_{\text{Reference}}\right)_j \text{ for all years i, j, i} \neq \text{j}$$

Contrasts were completed for all pairwise comparisons among years, where paired exposed and reference data were available. The analysis for analyte (metal) concentrations assumed data were $\log_{10}$ distributed so the hypothesis of testing differences between means is equivalent to testing the ratios of exposed to reference concentrations on the untransformed scale because of the following property of logarithms:

$$log(x_{\text{Exposed}}) - log(x_{\text{Reference}}) = log\left(\frac{x_{\text{Exposed}}}{x_{\text{Reference}}}\right).$$

Comparisons of TOC were conducted on untransformed data and thus significant interactions tested for absolute rather than relative differences between reference and exposed areas.

The results of the multiple comparisons among years were displayed by assigning letters (e.g., A, B, C) to each year. Letters were assigned such that the year with the highest difference in log or untransformed (e.g., TOC) concentrations between the exposed and reference areas was assigned the letter "A" and years that do not differ significantly ($\alpha = 0.05$) share a letter. When the *Area*×*Year* interaction term was not significant ($\alpha = 0.05$), the differences between areas were consistent among years and no contrasts were conducted. For simplicity, models comparing changes in concentrations between reference and exposed areas on the transformed or untransformed scale are hereafter referred to throughout the report as changes in the relative differences between these areas.

Temporal changes in the differences between the exposed and reference areas were quantified by calculating a Magnitude of Difference (MOD), which is the difference between the value for the exposed area and the predicted value for the exposed area, assuming the same difference from the baseline year (the first year the data were collected). This MOD was expressed as a percent change on the back-transformed scale as:

$$MOD = \frac{10\text{^}\bar{x}_{Exposed\ Observed} - 10\text{^}\bar{x}_{\text{Exposed }Predicted}}{10\text{^}\bar{x}_{\text{Exposed }Predicted}} \times 100\%$$

where $\bar{x}_{Exposed\ Observed}$ is the mean for the exposed area (in $\log_{10}$ units) for the given year and $\bar{x}_{\text{Exposed }Predicted}$ is the predicted mean (log units), assuming the relative difference between the exposed area and reference area did not change from the baseline year (i.e., $\bar{x}_{\text{Exposed }Predicted} = \bar{x}_{\text{Reference}} + \left(\bar{x}_{\text{Exposed Baseline}} - \bar{x}_{\text{Reference Baseline}}\right)$). The MODs for TOC did not need to be back-transformed but were calculated using the same formula otherwise.

Question 3 was answered using the results of the same two-way ANOVA used to answer Question 1 but considered exposed and reference data independently (rather than assessing the change in the differences between these areas as outlined for Questions 1 and 2). These analyses included unpaired exposed and reference data. When the interaction term of this

two-way ANOVA was significant, spatial and temporal *post hoc* contrasts were conducted to test differences among years for each area and between reference and exposed areas in each year. The MOD between the exposed and reference areas for significant spatial comparisons was calculated in each year as:

$$MOD = \frac{10\text{^}\bar{x}_{Exposed} - 10\text{^}\bar{x}_{\text{Reference}}}{10\text{^}\bar{x}_{\text{Reference}}} \times 100\%$$

where $\bar{x}_{Exposed}$ and $\bar{x}_{Reference}$ are the exposed and reference area means (in log units), respectively. The MOD for temporal differences from the base year were similarly calculated as:

$$MOD = \frac{10\text{^}\bar{x}_{Yeari} - 10^{\bar{x}}{}_{\text{Base year}}}{10\text{^}\bar{x}_{\text{Base year}}} \times 100\%$$

where $\bar{x}_{Yeari}$ and $\bar{x}_{Baseyear}$ are the means for the selected year and base year of monitoring (in log units), respectively. For both MOD calculations, the means for TOC were not back-transformed because the model used untransformed data. When the interaction term was not significant, the differences between exposed and reference areas were consistent over time and a spatial MOD (i.e., between areas) was calculated for all years combined if the *Area* term was significant, and temporal contrasts and MODs were conducted for the pooled areas (i.e., combined reference and exposed).

Analytes of Interest concentrations and TOC content were plotted to support the two-way ANOVA results and included comparison of post-breach data (i.e., those data included in the analyses) to BCWSQG and reference and/or pre-breach 95th percentile values.

Relationships between the Analytes of Interest concentrations and sediment physical (i.e., % clay) and chemical variables (TOC, total nitrogen, and total sulphur content) were evaluated using Spearman's Rank correlation analysis. Correlation analyses were conducted separately for each of the three data groupings outlined above (1: deep Polley Lake and Bootjack Lake areas; 2: deep Quesnel Lake areas; 3: shallow Quesnel Lake areas) using all available post-breach data (i.e., 2014 to 2024) to evaluate these relationships over time. For all three areas, differing relationships were apparent for the exposed areas relative to reference. As such, correlations were run separately for the three areas using the following data groups: 1) exposed and reference areas combined (i.e., BOL-B1, POL-P1, and POL-P2 combined; QUL-PNF, QUL-PFF1, and QUL-PREF1 combined; and QUL-LNF1 and QUL-LREF1 combined), and 2) exposed areas only (i.e., POL-P1 and POL-P2; QUL-PNF and QUL-PFF1 combined; and QUL-LNF1). Metal concentrations were measured in the <63 µm fraction of sediment (see Section 3.1.2), therefore relationships between Analyte of Interest concentrations and particle size were

completed for this fraction of sediment only, with clay content used in correlations calculated as (% clay) / (% silt and clay). Following the derivation of correlation coefficients, a Bonferroni-type correction (i.e., α = 0.05 divided by the total number of independent variables) was applied to minimize the risk of declaring false positive correlations since at least 5% of derived correlations would be expected to occur by chance alone at an uncorrected α of 0.05. Any significant correlations found at the Bonferroni-adjusted α were further investigated using scatter plots.

Sediment quality data were analysed using Principal Component Analysis (PCA) as a means of summarizing the data for use in correlation analyses to assess potential physical and/or chemical causes of differences in benthic invertebrate community condition (see Section 3.5.3.2). A PCA is a multivariate statistical ordination technique that can be used to reduce many variables and to assist in the identification of patterns in datasets. Separate PCAs were completed for sediment quality data from the two deep lake categories listed above; 1) Polley Lake (POL-P1 and POL-P2; exposed) compared to Bootjack Lake (BOL B2; reference); 2) deep exposed areas (QUL-PNF, QUL-PFF1) and a deep reference area (QUL-PREF1) of Quesnel Lake. Data included in the PCA were selected to include those years for which benthic invertebrate community data exist (i.e., 1999 to 2024 for deep Polley Lake areas [and reference], and 2014 to 2024 for deep Quesnel Lake areas). Prior to running PCA, analytes for which more than 25% of the data were below the LRL, or analytes for which an incomplete dataset existed (e.g. sulphur, mercury) were excluded from the data matrix. All concentration data were transformed using a $\log_{10}$-transformation and principal component axes were then generated. Subsequently, the correlation between each parameter and the first two principal components were tested using a Pearson's correlation coefficient and plotted to identify analytes that best explained similarities and differences in sediment chemistry among stations. All sediment statistical analyses and plots were completed using R (R Core Team 2024).

3.2 Sediment Toxicity

Sediment toxicity monitoring was completed at shallow and deep exposed areas of Quesnel Lake and Polley Lake (and associated reference areas) between 2022 and 2024 using two test organisms: *Chironomus dilutus* (benthic dipteran) and *Hyalella azteca* (an epibenthic amphipod). In deep exposed areas of Quesnel Lake and Polley Lake (and associated references), sediment toxicity monitoring using *C. dilutus* was initiated in 2014 and has been completed every three years since 2018 (Figures 3.1 and 3.2, Table 3.3), in accordance with the CEMP (MPMC 2019). Sediment toxicity testing using *C. dilutus* was completed in 2024 for the deep areas of Polley Lake (POL-P1, POL-P2) with a deep area of Bootjack Lake (BOL-B2) serving as reference, and for the deep near-field (QUL-PNF) and reference (QUL-PREF1) areas of

Table 3.3: Overview of Sediment Toxicity Monitoring in Lakes in the Vicinity of the Mount Polley Mine, 2014 to 2024[a]

Waterbody		Area Type	Area Code	Post-Breach																	
				2014 (Minnow 2015a)		2015 (Minnow 2016e)		2016 (Minnow 2017d)			2018 (Minnow 2019a)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)		2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024	
				C. dilutus	*H. azteca*	*C. dilutus*	*H. azteca*	*C. dilutus*	*H. azteca*		*C. dilutus*	*H. azteca*	*H. azteca*	*C. dilutus*	*H. azteca*	*H. azteca*	*H. azteca*	*C. dilutus*	*H. azteca*
				10-day	14-day	10-day	14-day	10-day	14-day	28-day	10-day	14-day	14-day	10-day	14-day	14-day	14-day	10-day	14-day
Polley Lake	Deep	Exposed	POL-P1	5	5	-	-	5	5	-	5	-	-	5	-	-	-	5	-
			POL-P2	5	5	-	-	5	5	4	5	-	-	5	-	-	-	5	-
	Shallow		POL-S	-	-	-	-	-	-	-	-	5	-	-	-	5	-	-	-
Bootjack Lake	Deep	Reference	BOL-B2	5	5	-	-	5	5	4	5	-	-	5	-	-	-	5	-
	Shallow		BOL-S	-	-	-	-	-	-	-	-	5	-	-	-	5	-	-	-
Quesnel Lake	Deep	Exposed (Near-field)	QUL-PNF	5 (5)	5 (5)	5	5	5	5	4	5	-	-	5	-	-	-	5	-
		Reference	QUL-PREF1	5 (5)	5 (5)	5	5	5	5	4	5	-	-	5	-	-	-	5	-
	Shallow	Exposed (Near-field)	QUL-LNF1	5 (5)	5 (5)	-	-	5	5	-	-	5	5	-	5[b]	5	5	-	5
		Reference	QUL-LREF1	5 (5)	5 (5)	-	-	5	5	-	-	5	5	-	5[b]	5	5	-	5

Notes: "-" = not sampled/not applicable. *C. dilutus* = *Chironomus dilutus*, *H. azteca* = *Hyalella azteca*. Test durations shown are for survival and growth tests (i.e., 10-day survival and growth, 14-day survival and growth, 28-day survival and growth).

[a] Values indicate the number of stations sampled per area. Values in brackets, e.g., (x), indicate the number of replicates per station. If no value in brackets is given, a single sample was collected per station. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] *Hyalella azteca* 14-day survival and growth tests were completed using two methodologies in 2021 as part of an investigation: 1) the standard static exposure methods that have been employed in all prior years; and 2) static-renewal exposure methods that differ from methods used in prior years. See Minnow (2022a) for details.

Quesnel Lake (Figures 3.1 and 3.2, Table 3.3). Prior to 2024, toxicity testing of sediments from these deep monitoring areas was last completed in 2021 (Table 3.3).

In shallow areas of Quesnel Lake, sediment toxicity using *H. azteca* monitoring was initiated in 2014 and has been completed annually since 2019 at the shallow near-field area (QUL-LNF1) and reference (QUL-LREF1) areas of Quesnel Lake (Figure 3.2, Table 3.3). This monitoring serves to satisfy Condition 9 of the CEMP approval dated February 10, 2021 (BCMOECCS 2021) which specified the following:

> *"H. azteca toxicity testing using sediment from shallow areas of Quesnel Lake must be continued as stated in the March 14, 2019 approval letter. "No effect to H. azteca" in that letter shall mean "no unacceptable response" relative to the reference area, as defined on page 37 of "Mount Polley Comprehensive Environmental Monitoring Program 2019 – Sediment and Aquatic Life".*

In shallow areas of Polley Lake (POL-S) and an associated reference (Bootjack Lake; BOL-S), sediment toxicity using *H. azteca* monitoring was initiated in 2019 and has been completed every three years since then, with monitoring last completed in 2022 (Figure 3.1, Table 3.3). This monitoring serves to satisfy Condition 9 of the CEMP approval dated February 10, 2021 (BCMOECCS 2021) which specified the following:

> *"The 14-day sediment toxicity test on H. azteca must be conducted every three years (i.e., next in 2022) using sediment of shallow habitat from Polley Lake unless MPMC can clearly show that copper concentrations in all Polley Lake shallow sediment samples are below the 95th percentile of the copper concentrations in the Bootjack Lake reference area shallow sediment samples.".*

Sample collection and analysis methods for 2024 are described herein and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historical sampling areas, refer to the references listed in Table 3.3.

3.2.1 Sample Collection

Sediment samples for toxicity testing using *C. dilutus* and *H. azteca* in 2024 were collected using a Petite Ponar grab sampler as described in Section 3.1.1. Toxicity testing using *C. dilutus* in 2024 was conducted with sediments from the deep areas of Polley Lake (POL-P1, POL-P2) with a deep area of Bootjack Lake (BOL-B2) serving as reference, and with sediments from the deep near-field (QUL-PNF) and reference (QUL-PREF1) areas of Quesnel Lake (Figures 3.1 and 3.2, Table 3.3). Toxicity testing using *H. azteca* was conducted with sediments from the shallow near-field area (QUL-LNF1) and reference (QUL-LREF1) areas of Quesnel Lake (Figure 3.2, Table 3.3).

Sediments were collected at a total of five replicate stations per area, with the field replicates serving as replicates in the laboratory. Sediment samples for toxicity testing were shipped to Nautilus Environmental (Nautilus) in Burnaby BC following the methods used for sediment quality samples, described in Section 3.1.1.

3.2.2 Laboratory Analysis

Upon receipt, Nautilus opened the coolers, measured temperature to verify the maintenance of cold samples, removed each sample from the coolers, logged the sample, and confirmed sample receipt with Mount Polley and Minnow. Static water toxicity testing of *H. azteca* and *C. dilutus* as outlined in detail in Nautilus (2024; Appendix G) was conducted according to procedures described in the Biological Test Method for these species: 14-day survival and growth test using *H. azteca* (Environment Canada 2017) and 10-day survival and growth test using *C. dilutus* (Environment Canada 1997). Briefly, Nautilus set up five field-replicate test vessels per sampling area (i.e., with each replicate representing a sampling station) for each toxicity test (i.e., static testing for 14-day *H. azteca* and 10-day *C. dilutus*). A laboratory control (beach sand in accordance with the biological test method) was also set up with five laboratory replicates in each test.

In the toxicity test laboratory, several supporting measurements were collected within the toxicity test vessels as described by Nautilus (2024; Appendix G). Briefly, this included meter measurements of overlying water (temperature, dissolved oxygen, conductivity, and pH) and the collection of overlying water for analysis of hardness, alkalinity, Dissolved Organic Carbon (DOC), and dissolved copper by ALS Environmental (Burnaby, BC) and total ammonia and hardness by Nautilus. Collection of overlying water samples for analysis of hardness, alkalinity, and total ammonia analysis was completed at test initiation (Day 0) and test termination (Day 10 for *C. dilutus* and Day 14 for *H. azteca*). Collection of overlying water samples for analysis of hardness, alkalinity, DOC, and dissolved copper by ALS was completed at test termination (Nautilus 2024; Appendix G).

3.2.3 Data Analysis

Upon receipt of the laboratory report, a DQR was completed, including an examination of laboratory controls, reference toxicants, and hold times (Appendix B).

Statistical analyses for the tests were performed by Nautilus using CETIS software (Tidepool Scientific Software 2022) and included contrasts of the exposed area against laboratory controls and the matched reference area. Statistical contrasts were completed following guidance provided by Environment Canada (2005) and involved the use of an ANOVA with Dunnett's test for quantitative data that met parametric test assumptions. When non-parametric techniques

were required, the data were analyzed using Steel's Many-one rank sum test. For quantile data, the Fisher Exact/ Bonferroni Holm test was performed. A two-tailed Tukey-Kramer test was applied to compare results from samples that were run with organisms from different batches in error (see details below). Significant differences were determined at the significance level of $\alpha = 0.05$.

Sediment toxicity test results were interpreted based on a combination of statistical contrasts and effect size by comparing exposed area results relative to both the laboratory control and reference area results. For this evaluation, results were grouped into three categories for separate tabular and graphical presentation, statistical analyses, and interpretation:

1. Deep Polley Lake areas (POL-P1 and POL-P2; exposed) compared to a deep reference area (Bootjack Lake; BOL B2), tested using *C. dilutus*.
2. Deep near-field area of Quesnel Lake (QUL-PNF) compared to an un-impacted deep reference area (QUL-PREF1), tested using *C. dilutus.*
3. Shallow near-field area of Quesnel Lake (QUL-LNF1) compared to an un-impacted shallow reference area (QUL-LREF1), tested using *H. azteca*.

During toxicity testing, a laboratory error occurred in which toxicity tests for the deep areas of Polley Lake (POL-P1 and POL-P2; exposed) and the corresponding deep area of Bootjack Lake (BOL-B2; reference) were initiated with different batches of *C. dilutus* organisms (see Appendix G for further details). The use of different test organism batches precluded direct comparison of exposed and reference area tests for these areas. Therefore, a weight of evidence approach was adopted by Nautilus to confirm the presence or absence of effects, including:

- Visual comparison of endpoints between exposed (POL-P1 and POL-P2) and reference areas (BOL-B2);
- Comparison of endpoints to relative control samples, which were different for the deep areas of Polley and Bootjack lakes; and
- Statistical comparison of exposed (POL-P1 and POL-P2) and reference (BOL-B2) areas using a two-tailed Tukey-Kramer test.

Comparisons for each test endpoint reported by the laboratory were evaluated using a stepwise procedure similar to that of the Southern California Coastal Water Research Project (SCCWRP) California Sediment Quality Objectives (CASQO; Bay et al. 2014):

1. Mean responses of percent survival and growth (dry weight [dw] per surviving organism) were expressed as a percentage of the mean laboratory control result and the mean field reference result.

2. Results of the statistical contrasts of mean responses in tests of impacted sediment against the laboratory control and the field reference sediment were compiled (i.e., the impacted area was identified as significantly different or not significantly different from the mean laboratory control result and the mean field reference result).

3. Results were categorized as follows:

    a. No unacceptable response was identified as a mean response within 20% of the mean laboratory control result and the mean field reference result (i.e., survival or growth were ≥80% of the control and field reference);

    b. Low to moderate response was identified as a mean response of between 20% and 50% of the mean laboratory control result and the mean field reference result (i.e., survival or growth were 50% to 80% of the control and field reference);

    c. High (large) response was identified as a mean response of >50% of mean laboratory control result and the mean field reference result (i.e., survival or growth were <50% of the control and field reference);

4. Results that were in the low to moderate response category were subject to a further categorization step:

    a. If the “low to moderate” response did not differ statistically from the laboratory control and the field reference, it was categorized as a low response;

    b. If the “low to moderate” response differed statistically from the laboratory control and the field reference, it was categorized as a moderate response.

5. Where comparisons to mean laboratory control result and the mean field reference result did not fall into the same response category, the result was discussed relative to both the control and the field reference.

Application of a 20% reduction in survival relative to the field reference to define acceptability is consistent with thresholds used elsewhere (e.g., Suter et al. 1995; BCMELP 1998; Government of Canada 2010; Mebane 2010; Nautilus and Zajdlik 2011; Bay et al. 2014). The 20% threshold is the same as the acceptability threshold for laboratory control survival identified in the test method (i.e., a test is considered acceptable if fewer than 20% of organisms in the laboratory control die; Environment Canada 2017).

If a toxicity response was observed for a given results category (e.g., deep Polley Lake, deep Quesnel Lake, or shallow Quesnel Lake), relationships between control normalized survival and growth results and supporting chemical and physical variables (i.e., TOC and copper concentrations in sediment and dissolved copper concentrations in overlying water [field and

laboratory; where available]) were evaluated using a simple linear regression model. No toxicity response was observed for deep Polley Lake sediments; therefore, deep Polley Lake results were excluded from regression analysis. The regression analysis was completed separately for each of the two Quesnel Lake results categories (e.g., deep and shallow). For Quesnel Lake shallow areas, the analysis included 14-day static test data for *H. azteca* from QUL-LNF and QUL-LREF1 (2014 to 2024). For Quesnel Lake deep areas, the analysis included all available 10-day static test data for *C. dilutus* (2014 to 2024)[7]. Sediment toxicity test results from 2015 and 2016 which were treated with TOC addition or removal[8] were omitted from the regression analyses. Each linear relationship was plotted with the line of best fit. Regression plots included comparison of sediment copper and aqueous dissolved copper concentrations to applicable guidelines (BCWSQG and BCWQG, respectively; see Section 3.8.3.3 for details of dissolved copper BCWQG calculation). Data were explored for outliers based on a Cook's Distance of 6/n; an approach more conservative than the recommended Cook's distance critical value for outlier identification (>4/n; Arimie et al. 2020). When outliers were identified, correlations were run with and without outliers included in the data and results of both analyses presented. Statistically significant regressions were identified using an α of 0.05.

Control normalized survival and growth results (i.e., presented as a percentage of the average laboratory control result) were also plotted over time for each exposed and corresponding reference monitoring area. All statistical analyses and plots were completed using R (R Core Team 2024).

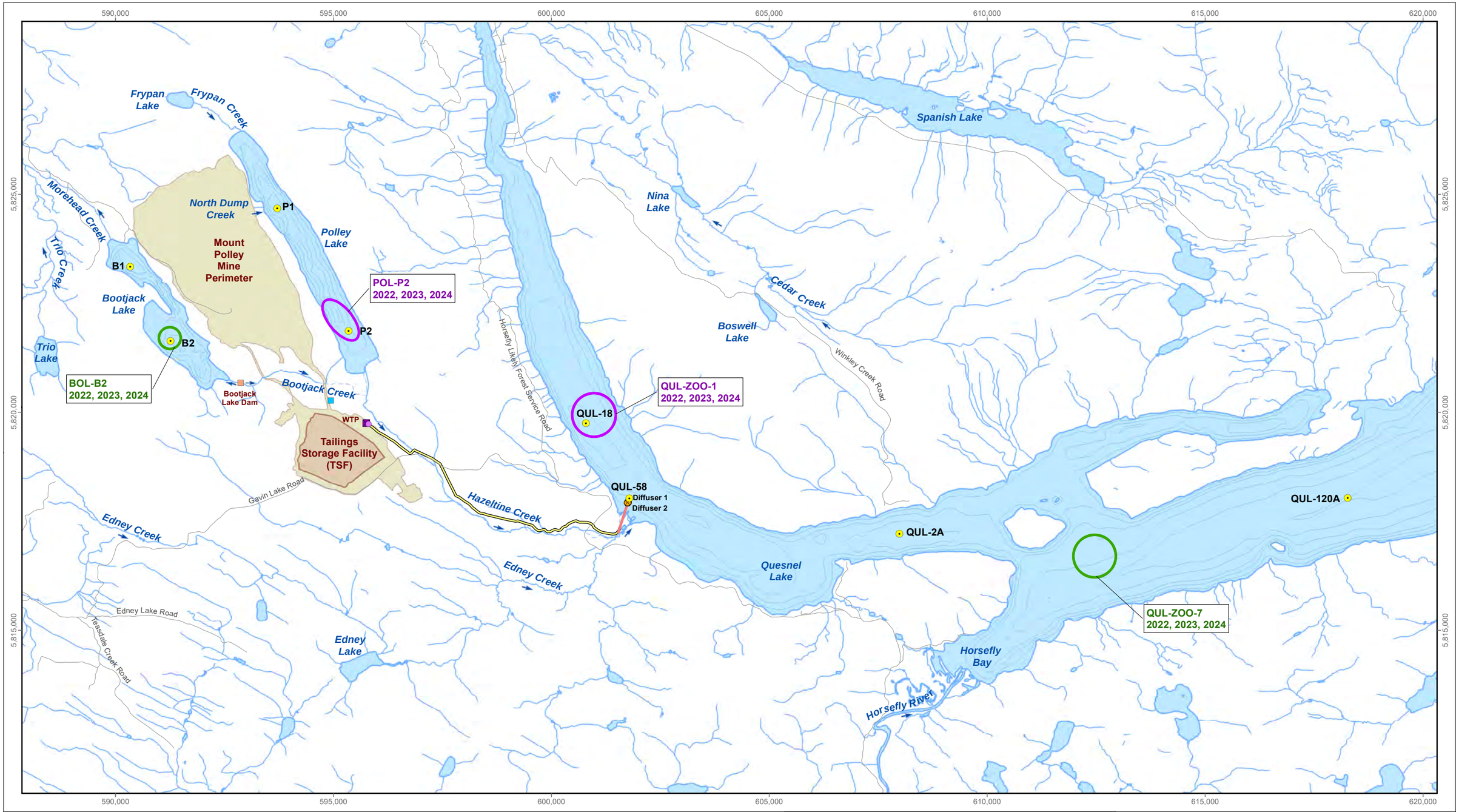
3.3 Plankton Community and Productivity

Plankton community and productivity monitoring was completed at exposed areas of Quesnel Lake and Polley Lake (and associated reference areas) annually between 2022 and 2024, in accordance with the CEMP (MPMC 2019)[9]. Post-breach plankton community and productivity sampling at current monitoring areas were initiated in 2016 and 2014 for phytoplankton and zooplankton in Quesnel Lake (exposed and reference areas), respectively, and in 2015 for both phytoplankton and zooplankton in Polley Lake (Figure 3.3, Tables 3.4 and 3.5). Since then,

[7] The regression analysis for Quesnel Lake deep areas included data from the following areas: QUL-PREF2, QUL-PREF1, QUL-PNF, QUL-PNF, QUL-PFFF, QUL-PFF1, QUL-PFF2, QUL-I.

[8] Some sediment samples collected in 2015 and 2016 were manipulated by either adding TOC or by removing TOC (by loss on ignition) in order to assist in interpreting the role of TOC in toxicity test response.

[9] Minnow has completed interpretive reporting for plankton community and productivity monitoring data collected since 2018 (Minnow 2019a, 2020, 2021a, 2022a, 2023a, 2024a) and has completed monitoring implementation since 2019 after providing monitoring program design modifications (Minnow 2019b) at the request of MPMC. A complete description of historic plankton sampling activities was included in Minnow (2019a) and the modified monitoring program design was included in the approved CEMP (MPMC 2019).



LEGEND

- Exposed
- Reference
- Routine Water Monitoring Station
- Effluent Mixing Tank
- Water Treatment Plant (WTP)
- Central Collection Sump
- Diffuser (Treated Effluent Discharge, December 2015 to present)
- Effluent Discharge Pipeline (January 2018 to present)
- Discharge to Diffusers (2015 to present)
- Historic Watercourse

[a] Monitoring at each plankton monitoring area included at least one of: phytoplankton community and productivity, zooplankton community and productivity, and zooplankton tissue quality. See Tables 3.4, 3.5, and 3.6 for details of monitoring components.

0 1 2 4 Km

Projection: North American Datum 1983 UTM Zone 10U

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N W E S

Plankton Monitoring Areas, Polley, Bootjack, and Quesnel Lakes, 2022 to 2024[a]

Date: March 2025
Project 247202.0004

minnow environmental inc.

Figure 3.3

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 5\24-04 Figure 3.3 Plankton and WQ Monitoring.mxd

Table 3.4: Overview of Phytoplankton Community and Productivity Monitoring in Lakes in the Vicinity of the Mount Polley Mine, 1995 to 2024[a]

Waterbody	Area Type	Area Code	Component	Baseline		Post-Breach																			
				1995 (HKP 1996)	1996 (HKP 1997)	2015 (Golder 2016a)	2016	2017	2018 (Minnow 2019a)	2019[b] (Minnow 2020a)			2020 (Minnow 2021a)			2021 (Minnow 2022a)			2022 (Minnow 2023a)			2023 (Minnow 2024a)			2024		
										June	July	August	June	July	August	June	July	August	June	July	August	June	July	August	June	July	August
Polley Lake	Exposed	POL-P2	community	7	5	6	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			chlorophyll-a	9	5	4	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Bootjack Lake	Reference	BOL-B2	community	9	6	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			chlorophyll-a	4	6	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Quesnel Lake	Exposed	QUL-ZOO-1	community	-	-	-	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			chlorophyll-a	-	-	-	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
	Reference	QUL-ZOO-7	community	-	-	-	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			chlorophyll-a	-	-	-	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1

Notes: "-" = not applicable; data from 2015 to 2018 were provided in electronic form to Minnow from the Mount Polley Mine database. References are not displayed for data from 2016 and 2017 because these data were not contained in a specific report (to Minnow's knowledge) and these data were provided by MPMC to Minnow as a Microsoft Excel file.

[a] Values indicate the number of samples collected per area per year or month. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] Phytoplankton sampling in 2019 was performed at all areas using two methodologies (surface grab and depth-integrated sampler) to facilitate a statistical comparison of methods (Minnow 2020a).

Table 3.5: Overview of Zooplankton Community and Productivity Monitoring in Lakes in the Vicinity of the Mount Polley Mine, 1995 to 2024[a]

Waterbody	Area Type	Area Code	Component	Baseline		Post-Breach																						
				1995 (HKP 1996)	1996 (HKP 1997)	2014 (Golder 2017a)	2015 (Golder 2017a)	2016 (Golder 2017a)	2017 (Golder 2017a)	2018 (Minnow 2019a)	2019[b] (Minnow 2020a)			2020 (Minnow 2021a)			2021 (Minnow 2022a)			2022 (Minnow 2023a)			2023 (Minnow 2024a)			2024		
											June	July	August	June	July	August	June	July	August	June	July	August	June	July	August	June	July	August
Polley Lake	Exposed	POL-P2	community	5	5	-	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			biomass	-	-	-	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Bootjack Lake	Reference	BOL-B2	community	6	6	-	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			biomass	-	-	-	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Quesnel Lake	Exposed	QUL-ZOO-1	community	-	-	8	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			biomass	-	-	8	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
	Reference	QUL-ZOO-7	community	-	-	5	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
			biomass	-	-	5	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1

Notes: "-" = not sampled/not applicable. Data from 2014 to 2018 were provided in electronic form to Minnow from the Mount Polley Mine database.

[a] Values indicate the number of samples collected per area per year or month. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] Analysis of zooplankton samples from Quesnel Lake was performed using two mesh sizes (50 µm and 150 µm) to facilitate comparison to historical samples collected using 150 µm mesh size. See Minnow (2020a) for details.

plankton community and productivity monitoring continued annually in each waterbody, and in 2019 was revised to incorporate a standardized annual monitoring approach (Figure 3.3, Table 3.4) which is consistent with the CEMP (MPMC 2019). Since 2019, annual monitoring has included an exposed area in Polley Lake (POL-P2; with Bootjack Lake [BOL-B2] serving as a reference area), and exposed (QUL-ZOO-1) and reference (QUL-ZOO-7) areas of Quesnel Lake (Figure 3.3, Tables 3.4 and 3.5; Appendix Table A.1.3), in accordance with the CEMP (MPMC 2019). Annual plankton community and productivity monitoring since 2019 has been completed in three sampling events per year (June, July, and August), with each sampling event occurring at least 30 days apart (Appendix Table A.1.3). Each year, single (n=1) phytoplankton and zooplankton samples were collected in June and August at each monitoring area, and five replicate (n = 5) samples were collected in July at each monitoring area (Tables 3.4 and 3.5), in accordance with the CEMP (MPMC 2019). Phytoplankton productivity has been evaluated solely based on chlorophyll-a- concentration since 2020 (see Minnow 2021a for details).

Sample collection and analysis methods for 2024 are described herein and are largely consistent with those outlined in the CEMP (MPMC 2019; exceptions and associated rationale are outlined in the following sub-sections). For details pertaining to prior sampling years, refer to the references listed in Tables 3.4 and 3.5.

3.3.1 Sample Collection

3.3.1.1 Phytoplankton

Phytoplankton sampling was completed in June (n=1 per area), July (n=5 per area), and August (n=1 per area) 2024 and included the collection of community composition and productivity (chlorophyll-a) samples (Table 3.4).

Phytoplankton samples were collected using a depth-integrated (DI) water sampler (i.e., a length of plastic tubing that was weighted at the bottom). To collect one sample, the weighted end of the DI sampler was lowered to the required sampling depth, crimped, and pulled to the surface while remaining crimped. The weighted end of the DI sampler was then placed into a clean plastic pail and the crimped end was released allowing the water to flow into the clean bucket. The DI sampler enables collection of water and phytoplankton throughout the photic zone, which is the upper layer of the water column receiving light penetration (and was estimated at approximately twice the measured Secchi depth). DI samples were collected using nearly the full length of the tube (length ~13 m) whenever station depth was greater than 12 m, or only a portion of the tube in areas < 12 m deep (Appendix Table A.1.3) to prevent collection of sediment or water from the sediment-water interface.

Upon retrieval of the DI sample into the clean bucket, *in situ* water quality measurements were immediately taken with a handheld YSI EXO™ (see Section 3.8.1). Phytoplankton and water samples were then taken by decanting water from the bucket into appropriate sample bottle(s), and samples were preserved and stored as follows:

1. Samples for analysis of phytoplankton community composition were decanted into an opaque 250 mL plastic bottle and then preserved using Lugol's solution, which was added using an eyedropper until the sample was a weak tea colour. The sample was gently swirled to thoroughly integrate the Lugol's solution and stored in a cool dark environment prior to shipment to the laboratory for analysis.
2. Samples for analysis of aqueous chlorophyll-a concentrations were decanted into an opaque 250 mL plastic bottle and supporting water samples were decanted into water quality sample bottles and preserved as required. Supporting water quality samples were kept on ice in the field and refrigerated until being shipped (on ice) to the analytical laboratory. Duplicate (split) routine water quality and chlorophyll-a samples were collected at a target frequency of 10% for QA/QC purposes.

Water collected for chlorophyll-a analysis was kept on ice in the field until same-day filtration. In brief, a measured[10] volume (~250 mL) of sample was decanted into the vacuum filtration apparatus and filtered through 0.45 µm pore diameter Whatman mixed cellulose ester (MCE) filter paper. The filter paper (containing sample) was then folded and placed into a labeled opaque centrifuge tube and frozen until shipment (on ice) to the analytical laboratory. Filtration equipment was rinsed with distilled water between samples.

Supporting *in situ* water quality depth profiles were recorded at every area (n=1) and Secchi depth was measured at every station (n=1 per area in June and August, n=5 per area in July; see Section 3.8.1 for description of supporting measures collection).

3.3.1.2 Zooplankton

Zooplankton sampling was carried out concurrently with phytoplankton sampling in June (n=1 per area), July (n=5 per area), and August (n=1 per area) 2024 and included collection of samples for assessment of community composition and productivity (Table 3.4).

Samples were collected using a 90 cm long zooplankton haul net with a 50 cm diameter mouth opening and 50 µm Nitex mesh. Zooplankton community samples were collected by lowering the zooplankton haul net to a specific depth (see below), then hauling the net vertically through the water column using a hand-over-hand motion at a rate of about 0.5 metres per second (m/s).

[10] The chlorophyll-a concentration was determined from the precise volume of sample filtered.

Each zooplankton sample consisted of a single vertical haul.[11] Haul depths differed among lakes; hauls were conducted at 31 m depth in the much deeper Quesnel Lake, at 20 to 27 m in Polley Lake, and at 10 to 15 m in Bootjack Lake. Haul depths at Polley and Bootjack Lakes were conducted from a depth approximately 2 m less than the total station depth (Appendix Table A.1.3).

Upon retrieval, material on the inside of the net was rinsed into the cod end by lifting the net in and out of the water without submerging the mouth of the net. Sample material was then rinsed from the cod end of the net into a 250 mL plastic bottle using a squeeze bottle filled with filtered water. Samples were then preserved with buffered formalin solution to a nominal concentration of 4%. Preserved samples were stored in a dark, cool place prior to shipment to the laboratory for taxonomic analysis.

Supporting measures included those outlined above for phytoplankton (Section 3.3.1.1; see Section 3.8.1 for description of supporting measures collection).

3.3.2 Laboratory Analysis

3.3.2.1 Phytoplankton

3.3.2.1.1 Community

Phytoplankton samples were sent to Biologica Environmental Services Ltd. (Biologica) in Victoria, BC, for taxonomic identification and enumeration. Upon arrival, samples were examined and additional Lugol's preservative was added (if required) to ensure adequate preservation. A sample receipt confirmation was then sent to Minnow.

Plankton community samples were processed by first thoroughly mixing (i.e., shaking) the sample container. Sub-samples (10 to 100 mL) were then dispensed into Utermöhl settling

[11] The CEMP approval amendment letter from BCMOECCS (dated July 15, 2019; BCMOECCS 2019) stipulated that zooplankton samples must be collected using a modified horizontal tow method, which is a condition that applies to all zooplankton sample collection. This was not the intent of the plankton program recommendations provided by Minnow (dated May 28, 2019; Minnow 2019b), which included the use of different plankton tow methods for the collection of: 1) zooplankton productivity and community samples, and 2) zooplankton tissue quality samples. Minnow maintains that zooplankton productivity and community samples should be collected using a vertical tow method only (consistent with the recommendations provided by Minnow in May 2019; Minnow 2019b). A modified horizontal tow method was not recommended for the collection of zooplankton community samples for two reasons. Firstly, zooplankton samples for community analysis have previously been collected by a single vertical tow. Changing the collection method for this sample type to a modified horizontal tow would limit comparability with previously collected data. Secondly, it is difficult to ensure that the sampling net ascends through the water column at a constant speed when conducting a horizontal tow. Since zooplankton community composition differs through the water column, variability in the amount of time that the net samples a given depth during a horizontal tow could influence the community results. Use of a vertical tow method eliminates this consideration entirely. Following consultation with MPMC regarding this rationale and the best methodological approach to implement, Minnow collected zooplankton community and productivity samples using a vertical haul methodology between 2019 and 2024. For a comparison of zooplankton community and productivity samples collected using both vertical and modified horizontal haul methodologies, see Minnow (2020a).

chambers and allowed to settle for 12 to 48 hours, depending on sub-sample volume. Sub-samples were then systematically scanned using a Zeiss Axio Vert A.1 inverted phase contrast microscope at 400x magnification. All algal cells were counted in a series of randomly located field of view (FOV) until a minimum of 300 algal units were identified and enumerated. Algal units represent single cells of all algal groups, as well as colonies or filaments of blue-green algae. Given that blue-green algal colonies and filaments may contain hundreds of cells, enumerating units (rather than individual cells) allows for a more equal representation of algal groups. The mean number of cells per unit (1 for single cells, >1 for all other algal forms) were estimated for all taxa and used to calculate total densities. Only "viable" cells (those that appeared to be alive at the time of collection) were identified and enumerated. Loricas, the cellulose cups formed by some chrysophyte species, were also counted when observed (USEPA 2010).

Phytoplankton were identified to genus, where possible, following the most up-to-date taxonomic references and collaborations with international and local algal taxonomic experts. Species-level identifications were only given to identifiable taxa for which there are reliable taxonomic references available that encompass the species-level morphological diversity in North America. This approach ensures long-term consistency of data sets and is in accordance with the trend in algal taxonomic practice to be more conservative with delineation of species. Species-level identifications for some taxa are problematic due to widespread phenotypic plasticity that can artificially inflate species richness (Wehr et al. 2015). When applicable, the term "cf." (*confertim*) was used when the species being identified looked similar to a known species but did not meet all the taxonomic requirements to assign the identification with confidence, and the terms "sp.1", "sp. 2", etc. were employed to distinguish between different undetermined species in the same genus.

Taxa were grouped according to their major ecological groupings (e.g., diatoms, cyanobacteria, etc.). Data were reported as density (cells per liter) for each taxon, for each ecological grouping, and as total density at each station.

Laboratory QA/QC included evaluation of sub-sampling accuracy on at least 10% of samples. Data were provided to MPMC and Minnow as a Microsoft Excel spreadsheet along with a methods and QA/QC report as an Adobe Acrobat PDF file (Appendix G).

3.3.2.1.2 Productivity

Phytoplankton chlorophyll-a analysis was completed by ALS Environmental (Burnaby, BC). Upon receipt, ALS Environmental measured the internal temperature of shipping coolers to verify the integrity of samples, logged each sample, and assigned each sample a unique identification code. A sample receipt confirmation was then sent to Minnow and MPMC.

Chlorophyll-a analysis followed procedures adapted from USEPA Method 445.0 (USEPA 1997). Briefly, chlorophyll-a was determined by routine acetone extraction followed by fluorescence detection using a non-acidification procedure, a method that is not subject to interferences from chlorophyll-b.

Laboratory QA/QC included reagent blanks and laboratory accuracy measures (i.e., LCS). Upon completion of the analyses, a data report was provided by ALS to MPMC and Minnow as an Adobe Acrobat PDF file and a Microsoft Excel spreadsheet (Appendix G).

3.3.2.2 Zooplankton

3.3.2.2.1 Community

Zooplankton community samples were sent to Biologica (Victoria, BC) for taxonomic analysis. The sample receipt procedure was as described above for phytoplankton (Section 3.3.2.1.1). Samples were transferred from their formalin solution into 70% ethanol and assigned a unique identification number.

The zooplankton community samples were processed through a 50 µm screen and analyzed in three fractions as follows:

- A “coarse” Unique, Rare, and Large fraction, in which a check of the entire sample was performed to look for such taxa. These organisms were enumerated as a whole count;
- A “coarse” fraction comprised of Cladocera, adult Copepoda, and copepodids, in which a minimum count of 200 organisms was obtained; and
- A “fine” or “micro” fraction, in which Copepod Nauplii and Rotifera were identified and enumerated. Processing of the micro fraction was completed to either a 100 count or a minimum of three sub-samples.

The coarse fraction was analyzed in a Bogorov tray through a stereo microscope at 10-40x magnification and the micro fraction was analyzed using a 1-mL Sedgewick-Rafter counting chamber. Sub-sampling for all fractions was performed using Hensen-Stempel pipettes. Generally, sub-samples were 1/10th of total sample volume for the coarse fraction and 1/100th for the micro fraction. Organisms were identified by taxonomic experts to the lowest practicable taxonomic level (LPL)[12] using a compound microscope (100–400x magnification),

[12] The term “Lowest Practical Level” is commonly used to describe the level of resolution for taxonomic identification (often relating to benthic invertebrate taxonomy; e.g., Environment Canada 2012b). However, the term “Lowest Practicable Level" (e.g., Carter and Resh 2001; Bailey et al. 2001) has been used throughout this report because it is a more accurate description of the taxonomic decision (i.e., the term “practicable” implies the level of identification that is attainable).

appropriate dissection tools, and standard taxonomic references. Zooplankton were identified to species wherever possible, although this was not possible for immature copepods that lack differentiating features required for identification beyond order (e.g., Calanoida, Cyclopoida, or Harpacticoida). For Copepoda, the stage of development was recorded as Nauplii or copepodite stages I-V, as was the sex for mature individuals (copepod stage VI). Rotifera were identified to the genus level. All identifications were performed using taxonomic references and collaborations with external experts, where necessary.

Laboratory QA/QC included evaluation of sub-sampling accuracy on at least 10% of samples. Data were provided to Minnow as a Microsoft Excel spreadsheet (Appendix G).

3.3.2.2.2 Productivity

Zooplankton productivity was evaluated as biomass values (i.e., dry weight biomass [mg/L]) derived from biovolume estimates based on cell measurements performed by Biologica. Biomass calculations were performed for the seven most dominant zooplankton taxa by measuring at least five to 10 specimens of each taxon and applying length/ weight regression formulae (USEPA 2003). Biomass estimates were presented as total wet weight (ww) and dry weight (dw) values derived from per-sample abundances. Data were provided to Minnow as a Microsoft Excel spreadsheet (Appendix G).

3.3.3 Data Analysis

3.3.3.1 Phytoplankton

Upon receipt of the analytical data, a DQR was performed, including an examination of data completeness, formulae checks, and evaluation of percent agreement among laboratory sub-sampling accuracy samples (see Appendix B).

3.3.3.1.1 Community Metrics

Phytoplankton community data were evaluated in terms of total density (cells/L), taxon richness (No. of taxa), Simpson's Diversity and Evenness (calculated as in Smith and Wilson 1996; Environment Canada 2012b), and the relative densities (%) and densities (cells/L) of major ecological groups (cells/L). These endpoints were calculated at the LPL of taxonomy. Phytoplankton community results at the LPL of taxonomy can contain a mixture of taxonomic levels (e.g., species, family, order, and phylum), which can affect the calculation of metrics such as taxon richness and Simpson's Diversity and Evenness. To address this issue, a series of decision criteria were applied to the data to reassign taxon abundance across levels of taxa, while conserving the relative abundances within the higher taxonomic levels (see Appendix E.2 text for details). The taxonomic groups evaluated included one or more of the following major

ecological groups (based on the presence of these taxa at each sampling area): Diatoms, Chlorophytes (green algae), Cyanobacteria (blue-green algae), Chrysophytes (golden algae), Cryptomonads, Dinoflagellates, Euglenophytes, and Radiophytes, and the relative densities (%) densities of all groups were determined for each sample. Phytoplankton productivity was evaluated using chlorophyll-a concentrations measured in micrograms per litre (µg/L).

Phytoplankton community and productivity metrics were calculated for each monitoring area in each year and were summarized by area and year using the following statistics: sample size, mean, median, minimum, maximum, and SD (where replicate data were available).

3.3.3.1.2 Statistical Analyses

Statistical analyses of phytoplankton community and productivity data were conducted to answer the following questions:

1. Were there differences in phytoplankton community and productivity between the exposed and reference areas in 2024?
2. Have the phytoplankton community and/or productivity of exposed areas changed among years (2019 to 2024) relative to changes at reference areas over this time?

To answer these questions, data were grouped into two categories for the separate calculation of community metrics, tabular and graphical presentation, and statistical analyses:

1. Polley Lake (POL-P2) compared to reference (Bootjack Lake; BOL-B2).
2. Quesnel Lake exposed area (QUL-ZOO-1) compared to an un-impacted reference (QUL-ZOO-7).

Phytoplankton data cannot be pooled across different sampling events due to high variability among seasons. As such, statistical analyses focused on replicate samples (n=5) collected in July, as per the CEMP (MPMC 2019). Results of single samples collected in June and August were interpreted without the use of formal statistical contrasts.

Statistical comparisons of data from July 2019 to 2024 were conducted as two-way ANOVAs with *Area* and *Year* as factors and by assessing the interaction between *Area* and *Year*. If the *Area*×*Year* interaction term was significant, all pairwise contrasts were evaluated. If the interaction term was not significant but the *Area* term was significant, pairwise contrasts were conducted between areas pooling years; if the *Year* term was significant, pairwise contrasts were conducted between years pooling areas. Pairwise contrasts were evaluated using a Sidak correction to account for multiple comparisons. Regardless of which overall ANOVA terms were significant, MOD were calculated based on Measures of Central Tendency (MCT) of individual

samples described below. The results of the multiple comparisons were displayed by assigning letters (e.g., A, B, C) to each unique combination of year and method, such that years that did not differ significantly share a letter and the year with the highest mean was assigned the letter "A."

Prior to analysis, the assumptions of normality and homogeneity of variances were tested on the residuals of the two-way ANOVA model using the Shapiro-Wilk test and Levene's test, respectively, based on median values and using α=0.05. Data were transformed as necessary to satisfy assumptions of normality and homogeneity of variance (log_{10}, $log_{10}(x+1)$ when zeros were present in the data). In instances where the residuals of the ANOVA model did not meet the assumptions of normality and homogeneity of variances, the analysis was conducted on ranks (equivalent to a non-parametric test).

MOD between the exposed area and reference area was calculated as:

$$MOD = \frac{MCT_{Exposed} - MCT_{Reference}}{SD_{Pooled}}$$

MOD between years was calculated as:

$$MOD_{Year} = \frac{MCT_{Year} - MCT_{Baseline\ Year}}{SD_{Pooled}}$$

where MCT is the mean for untransformed data, geometric mean for log_{10}-transformed data and the SD is the pooled standard deviation from the ANOVA model. The effect size calculations were conducted on the transformed scale when the data were transformed for analysis. When the analysis was done on the rank-transformed scale, the observed effect size was estimated using median values instead of means, and the Median Absolute Deviation (MAD) instead of SD:

$$MAD = median(|x_i - median(dataset)|)$$

where x_i is each observation in the dataset and $|f(x)|$ is the absolute value of $f(x)$.

All statistical comparisons were conducted using R (R Core Team 2024). Statistically significant differences in phytoplankton community endpoints between areas were identified using an α of 0.1 (as used for evaluation of all biological data in this report). Significant differences with a MOD that exceeded ±2 SD/MAD were further identified as potentially ecologically meaningful in both statistical analyses results and in data interpretation (Environment Canada 2012b[13]),

[13] Environment Canada (2012b) identifies a critical effect size (CES) of ± 2 SDs for evaluating ecologically meaningful changes in benthic invertebrate community. This criterion has been applied here to the interpretation of phytoplankton community.

although all statistically significant differences (e.g., including those with a MOD < ±2 SD/ MAD) were discussed in the data interpretation.

Total phytoplankton density (cells/L), taxon richness (No. of taxa), and chlorophyll-a concentrations (µg/L) were plotted as time-series figures comparing sampling areas over time (including all seasonal data from baseline to present, where available). Relative densities (%) and densities of major phytoplankton groups were plotted from 2019 to 2024 as stacked bar charts of mean values. Phytoplankton community metrics from July 2019 to 2024 were also plotted to support interpretation of the two-way ANOVA results. Untransformed data were plotted for ease of interpretation and plots were generated using R (R Core Team 2024). Historical (pre-2019) phytoplankton proportional density data had low comparability with 2019 to 2024 data due to changes in taxonomist and were therefore excluded from plots (see Minnow 2019a for details regarding historical taxonomic efforts and data limitations that affect comparability).

3.3.3.2 Zooplankton

Upon receipt of the analytical data, a DQR was performed, including an examination of data completeness, formulae checks, and evaluation of percent agreement among laboratory sub-sampling accuracy samples (see Appendix B).

3.3.3.2.1 Community Metrics

Zooplankton community data were evaluated in terms of total density (organisms/ L), taxon richness (No. of taxa), Simpson's Diversity and Evenness (calculated as in Smith and Wilson 1996; Environment Canada 2012b), and the relative densities (%) and densities (organisms/L) of major ecological groups. Zooplankton endpoints were calculated at the LPL of taxonomy. Similar to the phytoplankton community, zooplankton community results at the LPL of taxonomy can contain a mixture of taxonomic levels, which can affect the calculation of metrics such as taxon richness and Simpson's Diversity and Evenness. To address this issue, a series of decision criteria were applied to the data to reassign taxon abundance across levels of taxa, while conserving the relative abundances within the higher taxonomic levels (see Appendix E.2 text for details). Zooplankton data were converted from per-sample abundance values to volumetric density values (organisms/L) by dividing total densities by the volume of water through which the net passed (see Appendix E.2 text for details). For the calculation of relative densities (%) of major zooplankton groups, taxa were grouped as Calanoida, Cladocera, Cyclopoida, and Rotifera, with Copepoda Nauplii (the earliest juvenile stage of Copepoda) left as their own grouping. Zooplankton productivity was evaluated using dry weight biomass (mg/L).

Zooplankton community and productivity metrics were calculated for each monitoring area in each year and were summarized by area and year using the following statistics: sample size, mean, median, minimum, maximum, and SD (where replicate data were available).

3.3.3.2.2 Statistical Analyses

Zooplankton community data were evaluated to answer the following questions:

1. Were there differences in zooplankton community and productivity between exposed and reference areas in 2024?
2. Have the zooplankton community and/or productivity of exposed areas changed among years (2019 to 2024) relative to changes at reference areas over this time?

To answer these questions, data were grouped into two categories for the separate calculation of community metrics, tabular and graphical presentation, and statistical analyses:

1. Polley Lake (POL-P2) compared to reference (Bootjack Lake; BOL-B2).
2. Quesnel Lake exposed area (QUL-ZOO-1) compared to an unimpacted reference (QUL-ZOO-7).

Methods for replicate analysis, data pooling, statistical analyses, presentation of historical data, and current limitations of data for temporal statistical analyses of zooplankton data are the same as those outlined for phytoplankton in Section 3.3.3.1.2, with the one exception that dry weight biomass served as the measure of zooplankton productivity in both statistical analyses and plots.

3.4 Zooplankton Tissue Quality

Zooplankton tissue quality monitoring was completed at exposed areas of Quesnel Lake and Polley Lake (and associated reference areas) annually between 2022 and 2024, in accordance with the CEMP (MPMC 2019). Post-breach zooplankton tissue quality monitoring at current monitoring areas was initiated in 2014 in Quesnel Lake and in 2015 in Polley Lake (and reference; Bootjack Lake) and has been completed annually since then (Figure 3.3, Table 3.6). Since 2019, annual monitoring has included an exposed area in Polley Lake (POL-P2) with Bootjack Lake (BOL-B2) serving as a reference, and an exposed (QUL-ZOO-1) and reference (QUL-ZOO-7) area of Quesnel Lake (Figure 3.3, Table 3.6; Appendix Table A.1.3), in accordance with the CEMP (MPMC 2019). Annual zooplankton tissue monitoring since 2019 has been completed in three sampling events per year (June, July, and August), with each sampling event occurring at least 30 days apart (Appendix Table A.1.3). Each year, single (n=1) zooplankton tissue quality samples were collected in June and August at each monitoring area and five replicate (n = 5) samples were collected in July at each monitoring area (Table 3.6), in accordance with the CEMP (MPMC 2019).

Table 3.6: Overview of Zooplankton Tissue Quality Monitoring in Lake Habitats in the Vicinity of the Mount Polley Mine, 2014 to 2024[a]

Waterbody	Area Type	Area Code	Post-Breach																					
			2014 (Golder 2017a)	2015 (Golder 2017a)	2016 (Golder 2017a)	2017 (Golder 2017a)	2018 (Minnow 2019a)	2019 (Minnow 2020a)			2020 (Minnow 2021a)			2021 (Minnow 2022a)			2022 (Minnow 2023a)			2023 (Minnow 2024a)			2024		
			September to December	May to September	Early and Late Season	Early and Late Season	Early and Late Season	June	July	August	June	July	August	June	July	August	June	July	August	June	July	August	June	July	August
Polley Lake	Exposed	POL-P2	-	4	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Bootjack Lake	Reference	BOL-B2	-	-	-	-	-	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
Quesnel Lake	Exposed	QUL-ZOO-1 (ZP 2, 4, 6, 9, 12, 15, 18, 21)	8	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1
	Reference	QUL-ZOO-7 (ZP 8, 11, 14, 17, 20)	5	5	2	2	2	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1	1	5	1

Notes: "-" = not sampled/not applicable. "ZP" = zooplankton. In 2014, QUL-ZOO-1 and QUL-ZOO-7 were reported as ZP stations. Data from 2014 to 2018 were provided in electronic form to Minnow from the Mount Polley Mine database.

[a] Values indicate the number of samples collected per area in the month or season identified. In 2014 to 2018, single samples were collected from each area during each sampling event. Only sampling areas that were monitored between 2022 to 2024 are displayed, as well as historical data for these areas.

Sample collection and analysis methods for 2024 are described herein and are largely consistent with those outlined in the CEMP (MPMC 2019; exceptions and associated rationale are outlined in the following subsections). For details pertaining to prior sampling years, refer to the references listed in Table 3.6.[14]

3.4.1 Sample Collection

Zooplankton tissue quality samples were collected in June (n =1 per area), July (n = 5 per area), and August (n=1 per area), 2024, using methods largely consistent with the CEMP (MPMC 2019).[15]

Zooplankton tissue samples were collected using a 90 cm long zooplankton haul net with a 50 cm diameter mouth opening and 50 µm Nitex mesh. Sampling in Polley Lake (POL-P2) and Bootjack Lake (BOL-B2) was completed using the vertical haul method described in Section 3.3.1.2, with a maximum start depth of approximately 20 to 27 m in Polley Lake and 10 to 15 m in Bootjack Lake (Appendix Table A.1.3). Vertical hauls were completed until a sufficient sample weight was obtained (minimum 1.5 g wet weight).

Zooplankton tissue quality samples were collected from Quesnel Lake (QUL-ZOO-1 and QUL-ZOO-7) by completing a single modified horizontal haul[16] at each area. Each horizontal haul was completed by lowering the net to a starting depth of 31 m and then towing the net through the water column for a set time (e.g., 5 to 5.5 minutes; Appendix Table A.1.3) while slowly retrieving the net to the surface.

Upon retrieval of each vertical or horizontal haul, the plankton net was rinsed towards the cod end to concentrate the sample. Excess water was decanted through the mesh of the cod end or

[14] Minnow has completed interpretive reporting for plankton community and productivity monitoring data collected since 2018 (Minnow 2019a, 2020a, 2021a, 2022a, 2023a, 2024a) and has completed monitoring implementation since 2019 after providing monitoring program design modifications (Minnow 2019b) at the request of MPMC. A complete description of historic plankton sampling activities was included in Minnow (2019a) and the modified monitoring program design was included in the approved CEMP (MPMC 2019).

[15] Zooplankton tissue quality samples were historically collected using multiple vertical hauls until a sufficient sample weight was obtained. Due to the low productivity in Quesnel Lake, this process was labour-intensive. Therefore, Minnow recommended substitution of the vertical tow method for a modified horizontal tow method in Quesnel Lake to decrease the time required to collect sufficient sample material. Minnow recommended the continuation of vertical haul methods in Polley Lake (Minnow 2019b). The modified horizontal tow method for the collection of zooplankton tissue quality samples from Quesnel Lake was incorporated into the CEMP approval amendment letter from BCMOECCS (dated July 15, 2019; BCMOECCS 2019). However, the letter stipulated that all zooplankton samples must be collected using the modified horizontal tow method. This methodology was only recommended for use in Quesnel Lake (not Polley or Bootjack Lakes) and specifically for zooplankton tissue quality sample collection for the reasons outlined above (Minnow 2019b). Minnow maintains that the use of a vertical tow method for the collection of zooplankton tissue quality samples is suitable for Polley and Bootjack lakes and has implemented this methodology in 2019 to 2024. The haul method used (vertical or horizontal) does not affect the characteristics of the resulting zooplankton tissue quality sample; only the time associated with sample collection.

[16] Modified horizontal tow methods were consistent with those approved in July 2019 (BCMOECCS 2019) and incorporated into the CEMP (MPMC 2019).

the net. If too much water remained in the sample, the cod end was removed from the plankton net, the stretched net was placed over a bucket, and the sample was poured out of the cod end onto the net. A scoopula was then used to facilitate drainage by pressing on the mesh of the net. The scoopula was used to transfer the sample from the cod end or net (depending on method of sample drainage) into a pre-labelled plastic scintillation vial. All sampling equipment was rinsed between stations using site water. Duplicate (split) zooplankton tissue samples were collected at a target frequency of 10% for QA/QC purposes. Immediately after collection, samples were stored in a cooler with ice packs until being frozen prior to shipment (on ice) to the analytical laboratory.

Supporting measures during each sampling event included measurement of a Secchi depth, a vertical depth profile of *in situ* water quality measures, and a supporting depth-integrated water quality sample collected at each area (see Section 3.3.1.1 for DI sample collection methods). See Section 3.8.1 for a description of supporting measures collection.

3.4.2 Laboratory Analysis

Laboratory analysis of zooplankton tissue quality samples was completed by ALS Environmental in Burnaby BC. Upon receipt of the sample shipment(s), ALS Environmental measured temperature in each cooler to verify the maintenance of cold samples, logged each sample, and assigned each sample a unique sample identification code. A SRN was then sent to MPMC and Minnow for verification.

Laboratory analysis of zooplankton tissue quality samples included metals by CRC-ICP-MS (USEPA Method 6020B; USEPA 2014), mercury by CVAAS (USEPA Methods EPA 200.2/1631E; USEPA 1994, 2001), and moisture content. Laboratory QA/QC included MB samples, laboratory duplicates, and laboratory accuracy measures (i.e., LCSs and/or RMs). Upon completion of the analyses, a data report was provided by ALS to MPMC and Minnow (Appendix G).

3.4.3 Data Analysis

Upon receipt of the initial analytical data, a DQR was completed, including an examination of data completeness, LRLs achieved, laboratory precision, laboratory accuracy, and field precision (Appendix B).

Data analysis of zooplankton tissue quality results focused on replicate samples (n=5) collected in July of each year (2019 to 2024). Results of single (n=1) samples collected from 2014 to 2024 were interpreted without the use of formal statistical contrasts (including single samples from June and August 2019 to 2024). Zooplankton tissue quality data from each sampling event in 2024 (June, July, and August) were screened against the British Columbia selenium guideline for the protection of aquatic life (for invertebrate tissue) of 4 mg/kg dw (BCMOE 2014).

Replicated zooplankton tissue quality data from July were summarized by area by calculating sample size, mean, SD, minimum, median, and maximum. Summary statistics were calculated using the K-M method as described in Section 3.8.3.1.

Statistical analyses of analyte concentrations in zooplankton tissues were conducted using replicated data (i.e., data from July 2019 to 2024) to answer the following questions:

1. Have mean analyte concentrations at the exposed area changed relative to the reference area?
2. Were there differences in mean analyte concentrations between exposed and reference areas, and does the difference depend on year?

To answer these questions, data were grouped into two categories for separate tabular and graphical presentation and statistical analyses:

1. Polley Lake (POL-P2; exposed) compared to Bootjack Lake (BOL-B2; reference).
2. Quesnel Lake exposed area (QUL-ZOO-1) compared to an un-impacted reference (QUL-ZOO-7).

Question 1 was answered by conducting a two-way ANOVA assessing the relative differences between exposed and reference areas, with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year* (as described in Section 3.1.3.2). Due to the prevalence of analyte results which were below the LRL, the two-way ANOVA was completed with Maximum Likelihood Estimation (MLE) using a censored regression, assuming a lognormal distribution. If the *Area*×*Year* interaction term was significant (α = 0.05), then the concentrations from the exposed area relative to the reference area differed among years. In this case, pairwise contrasts among years were completed to compare the relative difference in means (in log-units) between areas among years. Letters were assigned such that the year with the greatest relative difference between exposed and reference areas was assigned the letter “A” and years that do not differ significantly (α = 0.05) share a letter. When the *Area*×*Year* interaction term was not significant (α = 0.05), the differences between areas were consistent among years and no relative contrasts were conducted.

Temporal changes in the relative difference between exposed and reference areas were quantified by calculating a MOD as described in Section 3.1.2.3, but back-transformation for natural logarithms (rather than $\log_{10}$).. This MOD was also expressed as a percent change as:

$$MOD = \frac{exp\hat{}\bar{x}_{Exposed\ Observed} - exp\hat{}\bar{x}_{\text{Exposed } Predicted}}{exp\hat{}\bar{x}_{\text{Exposed } Predicted}} \times 100\%$$

where $\bar{x}_{Exposed\ Observed}$ is the mean for the exposed area (in log units) for the given year and $\bar{x}_{\text{Exposed }Predicted}$ is the predicted mean (log units), assuming the relative difference between the exposed area and reference area did not change from the baseline year (i.e., $\bar{x}_{\text{Exposed }Predicted} = \bar{x}_{\text{Reference}} + \left(\bar{x}_{\text{Exposed B}aseline} - \bar{x}_{\text{Reference B}aseline}\right)$).

Question 2 was answered using the results of the two-way ANOVA. When the *Area×Year* interaction term was significant (α = 0.05), contrasts were conducted for each year to compare the exposed and reference areas. When the *Area×Year* interaction term was not significant, (i.e., the difference between areas did not depend on year) the area comparison was assessed using the *Area* term of the two-way ANOVA. For significant interactions, the MOD between the exposed area and reference area was calculated in each year as:

$$MOD = \frac{exp\hat{}\bar{x}_{Exposed} - exp\hat{}\bar{x}_{\text{Reference}}}{exp\hat{}\bar{x}_{\text{Reference}}} \times 100\%$$

where $\bar{x}_{Exposed}$ and $\bar{x}_{Reference}$ are the exposed and reference area means (in log units), respectively. When the interaction term was not significant the MOD between reference and exposed areas was calculated across all years combined.

Statistical comparisons were completed for all available analytes; however, data interpretation focused on primary and secondary analytes (see Table 2.4). Plots of data from July 2019 to 2024 that support the two-way ANOVA were presented for primary and secondary analytes that: 1) had a significant *Area×Year* interaction in the analyses and had a positive MOD for 2024 (i.e., exposed concentrations were significantly higher than reference) or negative MOD for 2024 (i.e., exposed concentrations were significantly lower than reference) ; and 2) lacked a significant *Area×Year* interaction in the analyses but had a positive overall MOD (i.e., exposed concentrations were significantly higher than reference and the difference did not depend on year). Concentrations of primary and secondary analytes from all seasons from 2014 to 2024 were also plotted to allow qualitative comparison among seasons and qualitative temporal comparison of results. Years with more than 50% of the data reported below the LRL for both the exposed and reference areas were excluded from the analysis. All statistical comparisons and plots were completed using R (R Core Team 2024).

Routine water quality monitoring data collected by Mount Polley between 2015[17] and 2024 in Polley Lake, Bootjack Lake, and Quesnel Lake were used to aid in tissue quality interpretation and to evaluate if water quality has changed temporally. The evaluation included water quality data collected at the surface of the north and south basin of Polley Lake (POL-P1 and POL-P2, respectively), and from stations QUL-18 (exposed), QUL-2a (exposed), and QUL-120a (reference) of Quesnel Lake (Figure 3.3). Post-breach trends (2015 to 2024) of total and dissolved concentrations of primary and secondary analytes (Table 2.4) were evaluated at these routinely monitored stations using a Seasonal Kendall test (as described in Section 3.8.3.4) and were also graphically compared to approved and working British Columbia Water Quality Guidelines (BCWQG; refer to Sections 3.8.3.2 and 3.8.3.3 for details). Results of depth-integrated water quality samples collected concurrently with the zooplankton tissue samples in 2024 were also compared to BCWQG (for details, refer to Section 3.8.3.2).

3.5 Benthic Invertebrate Community

Benthic invertebrate community monitoring was completed at deep exposed areas of Quesnel Lake and Polley Lake (and associated reference areas) between 2022 and 2024. In deep exposed areas of Quesnel Lake and Polley Lake (and associated references), post-breach benthic invertebrate community monitoring was initiated in 2014 and has been completed at least every three years since 2018 (Figures 3.1 and 3.2, Table 3.7), in accordance with the CEMP (MPMC 2019). Although not required by the CEMP (MPMC 2019), benthic invertebrate community has been monitored annually at the deep near-field area of Quesnel Lake (QUL-PNF) since 2018 for evaluation of monitored natural recovery (Table 3.7).

In Polley Lake, benthic invertebrate community monitoring in 2024 included two deep monitoring areas (POL-P1 and POL-P2) and an associated deep reference area in Bootjack Lake (BOL-B2); sampling at these areas last occurred in 2021 (Figure 3.1, Table 3.7). In Quesnel Lake, benthic invertebrate community monitoring in 2024 included three deep areas (approximately 80 to 100 meters depth), with one near-field area (QUL-PNF), one far-field area (QUL-PFF1), and one reference area (QUL-PREF1). The benthic invertebrate community at QUL-PNF has been monitored annually for the past seven years (2018 to 2024) for the evaluation

[17] Routine water quality data prior to 2015 are available for Polley Lake, Bootjack Lake, and Quesnel Lake but were excluded from plots and statistical analyses to distinguish between short-term effects from potential long-term effects of the breach on water quality trends analysis in these waterbodies. The exclusion of data prior to January 2015 was based on the rationale explained in Minnow (2019a). Briefly, laboratory turbidity data resulting from the suspension of fine particulate matter immediately after the breach were used to qualitatively identify a “breach” period (i.e., a period characterized by short-term effects on water quality). By late 2014, laboratory turbidity had decreased to values more similar to pre- breach. Based on these results, the 'breach” period was defined as beginning on August 4, 2014, and ending in December 2014. Therefore, use of data starting in January 2015 should be effective in excluding short-term breach effects on water quality.

Table 3.7: Overview of Benthic Invertebrate Community Monitoring in Lakes in the Vicinity of the Mount Polley Mine, 1989 to 2024[a]

Waterbody		Area Type	Area Code	Pre-Breach				Post-Breach												
				1989[b] (Imperial Metals 1990)	1995 (HKP 1996)	1996 (HKP 1997)	1999 (Beak 2000)	2014 (Minnow 2015a)	2015 (Minnow 2016a)	2016 (Minnow 2016d)	2016 (Minnow 2017a)	2018 (Minnow 2019a)	2018 (Minnow 2019c)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)	2021 (Minnow 2022c)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Polley Lake	Deep	Exposed	POL-P1 (P1 in 1995 to 1999)	-	10[c]	10[c]	3	3	-	-	5	5	-	-	-	5	-	-	-	5
			POL-P2 (P2 in 1989 to 1999)	1	10[c]	10[c]	3	3	5	-	5	5	-	-	-	5	-	-	-	5
Bootjack Lake	Deep	Reference	BOL-B2 (B2 in 1989 to 1999)	1	9[c]	10[c]	3	3	3	-	5	5	-	-	-	5	-	-	-	5
Quesnel Lake	Deep	Exposed (Effluent-Exposed)	QUL-EEMEXP[e]	-	-	-	-	-	-	5	-	-	5	-	-	-	5	-	-	5
		Reference (Unimpacted)	QUL-EEMREF1[e]	-	-	-	-	-	-	5	-	-	5[d]	-	-	-	5	-	-	5
		Reference (Impacted)	QUL-EEMREF2[e]	-	-	-	-	-	-	-	-	-	5[d]	-	-	-	5	-	-	5
		Exposed (Near-Field)	QUL-PNF	-	-	-	-	5	5	-	5	5	-	5	5	5	-	5	5	5
		Exposed (Far-Field)	QUL-PFF1	-	-	-	-	5	-	-	5	5	-	-	-	5	-	-	-	5
		Reference	QUL-PREF1	-	-	-	-	5	5	-	5	5	-	5	-	5	-	-	-	5

Notes: Displayed monitoring efforts used the following sampling methodology: petite-ponar grab sampler, 5-grab composite, 250 µm sieve, LPL (Lowest Practicable Level) taxonomy, except where noted otherwise.

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] In 1989, each sample was a single grab sieved using 355 µm mesh (Imperial Metals 1990). In 1995 and 1996, each sample was a single grab sieved using 200 µm mesh (HKP 1996, 1997). In 1999, each sample was a composite of 3 grabs, and was sieved using 200 µm mesh (Beak 2000).

[c] Five replicate samples were collected in Spring, and five were collected in Fall (with the exception of 6 replicates collected in Fall 1995 at B1, and 4 replicates collected in Fall 1995 at B2). Data from the Fall 1996 collection are unavailable due to loss of the samples at the taxonomic laboratory (HKP 1997).

[d] Results were also reported for the 500 µm sieve fraction by the laboratory.

[e] Areas are associated with effluent discharged-related monitoring under the Metal and Diamond Mining Effluent Regulations [MDMER] Environmental Effects Monitoring [EEM]). QUL-EEMEXP represents and effluent-exposed area, QUL-EEMREF1 represents a non-breach-influenced reference area, and QUL-EEMREF2 represents a breach-influenced reference area.

of monitored natural recovery. Prior to 2024, the other deep areas (QUL-PREF1 and QUL-PFF1) were last monitored in 2021 (Figure 3.2, Table 3.7).

Benthic invertebrate community was also documented in deep areas of Quesnel Lake in 2024 as part of Phase 4 EEM under the MDMER of the federal *Fisheries Act*. Three deep areas were evaluated as part of EEM; one exposed (QUL-EEMEXP) and two reference areas (QUL-EEMREF1 [non-breach-influenced], and QUL-EEMREF2 [breach-influenced]). Results for the Phase 4 EEM are due in a separate report in October 2025, therefore methods and results for this monitoring are not included in the present report. Prior to 2024, benthic invertebrate community monitoring in support of the Phase 3 EEM was completed in 2021 (Table 3.7; Minnow 2022c).

Sample collection and analysis methods for 2024 are described herein (excluding those related to the Phase 4 EEM) and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, refer to the references listed in Table 3.7.

3.5.1 Sample Collection

Benthic invertebrate community samples were collected from deep areas of Polley Lake (and reference; Bootjack Lake) and from deep areas of Quesnel Lake between August 19 and 24, 2024 (Appendix Table A.1.1). Five replicate stations were sampled within each monitoring area (Figures 3.1 and 3.2, Table 3.7) to provide adequate statistical power to detect differences of ± two SDs at α and β of 0.10. One sample was collected at each replicate station. To ensure that the sample was representative of the station, each single sample was a composite of five sub-samples (grabs; 0.116 m^2 of bottom area in total).

Samples were collected using a stainless-steel Petite Ponar grab sampler according to methods consistent with provincial (BCMOE 2013) and federal (Environment Canada 2012b) guidance and with previous monitoring (see Table 3.7). Samples were collected from each station using the ponar sampling methods described in Section 3.1.1. Upon retrieval, grab samples were closely examined to verify that only high quality, comparable samples were retained. Each grab was placed into a tub to evaluate whether the grab was complete (i.e., that the grab captured the surface material and was full to each edge), to evaluate the depth to which the grab penetrated, and to verify consistency in terms of particle size, organic matter, and the presence or absence of plants or algae. Incomplete or unusual grabs were discarded. Acceptable grab samples were rinsed from the ponar into a plastic tub to ensure the complete removal of all material from the grab sampler. This grab sampling method was repeated until five acceptable grabs were collected at a given station.

At each replicate station, the composite sample of five grabs was placed into a 250 µm mesh sieve bag and sieved free of all material less than 250 µm in diameter. After sieving, the retained material (sample) was carefully transferred into one or more pre-labelled 1 L wide mouth plastic jars using a wash bottle. The transfer was completed while working over a plastic tub to avoid any potential loss of organisms. Any organisms that fell into the tub or adhered to the sieve bag were removed and added to the sample. Each sample was then preserved with buffered formalin solution to achieve a nominal concentration of 10% and stored at room temperature until shipment to the laboratory.

Supporting measures were collected at each sampling station, including *in situ* water measures, Secchi depth, and supporting sediment measures (see Section 3.1). Refer to Section 3.8.1 for additional details about supporting measures.

3.5.2 Laboratory Analysis

Taxonomic identification of the benthic invertebrate community samples was completed by Cordillera Consulting (lead taxonomist Scott Finlayson), in Summerland BC, using standard methods that incorporate QA/QC measures (e.g., Environment Canada 2012b, 2014). Taxonomists at Cordillera have achieved Level 2 certification by the Taxonomic Certification Program of the Society for Freshwater Science (formerly the North American Benthological Society), including certification for Group 1 (general Arthropods East/West), 2 (Ephemeroptera, Plecoptera and Trichoptera [EPT] East/West), 3 (Chironomidae East/West), and 4 (Oligochaeta) benthic organisms. Organisms were identified to the LPL (typically genus or species) using up-to-date taxonomic keys.

Upon arrival, each benthic sample was logged into proprietary software and inspected for leaks, damage, and correct preservation, before the addition of Rose Bengal dye. A sample receipt confirmation was then sent to Minnow. Sample processing was initiated with sample washing, including elutriation to remove sand and gravel (as applicable). The remaining organic material was then examined to estimate the total number of invertebrates and preserved in 70% ethanol. If the estimated number of invertebrates was greater than 600 individuals and the sample was fine and non-clumping, a sub-sample was taken using a Marchant Box (Marchant 1989) as described by Environment Canada (2014). All samples were sieved and processed in the laboratory using the same mesh size as used in during field collections (250 µm).

Samples (or sub-samples) were sorted using a gridded Petri dish under a low power stereo microscope into family/order while maintaining counts (counts excluded Porifera, Nemata, Platyhelminthes, Ostracoda, Copepoda, Cladocera, and any terrestrial drop-ins). When specimens were broken, only heads were counted towards the total, and larval and pupal exuviae were not counted. All samples were processed to a minimum 300 organism count. If the

300th organism was found part way through counting a cell, the entire cell was completed, and if 300 organisms had not been reached by the 50th cell of the Marchant Box, then the entire sample was sorted. All sorted organisms were stored in labeled vials containing 80% ethanol, separated by family/order, while debris was preserved and labeled separately.

Insects were identified to the genus/species level and non-insects were identified to, at minimum, family level and to the genus/species level where possible. Identification was completed by experienced, certified taxonomists using standard keys. Taxonomists made comparisons to an externally verified reference collection, and to Standard Taxonomic Effort lists compiled by the Canadian Aquatic Biomonitoring Network (CABIN), Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT), and Pacific Northwest Aquatic Monitoring Partnership (PNAMP) to ensure accuracy. Following identification, newly identified representative specimens of each taxon were placed in separate vials to update an ongoing reference collection.

Laboratory QA/QC included an assessment of sub-sampling precision and accuracy, sorting efficiency, and taxonomic identification accuracy on at least 10% of the samples (Environment Canada 2012b, 2014). Data were entered into proprietary software (INSTAR1), which was also used to calculate benthic invertebrate community metrics and to generate the taxonomic report. Data were provided to Minnow as a Microsoft Excel spreadsheet along with a methods and QA/QC report as an Adobe Acrobat PDF file (Appendix G).

3.5.3 Data Analysis

Upon receipt of the analytical data, a DQR was performed, including an examination of data completeness, organism sorting efficiency, sub-sampling precision and accuracy, and taxonomic identification error (see Appendix B). Following completion of the DQR, benthic invertebrate community results were analyzed as described below.

3.5.3.1 Metrics

Benthic invertebrate community condition was evaluated using metrics of organism density (organisms/m^2), taxon richness (No. of taxa), Simpson's Diversity and Evenness, and the relative density (%) and density (organisms/m^2) of dominant taxa groups. These endpoints were calculated at the LPL of taxonomy. Benthic invertebrate community results at the LPL taxonomy level can contain a mixture of taxonomic levels (e.g., species, family, order, and class), which can affect the calculation of metrics such as taxon richness and Simpson's diversity. To address this issue, a decision key was applied to the benthic invertebrate data to reassign taxon abundance across levels of taxa, while conserving the relative abundances within the higher taxon levels (see Appendix E.4 text and Appendix Figure E.4.1 for details). Several taxa were excluded from total organism counts by the laboratory (see Section 3.5.2) prior to application of the decision key

and endpoint calculation. Rare members of the benthic invertebrate community for which the level of identification was insufficient to determine whether the individual was a member of the aquatic or terrestrial community were also excluded.

Evaluation of the benthic invertebrate community at Polley Lake (and reference; Bootjack Lake) included comparison to samples collected at the same sampling locations in 1999 (pre-breach; Beak 2000). It should be noted that some caution must be applied to the interpretation of post-breach results relative to pre-breach results. This is due to the challenges presented using different laboratories for the taxonomic analyses of samples (i.e., different laboratories for pre-breach and post-breach sample analyses) and the large time span between data collection in 1999 versus 2024 (over which general improvements in laboratory protocols and higher-level taxonomic changes may have occurred). A major difference between the taxonomic analyses performed by the different laboratories was the use of CABIN protocol (Environment Canada 2012a) for processing of post-breach samples (2014 to 2024). CABIN protocol excludes enumeration of the taxa outlined in Section 3.5.2 while these taxa were enumerated for pre-breach (1999) samples. Therefore, these taxa were not included in the present analyses in accordance with CABIN protocol (Environment Canada 2012a). In addition, aquatic mites were not identified past Arachnida in 1999; therefore, aquatic mite data in all post-breach results were collapsed to Arachnida. The collapsed and merged pre-breach and post-breach data were used for calculation of benthic invertebrate community metrics as described above.

Following taxa exclusions, application of the decision key, and the collapsing of taxonomic data to maintain consistency among years, the metrics outlined above were calculated for all years included in the evaluation (1999 to 2024; Table 3.7): organism density, taxon richness, Simpson's Diversity and Evenness (calculated as in Smith and Wilson 1996; Environment Canada 2012b). The densities and relative densities (%) of dominant/indicator taxa were also calculated. Dominant/indicator taxa were defined as those groups representing more than 5% of total organism abundance within each set of data, or any taxon groups considered to be important indicators of environmental stress. The benthic invertebrate community metrics were calculated and summarized for each year using the following statistics: sample size, mean, median, minimum, maximum, and SD.

Correspondence Analyses (CA; a multivariate ordination method) was used to further examine spatiotemporal differences benthic invertebrate community structure in the deep lake monitoring areas. Specifically, data were evaluated in two separate CAs; one using all years of data (1999 to 2024) from deep Polley Lake areas (POL-P1, POL-P2) with Bootjack Lake serving as reference (BOL-B2), and one using all years of data (2014 to 2024) from deep exposed

(QUL-PNF, QUL-PFF1) and reference (QUL-PREF1) areas of Quesnel Lake. Correspondence Analysis is a multivariate ordination method that is used to reduce complex multivariate data into a smaller number of independent variables (Gauch 1982; Pielou 1984). The analysis extracts theoretical values (CA axis scores) that capture the variation in the abundance of benthic invertebrate taxa. The CA produces axis scores for each deep station in each year (with available data) as the sum of a weighted average of $ln_{(x+1)}$-transformed species densities (#/m^2). Taxa scores are also produced as the sum of weighted averages of their densities across stations and years. The structure of the data can then be depicted in scatter plots of one CA axis against another, showing both taxa and station scores. Taxa that tend to co-occur plot together and those that rarely co-occur plot farther apart. Similarly, years at the deep areas that share many taxa plot closer to one another, while those with few in common plot further apart. Thus, CA can be used to describe which benthic invertebrate taxa best accounts for observed differences in the overall benthic invertebrate community between years and/or areas. The CA analysis was conducted at the LPL of taxonomic organization using $ln_{(x+1)}$-transformed density data. CA is sensitive to the presence of rare taxa (Legendre and Legendre 1983; Poos and Jackson 2012). Taxa occurring in fewer than 1% of samples or those that made up less than 1% of the total abundance of each dataset were excluded from the analysis (Dolédec and Chessel 1991). The ordination was conducted using the cca() function in the vegan package (Oksanen et al. 2020) of R statistical software (R Core Team 2024). Results of the CA were summarized by sampling station and year using the following statistics: sample size, mean, median, minimum, maximum, and SD. Taxa with the highest magnitude weights on the CA axes were identified and used in interpretation of the separation of stations on the CA axes.

3.5.3.2 Statistical Analysis

Statistical analyses of benthic invertebrate community data were conducted using pre-breach data (where available) and post-breach data (i.e., 2014 to 2024) to answer the following questions:

1. Were there differences between the benthic invertebrate community of exposed and reference areas in 2024?
2. Has the benthic invertebrate community of exposed areas changed among years relative to changes at reference areas over this time, and where pre-breach data exist, has the community recovered to pre-breach conditions?

To answer these questions, data were grouped into two categories for the separate calculation of community metrics, tabular and graphical presentation, and statistical analyses:

1. Polley Lake (POL-P1, POL-P2) compared to reference (Bootjack Lake; BOL-B2).

2. Quesnel Lake exposed areas (QUL-PNF, QUL-PFF1) compared to an un-impacted reference (QUL-PREF1).

The statistical analyses were completed following the methods outlined in Section 3.3.3.1.2. For Polley Lake (and reference; Bootjack Lake), this included evaluation of post-breach results from 2014 to 2024 as well as pre-breach data (1999; Table 3.7). For Quesnel Lake, this included evaluation of post-breach results from 2014 to 2024 since no pre-breach data exist (Table 3.7).

Interpretation of benthic invertebrate community metrics was enhanced by inspection of raw data and taxonomic proportions to detect patterns of ecologically relevant spatial and temporal differences. Ecological and habitat requirements of benthic invertebrates, as outlined in standard references (Clarke 1981; Edmunds et al. 1976; Weiderholm 1983; Wiggins 1996; Vieira et al. 2006; Merritt et al. 2008) were also used in data interpretation. All statistical comparisons were conducted using R (R Core Team 2024). Statistically significant differences in benthic invertebrate community between areas were identified using an α of 0.1 (as used for evaluation of all biological data in this report). Significant differences with a MOD that exceeded ±2 SD/MAD were identified as potentially ecologically meaningful in statistical analyses results and in data interpretation (Environment Canada 2012b[18]), although all statistically significant differences (e.g., including those with a MOD < ±2 SD/MAD) were discussed in the data interpretation. Densities and relative densities (%) of major benthic invertebrate groups were plotted as stacked bar charts. Benthic invertebrate community metrics were plotted to support the two-way ANOVA results. Untransformed data were plotted for ease of interpretation and plots were generated using R (R Core Team 2024).

Potential relationships between benthic invertebrate community metrics and physical and chemical conditions of the monitoring areas were explored using correlation analysis as part of causal assessment. Correlation analyses were completed separately for the two data categories outlined above: 1) deep areas of Polley and reference (Bootjack Lake; 1999 to 2024) and 2) deep areas of Quesnel Lake (2014 to 2024). Although correlation is not causation, it is a fundamental tool applied for exploring data and generating evidence of causation (Shipley 2000, Suter 2015). Benthic invertebrate community metrics (including CA axis scores) were compared to environmental variables including physical measures (station depth), bottom *in situ* water quality measures (temperature, dissolved oxygen, pH, and specific conductance), physical/ chemical sediment measures (% fines and TOC content), sediment Analyte of Interest concentrations (see Section 3.1.3.1 for details), and sediment chemistry PCA axis scores (see Section 3.1.3.2 for details). Following derivation of correlation coefficients using Spearman's

[18] Environment Canada (2012b) identifies a CES of ± 2 SDs for evaluating ecologically meaningful changes in benthic invertebrate community.

Rank correlation, a Bonferroni-type correction (i.e., α [0.05] divided by the total number of independent variables) was applied to minimize the risk of declaring false positive correlations.

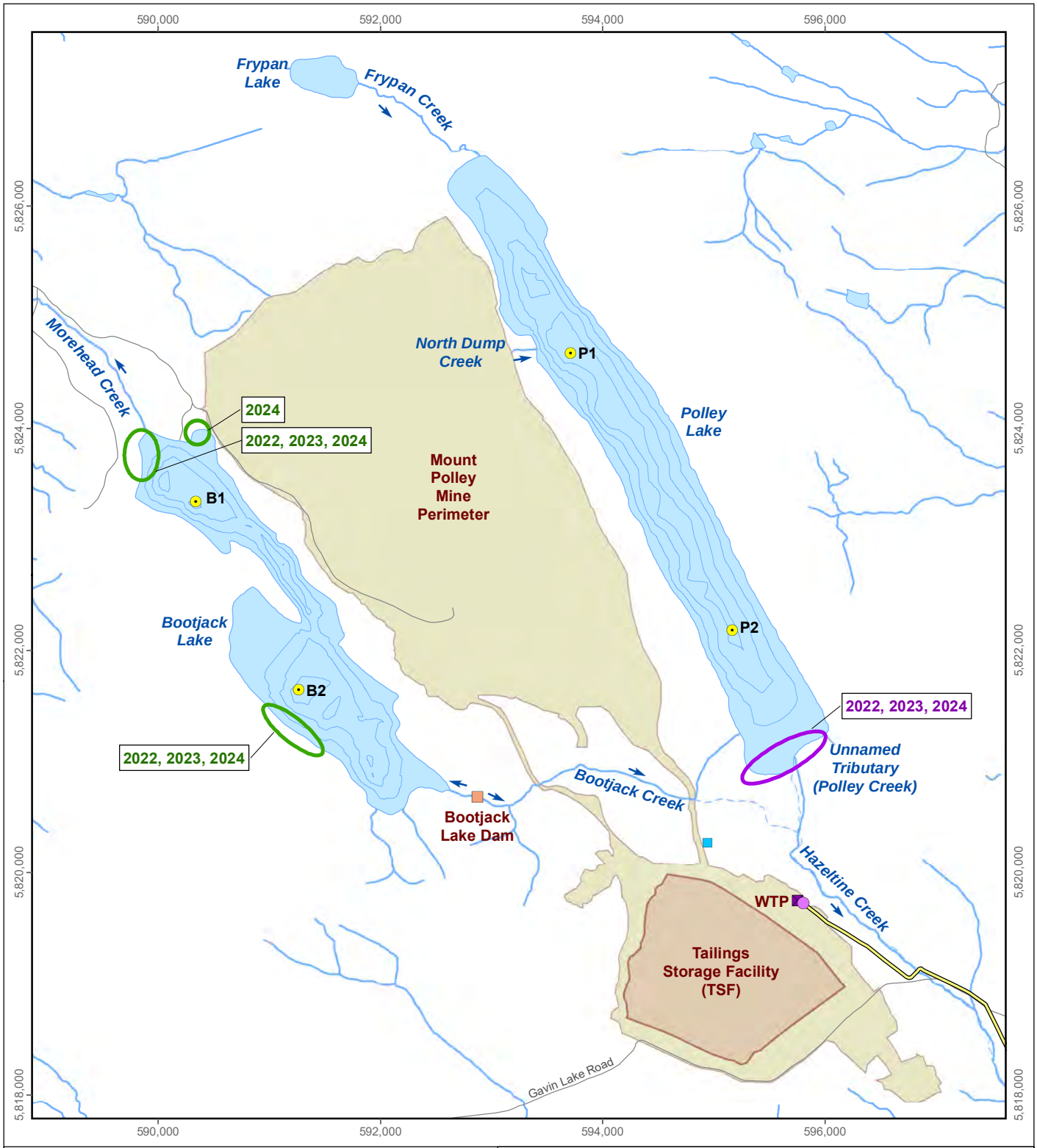
Statistically significant correlations found at the Bonferroni-adjusted p-value were further investigated using scatter plots to determine if a continuous distribution of data was realized (possible causal relationships) or if these relationships were leveraged by outlying points (or groups of points). The effects of leverage were carefully considered because any differences in benthic community attributes observed at the exposed areas relative to reference, or temporal differences at the exposed area, might be correlated with breach-related differences in water or sediment quality regardless of cause. Leverage is a particularly important consideration in cases where substantially impacted areas are compared to unimpacted reference areas, because physical, chemical, and biological features may all be impacted and relationships among them may not actually indicate a cause other than "they were all impacted." Statistically significant correlations, coupled with careful examination of scatterplots, were used to identify the factors that most contribute to temporal and spatial variability in benthic invertebrate community endpoints. These factors were then evaluated with consideration of known physical and chemical influences on benthic invertebrate communities (e.g., limitation due to low nutrient availability, toxicity by exposure to high analyte concentrations).

3.6 Fish Catchability, Usage, and Population Health

3.6.1 Overview

Fish population health monitoring in Polley Lake was completed annually from 2022 to 2024, consistent with the CEMP (MPMC 2019). This monitoring was initiated in 2014, revised to incorporate a standardized monitoring approach in 2019 (Minnow 2020a), and has continued annually from 2019 to 2024 (using the standardized monitoring approach), in accordance with the CEMP (MPMC 2019). The objective of fish population health monitoring is to continue to document population structure and abundance, provide an estimate of Young-of-the-Year (YOY) survival in Polley Lake, and to assess the success of remediation efforts in Hazeltine Creek. A brief background and summary of historical findings of this monitoring is provided below.

Historically, the majority of Polley Lake rainbow trout (*Oncorhynchus mykiss*) recruitment was supported by spawning and rearing in Hazeltine Creek and lower Bootjack Creek, downstream of Polley Lake (Bruce and Slaney 1991). Following the breach, both Hazeltine Creek and Bootjack Creek were inaccessible to Polley Lake fish and spawning and juvenile rearing habitat for the Polley Lake rainbow trout population was limited to Frypan Creek and a few unnamed intermittent tributaries around the lake (Figure 3.4). Production of rainbow trout fry from these creeks was insufficient to sustain the historical rainbow trout population within Polley Lake (Minnow 2018d).



LEGEND

- Routine Water Monitoring Station
- Exposed Area
- Reference Area
- Water Treatment Plant (WTP)
- Effluent Mixing Tank
- Central Collection Sump
- Effluent Discharge Pipeline (January 2018 to present)
- Historic Watercourse

Fish Tissue Quality Monitoring Areas, Polley and Bootjack Lakes, 2022 to 2024

0 0.5 1 2 km

Projection: North American Datum 1983 UTM Zone 10U

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Figure 3.4

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 3\24-04 Figure 3.4 Fish Tissue Quality Monitoring Areas, Polley and Bootjack Lakes, 2022-2024.mxd

Post-breach monitoring in Polley Lake was initiated in 2014 to assess the impact of the breach and monitor the health of fish populations (particularly rainbow trout and longnose sucker [*Catostomus catostomus*]) over time. Notably, age- and size-frequency distributions for rainbow trout caught in 2016 indicated that far fewer age-1 and age-2 individuals were captured than in 2014 (Minnow 2017c) and an absence and near absence of age-1, age-2, and age-3 fish was reported in 2017 and 2018, respectively (Minnow 2018d, Minnow 2019a). This is indicative of limited recruitment associated with Hazeltine Creek being inaccessible for spawning and rearing from 2014 to 2017.

After remediation efforts in Hazeltine Creek were completed in the fall of 2017, fish from Polley Lake were allowed access to the upper two reaches of Hazeltine Creek (Reach 1: HAC-R1, and Reach 2: HAC-U [HAC-R2]) on April 26, 2018, and subsequently to the entire length of Hazeltine Creek on October 7, 2020 (Minnow 2019b, 2020b, 2021b).[19] Following re-establishment of fish access to upper Hazeltine Creek in 2018, fish population monitoring has been completed twice a year in Polley Lake (spring and fall). Sampling efforts in spring target adult fish aggregating before spawning (also targeted for tissue quality sample collection), whereas fall fishing efforts are randomized using standard effort to provide interannual comparisons of fish population structure and abundance in Polley Lake. Monitoring conducted in the spring in Polley Lake showed that rainbow trout catch-per-unit-effort (CPUE) was higher in 2019 than in 2018 and 2017 but substantially lower than in 2016. Rainbow trout CPUE in the spring subsequently decreased from 2019 to 2021 (consistent with loss of recruitment and natural mortality of older fish since the breach) before increasing in 2022 and 2023 to the highest point since 2016 suggesting that most of the remaining 2018 and a portion of the 2019 cohort had reached maturity.

Monitoring conducted in the fall in Polley Lake, when fishing is randomized, showed rainbow trout CPUE that was higher from 2019 to 2021 than in 2016 and 2018 (with the highest CPUE documented in 2021; Minnow 2023a). This was driven mostly by the higher relative abundance of smaller rainbow trout in catches (YOY to age-2 based on predicted length-at-age from a linear model) resulting from successful recruitment of rainbow trout to Polley Lake and overwintering survival. In 2022 and 2023, CPUE declined relative to the previous three years,

[19] High water levels associated with the spring freshet in May 2020 caused flooding that enabled adult rainbow trout to bypass the fish fence located at the downstream extent of HAC-U and access the creek downstream (Minnow 2021b). In response, MPMC extended monitoring to include Reach 3 of Hazeltine Creek (HAC-R3) in the 2020 Hazeltine Creek Monitoring Program (Minnow 2021b). On July 4, 2020, the fish fence at the downstream extent of HAC-U was moved to lower Hazeltine Creek (in the vicinity of HAC-D). On October 7, 2020, the fish fence in lower Hazeltine Creek was removed (following completion of remediation works in this area), and fish were allowed access to the entire length of Hazeltine Creek. The entirety of Hazeltine Creek remained accessible to fish from October 2020 until present, except for a brief period (July to August 2021) when lower Hazeltine Creek was inaccessible during the completion of final instream remediation works in this area (Minnow 2022b).

but rainbow trout catches included a higher relative frequency of age-2 and older (age-2+) fish and a size class distribution more closely resembling 2016, signaling the successful recruitment of older age classes. Further, since 2019 when catches provided strong evidence of successful recruitment of the 2018-year class, annual monitoring data has been characterized by good year to year survival of this cohort as well as the successful recruitment of subsequent cohorts through to 2022 and 2023 (Minnow 2023a, 2024a).

Sampling methodologies for fish surveys completed in 2024 are described herein and were consistent with fish surveys conducted annually since 2018, and consistent with the CEMP (MPMC 2019). The methods associated with monitoring of fish population structure and abundance in Polley Lake prior to 2018 are described elsewhere (MPMC 2019; Minnow 2019a). In 2024, the spring survey was completed in April/May in Polley Lake with Bootjack Lake serving as reference (April 23 to May 2, 2024; Appendix Table C.6.1), and the fall survey was completed in Polley Lake in September (September 24 to 29, 2024; Appendix Table C.6.2). The spring survey served two purposes: 1) to provide data for the evaluation of fish population structure and abundance in Polley Lake; and 2) to provide data for the evaluation of fish tissue quality in Polley Lake compared to reference (Bootjack Lake; see Section 3.7). The fall survey served to provide complementary interannual comparisons of fish population structure and abundance in Polley Lake.

Fish sampling described herein was conducted under BCMOWLRS Fish Permit WL24-846725.

3.6.2 Spring Survey

The spring survey was initiated shortly after ice-out in Polley and Bootjack lakes (i.e., April 16, 2024) in Polley Lake (and a similar date in Bootjack Lake). Ice cover, water temperature, and/or fish “homing” to natal streams (e.g., Hazeltine Creek or Bootjack Creek which is currently diverted directly into the south-west end of Polley Lake; Figure 3.4) were closely monitored by mine staff to support the timing of program commencement. Initial fish aggregation in Hazeltine Creek was observed by mine staff on April 9, 2024.

Spring fishing was conducted from April 23 to May 2, 2024 using seven hoop net sets in Polley Lake and twenty in Bootjack Lake (2.5-foot diameter, 1.5-inch stretched mesh; Appendix Table C.6.1). Hoop nets were set for one to two nights and targeted key spawning areas such as the outflow to Hazeltine Creek (for Polley Lake) and small tributary streams of Bootjack Lake to capture individuals that were ready to spawn (Figure 3.4).

For each hoop net set, the level of sampling effort was recorded (i.e., set duration), along with supporting Global Positioning System (GPS) coordinates. Supporting measures also included vertical depth profiles of *in situ* water quality measures at the two deep basins of each lake

(Polley and Bootjack Lakes; see Section 3.8.1 for details). Captured fish were identified and enumerated to characterize the fish community.

3.6.3 Fall Survey

Fall fishing was conducted in Polley Lake from September 24 to 29, 2024 using seven hoop nets (three 2.0-foot diameter nets [0.8-inch stretched mesh] and four 2.5-foot diameter nets [1.5-inch stretched mesh]). Net set locations were determined *a priori* by dividing Polley Lake into 28 sampling areas (Figure 3.5) and using a random number table to select the sampling area where any given net would be set on a given day. All seven hoop nets were set at the pre-determined locations in Polley Lake and left overnight. The next day, all seven nets were lifted, fish enumerated and/or measured (see Section 3.6.4 for details) and reset at a new pre-determined locations in Polley Lake. This continued for a total of five nights of effort (Appendix Table C.6.2).

For each hoop net, sampling effort (i.e., set duration, configuration), and supporting GPS coordinates were recorded. Supporting measures also included vertical depth profiles of *in situ* water quality measures at the two deep basins of Polley Lake and supporting habitat data (see Section 3.8.1 for details).

3.6.4 Fish Processing

Target species that were captured during the spring and fall surveys were retained for non-lethal evaluation of fork length, total length and weight. Target sample sizes for non-lethal measures were n ≥ 30 per lake (Polley and Bootjack lakes) for rainbow trout and longnose sucker in the spring. In the fall, non-lethal measurements were completed for rainbow trout, longnose sucker, and redside shiner (*Richardsonius balteatus*) from Polley Lake, with target sample sizes of n ≥ 100 fish for longnose sucker and redside shiner. The target sample size was achieved for redside shiner (n = 106) and nearly achieved for longnose sucker (n = 94). For rainbow trout, physical measurements during fall monitoring were targeted from n ≥ 100 of each juvenile and adult fish to ensure collection of measurements from a relatively large sample size across the entire size range of rainbow trout captured. The sample size achieved for rainbow trout (n = 64) was limited by catch results. Prior to the collection of physical measurements, rainbow trout were assigned as juvenile or adult in the field based on the presence (juvenile) or absence (adult) of observable parr marks. This approximation was for field-based determination of maturity only.

Incidental mortalities were disposed of in an approved manner. All other fish were released live immediately following capture. Fish selected for non-lethal sampling were retained in an aerated holding container until the collection of fork length, total length, and body weight measures, then were immediately released. A measuring board was used to measure fork and total length to the

LEGEND

- Hoop Net Location
- Routine Water Monitoring Station
- Fish Sampling Section
- Historic Watercourse

Notes: Shortened hoop net identifiers are shown on this figure for ease of presentation; see Appendix Table C.6.2 for full hoop net identifiers and details.

Randomized Hoop Netting Locations for Fall Fish Population Health Monitoring, Polley Lake, 2024

0 0.5 1 2 Kilometers

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Figure 3.5

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 9\24-04 Figure 3.5 Randomized Hoop Netting Locations for Fall Fish Population Health Monitoring, Polley Lake, 2024.mxd

nearest millimeter. Fresh body weight was measured using Pesola™ spring scales (depending on fish weight). The Pesola™ scales were demarcated at intervals of 1 to 2% of the total scale range, providing an accuracy of ± 0.3% of the fish mass. The Pesola™ spring scale for individual weight measurement was selected so that the fish weight was near the top of the scale's range to ensure that measurements achieved a resolution near 1%.

In April/May, a subset of eight female rainbow trout and longnose sucker from each lake (Polley Lake and Bootjack Lake) were sacrificed for the assessment of condition, tissue quality, and age distribution. See Section 3.7.1 for details of the processing methods for these fish.

3.6.5 Data Analysis

Three endpoints were used to evaluate the health of rainbow trout, longnose sucker, and redside shiner populations from Polley Lake over time (2014 to 2024). First, cumulative relative frequency distributions (CRFD) of fork lengths were used as an indicator of recruitment for each of these three species. Second, weight-at-age was used as an indicator of energy use for rainbow trout and longnose sucker. Third, condition (weight-at-length) was used as an indicator of energy storage for rainbow trout and longnose sucker. The calculation of CRFD included data from the randomized fall surveys only, when fish are not aggregating for spawning (which could influence the CFRD results). Condition and weight-at-age were analyzed separately for spring and fall sampling events (for years and seasons in which the necessary data were collected) and were analyzed for males and females separately (if data on sex was available) or for both sexes combined. For rainbow trout and longnose sucker, condition analyses of data from spring and fall surveys were initially conducted using all fish captured; condition was then analyzed again using only fish with the greatest overlap in size (i.e., fork length) among years. Interpretation of condition analysis results was focused on the tests which included individuals with the greatest overlap in fork length (i.e., those tests that only included fish larger than a given fork length) to ensure interpretation of temporal contrasts were based on the analyses with the most robust and temporally comparable data sets.

Summary statistics (sample size, mean, SD, minimum and maximum value) were calculated separately by area and species for each measurement variable recorded in 2024 (weight, length, and age where available).

3.6.5.1 Weight-at-Age and Condition

Rainbow trout and longnose sucker condition and weight-at-age (females in spring only) were compared among years (i.e., 2016 to 2024 for spring surveys and 2014 to 2024 for fall surveys) using an Analysis of Covariance (ANCOVA) with $\log_{10}$-transformed body weight as the response, Year as a factor, and $\log_{10}$-transformed age or fork length as a covariate.

Significant interactions between the covariate and year (i.e., the assumption of homogeneity of regression slopes among years) in the ANCOVA were assessed using α = 0.1.

When the interaction term was significant, the coefficients of determination (R^2) of the interaction model and parallel slope model were compared to assess whether the slopes were practically significant. Briefly, if the R^2 was >0.8 and within 0.02 between the two models, then the conclusion was that the interaction model and parallel slope models were practically the same (Environment Canada 2012b) and the ANCOVA proceeded with the parallel slope model. Statistical outliers were defined to be observations with Studentized residuals with magnitude > 4 (Environment Canada 2012b) and statistical analyses were completed with these outliers excluded and an inventory of excluded outliers was provided with the analyses results. If the interaction could not be removed by comparison of R^2 values or removal of outliers, the conclusion was that the difference in the response variable between areas was dependent on the covariate values. When the interaction term was not significant it was removed from the model and the parallel slope ANCOVA model was fit.

Statistical comparisons were run as all pairwise contrasts over time. Statistically significant *post hoc* contrasts were identified at α = 0.1 using Tukey's Honestly Significant Difference. The results of the pairwise comparisons among years were expressed using a compact letter system. Capital letters were assigned to years (e.g., A, B, and C) such that years that did not differ significantly share a letter, and the year with the highest mean was assigned the letter "A."

A MOD was calculated for each endpoint in each year relative to the baseline year (defined as the minimum year used in the statistical comparison) as:

$$\text{MOD} = \frac{\bar{x}_{\text{i}} - \bar{x}_{\text{baseline}}}{\bar{x}_{\text{baseline}}} \times 100\% \text{ ,}$$

where $\bar{X}_i$ is the mean of a given year, and $\bar{X}_{Baseline}$ is the mean of the baseline (earliest) year (for ANOVA), or the covariate-adjusted mean (for ANCOVA, without interaction). When an interaction was observed, the MOD was estimated for small and large fish at the minimum and maximum values of the overlap in covariate values between areas using the predicted values of the response variables from the interaction ANCOVA regression model (Environment Canada 2012b). When response variables were $\log_{10}$-transformed, means were reported in the original data units (i.e., anti-logged), equivalent to geometric means.

Weight-at-age and condition were plotted using scatterplots with regression lines separated by year. The statistical analyses and regression model fitting for these endpoints were completed with the outliers excluded (as outlined above) and outliers were identified in plots as symbols with

an "×" through them. All statistical analyses and plots were conducted using R (R Core Team 2024).

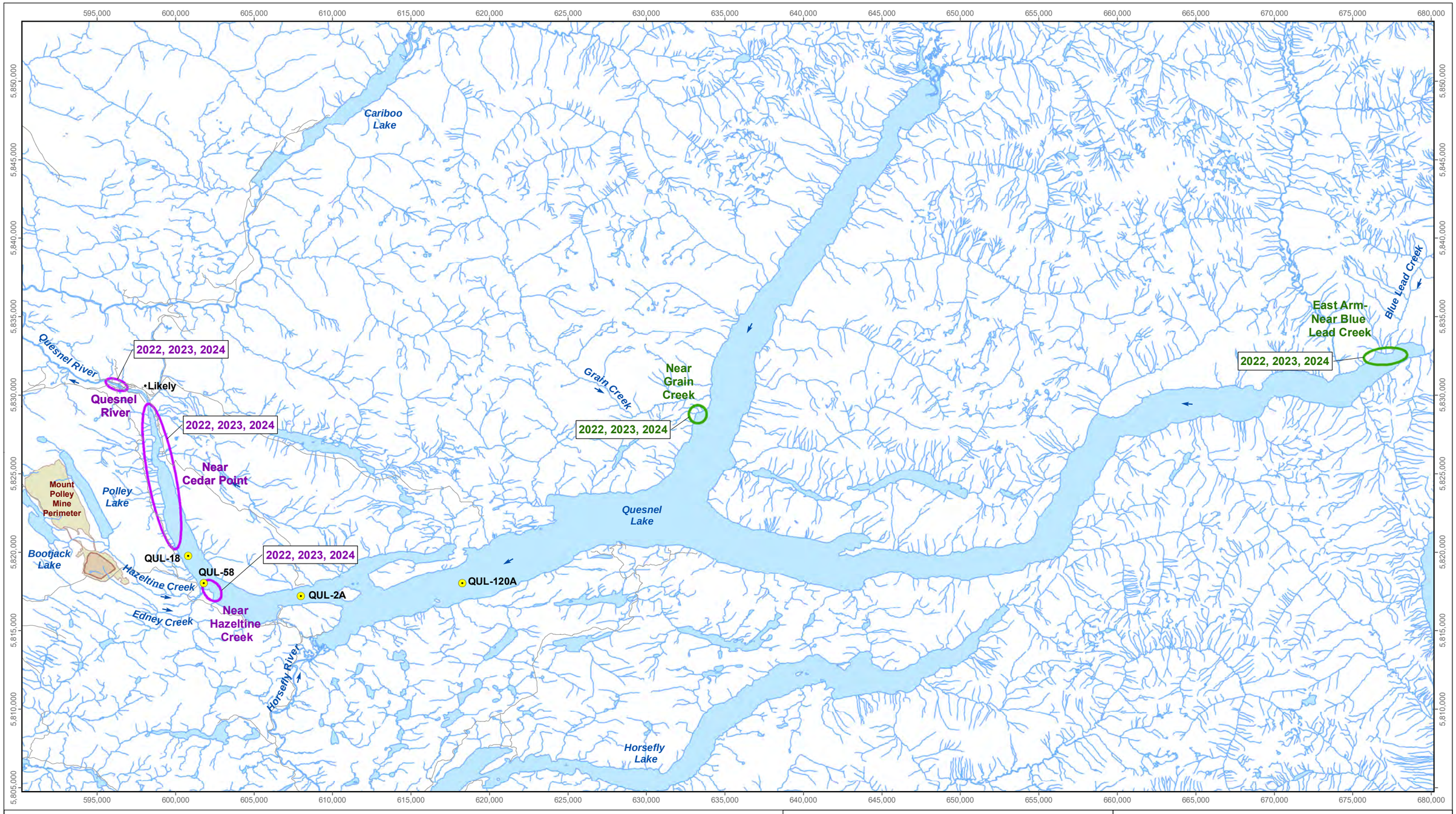
3.6.5.2 Length Frequency Distributions

Length frequency distributions of data from the randomized sampling efforts conducted in the fall were plotted using histograms and CRFD. The CRFD is a plot of the proportion of fish on the y-axis and length on the x-axis and shows the proportion of fish that have a length less than the length value on the x-axis. Statistical comparisons of length frequency distribution between years were conducted using the two-sample Kolmogorov-Smirnov (K-S) test. The two-sample K-S test compares the maximum difference in the CRFDs between areas and evaluates whether this maximum difference varies significantly among years ($p < 0.1$). Estimated fork length for fish at a given age were estimated using a Von Bertalanffy function and plotted above the histograms for reference.

3.7 Fish Tissue Quality

Fish tissue quality monitoring was completed annually between 2022 and 2024 in Polley Lake (with Bootjack Lake serving as a reference), in Quesnel Lake (exposed and reference areas) and in Quesnel River, in accordance with the CEMP (Figures 3.4 and 3.6; MPMC 2019). Post-breach fish tissue quality in Polley Lake (with Bootjack Lake as reference) and Quesnel Lake (exposed and reference areas) was initiated in 2015 and has continued annually since then (Table 3.8). In 2018 the sampling approach was standardized, consistent with the CEMP (MPMC 2019). Since 2018, two fish tissue quality monitoring surveys have been completed annually: a spring survey in Polley and Bootjack lakes and a fall survey in Quesnel Lake and Quesnel River. The spring survey completed annually since 2018 in Polley and Bootjack lakes has targeted one sport-fish species (rainbow trout) and one small home range species (longnose sucker; Figure 3.4, Tables 3.8 and 3.9). The annual fall survey (late September to early October) completed annually since 2018 has targeted two small home-range species (northern pikeminnow [*Ptychocheilus oregonensis*] and peamouth chub [*Mylocheilus caurinus*]) from Quesnel Lake, and one sport fish species from each of Quesnel Lake and Quesnel River (lake trout [*Salvelinus namaycush*] and rainbow trout, respectively; Figure 3.6, Tables 3.8 and 3.9).

Sample collection and analysis methods specific to 2024 are described herein and are consistent with the CEMP (MPMC 2019). For details pertaining to prior sampling years, refer to the references listed in Table 3.8.



LEGEND

- Exposed Area
- Reference Area
- Routine Water Monitoring Station

0 3.5 7 14 km

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Fish Tissue Quality Monitoring Areas, Quesnel Lake and Quesnel River, 2022 to 2024

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Figure 3.6

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 8\24-04 Figure 3.6 Fish Tissue Quality Monitoring.mxd

Table 3.8: Overview of Fish Tissue Quality Monitoring in Lakes in the Vicinity of the Mount Polley Mine, 2015 to 2024

Time Period	Waterbody or Area	Fish Species (Species Code)	Target Sample Size	Target Tissue(s)[b]
Spring 2015 (Minnow 2017e)	Polley Lake Tributary (Frypan Creek; Exposed)	rainbow trout (RB)	8[a]	muscle, ovary, liver, kidney,
	Bootjack Lake Tributary (Reference)		8[a]	
Fall 2015 (Minnow 2017e)	Quesnel Lake near Hazeltine Creek (Exposed)	burbot (BB), lake trout (LT), largescale sucker (CSU), northern pikeminnow (NSC), peamouth chub (PCC), redside shiner (RSC)	8	muscle, ovary, liver, kidney, or whole-body
	Quesnel Lake near Grain Creek (Reference)	largescale sucker (CSU), peamouth chub (PCC), redside shiner (RSC)	8	muscle or whole-body
	Quesnel Lake East Arm near Blue Lead Creek (Reference)	burbot (BB), lake trout (LT)	8	muscle, ovary, liver, kidney
	Quesnel Lake near Poquette Creek (Exposed)	kokanee (KO)	8	muscle, liver, kidney
	Quesnel River (Exposed)	rainbow trout (RB)	8	muscle, liver, kidney
	Trio Lake (Reference)	rainbow trout (RB)	8	muscle, liver, kidney
Spring 2016	Polley Lake (Exposed)	longnose sucker (LSU), rainbow trout (RB), redside shiner (RSC)	8[a]	muscle, ovary, liver
	Quesnel Lake near Hazeltine Creek (Exposed)	largescale sucker (CSU), northern pikeminnow (NSC), peamouth chub (PCC)	8	muscle and liver, or whole-body
	Quesnel Lake near Grain Creek (Reference)			
Spring 2017 (Minnow 2018e)	Polley Lake (Exposed)	longnose sucker (LSU), rainbow trout (RB)	8	muscle, ovary, liver
	Bootjack Lake (Reference)	longnose sucker (LSU), rainbow trout (RB)	8	muscle, ovary, liver
Fall 2017 (Minnow 2018e)	Quesnel River (Exposed)	rainbow trout (RB)	8	muscle, liver, kidney
	Quesnel Lake near Hazeltine Creek (Exposed)	northern pikeminnow (NSC)	8	whole-body
Spring 2018 to 2024 (Annually; Minnow 2019a, 2020a, 2021a, 2022a, 2023a, 2024a)	Polley Lake (Exposed)	longnose sucker (LSU), rainbow trout (RB)	8	muscle, ovary, liver, kidney
	Bootjack Lake (Reference)	longnose sucker (LSU), rainbow trout (RB)	8	muscle, ovary, liver, kidney
Fall 2018 (Minnow 2019a)	Quesnel Lake near Poquette Creek (Exposed)	kokanee (KO)	8	muscle, ovary (if present), liver, kidney
	Quesnel Lake North Arm near Mitchell River (Reference)	kokanee (KO)	8	muscle, ovary (if present), liver, kidney
Fall 2018 to 2024 (Annually; Minnow 2019a, 2020a, 2021a, 2022a, 2023a, 2024a)	Quesnel Lake near Hazeltine Creek (Exposed)	northern pikeminnow (NSC)	8	whole-body
		peamouth chub (PCC)	8	muscle, ovary (n=2), liver, kidney
	Quesnel Lake near Cedar Point (Exposed)	lake trout (LT)	8[c]	muscle, ovary (n=2), liver, kidney
	Quesnel Lake near Grain Creek (Reference)	northern pikeminnow (NSC)	8	whole-body
		peamouth chub (PCC)	8	muscle, ovary, liver, kidney (n=5 for each tissue type)
	Quesnel Lake East Arm near Blue Lead Creek (Reference)	lake trout (LT)	8	muscle, ovary (n=1), liver, kidney
	Quesnel River (Exposed)	rainbow trout (RB)	8	muscle, ovary (n=5), liver, kidney

Grey shading indicates fish tissue sampling completed in 2024.

[a] The target for these collections was n = 8 ovary samples. For the spring 2015 and 2016 data set, this resulted in more than 8 muscle and liver samples.

[b] The target sample size was achieved in 2024 for each species and tissue unless otherwise indicated. Actual sample sizes that differed from the target sample size in 2024 are indicated in parentheses (e.g., n=5) following each tissue type listed.

[c] The target for these collections was n = 8 samples of each tissue type. For the fall 2019 data set, this resulted in collection of more than 8 muscle, liver, and kidney samples for lake trout.

Table 3.9: Life History and Habitat Preferences of Target Fish Species in Lakes in the Vicinity of the Mount Polley Mine[a]

	Lake Trout (LT)	Longnose Sucker (LSU)	Northern Pikeminnow (NSC)	Peamouth Chub (PCC)	Rainbow Trout (RB)
	Salvelinus namaycush	*Catostomus catostomus*	*Ptychocheilus oregonensis*	*Mylocheilus caurinus*	*Oncorhynchus mykiss*
Home Range	move within lake to spawning sites.	move to spring spawning sites, but tagged fish have often been re-captured close to where they were originally captured.	move to spring spawning sites, but and considered to have small home range (tagged fish in the Columbia River were generally found within 3 km of the tagging location).	move to spawn in spring. Movement limited to diel inshore movement in evening and offshore in morning.	move from lake habitat to spawning creeks (generally tributaries to, or outlets of, their native lake).
Spawning	in the fall (September-November), usually at night, when water temperatures drop below 10 °C , usually in lakes over boulder or rubble bottom from depths ranging from 0.3 to 12 m, although some populations spawn in rivers.	in spring shortly after ice-out at a threshold temperature of 5 °C, although some populations in the Peace and Cariboo regions delay to a water temperature of 15 to 16 °C. Usually spawn in streams over gravel substrates in moderate currents.	in the spring at a threshold temperature of 12 °C (April to July), typically in gravel or cobble of inlet streams, generally close to the lake.	in spring/early summer (April-July) at water temperatures between 9 and 15 °C. Typically in lake inlet or outlet streams in areas of flowing water over gravel substrate. Rarely more than a few hundred metres from the lake.	in spring (April-June) at water temperatures between 8 and 15 °C. Triggered by rising water temperature above 5 °C. In fine gravel of riffle areas of tributary streams, typically at depths of 0.15 to 2.5 m and water velocity of 0.3 to 0.9 m/s. Can also spawn on gravel beaches in lakes.
Growth	growth is highly variable; in some lakes 2+ fish were in the 20 cm range.	3 to 6 cm by end of first growing season.	3.5 to 6.5 cm by end of first growing season.	3.5 to 6.0 cm by end of first growing season.	growth is highly variable depending on habitat type, productivity and food chain structure.
Maximum Age and Size	>20 years is common; oldest aged was 62 years; 75 cm.	19 years (probable under-estimate); 50 cm.	20 years; 50+ cm; females live longer and grow larger than males.	males live up to 8 years and females live up to 19 years; 25 cm.	8 years; maximum size is highly variable depending on habitat type, productivity and food chain structure.
Age at Maturity	between 5 and 13 years; males 1 to 2 years before females.	males - 5 to 6 years females - 6 to 7 years	males - 3 to 4 years females - 5 to 6 years	males - 3 years females - 4 years	3 to 5 years; as early as 1 year by males and as late as 6 years by females.
Food	young-of-year forage on plankton and aquatic insect larvae, adding larger benthic organisms as they grow. At a length of 35 to 40 cm, switch to piscivore if an appropriate prey species is available.	are benthivores as adults, but early stages forage in shallow water for a variety of prey, most commonly zooplankton. Mouth shifts from terminal to ventral with development. As adults, most common food is chironomid larvae and pupae.	mostly aquatic insects when small; diets include fish after 10 cm size. Are mostly piscivorous when larger than 30 cm (although they will eat almost any prey of suitable size).	juveniles consume a wide variety of prey (planktonic crustaceans, chironomid pupae, benthic invertebrates). Consume larger prey as they grow; adults primarily eat invertebrates, but occasionally eat fish.	in creeks, fry and juveniles forage on drifting aquatic insects. In lakes, fry forage on bottom and water column invertebrates; juveniles and adults have similar diets, but adults take larger prey and more adult insects. Large adults (> 40 cm) in large lakes often become piscivorous.
Habitat - Early Life Stages	young seek out deeper water within a month of being hatched, and prefer deeper water than adults (possibly due to cannibalism). When surface waters are cool, juveniles can also be found in shallow water about 1 to 2 m offshore.	young-of-year stay near shore near cover (vegetation or woody debris). Fry transition to deeper water.	young-of-year are typically found around lake margins in shallow water close to cover. Juveniles tend to move offshore into deeper water in the fall.	young-of-year are typically found in shallow water, and tend to move offshore at night. Juveniles also occupy shallow water, but generally deeper than young-of-year.	alevins take 1 to 4 weeks to emerge. Fry may move immediately to lakes, or reside in the stream as many as 3 years. Fry staying in the stream are territorial, and initially occupy slow, shallow areas (shallower than other species), moving to deeper and faster water as they get older.
Habitat - Adults	prefer cool water (below approximately 10 °C); during warmer summer months adults inhabit the hypolimnion (below the thermocline) and disperse throughout the lake during the winter months.	habitat generalists, found in lakes and rivers. In lakes, tend to forage inshore at night, but remain below the thermocline in the day.	often in the littoral zone about 1 m off the bottom and at the offshore side of weed beds. Move into deeper water in the fall.	habitat use changes seasonally. Generally near bottom in the winter. Move inshore in the spring and after spawning, exhibit a diel migration, moving inshore in the evening and offshore in the morning.	in lakes, prefer cool (7 to 18 °C) temperatures and high dissolved oxygen; tend to stay below the 18 °C isotherm. Spend most of the time within 3 m of surface and are often in cover in the lower littoral zone.

Notes: km = kilometres, °C = degrees Celsius, m = metres, m/s = metres per second, cm = centimetres, + = plus, > = greater than.

[a] Based on information in Scott and Crossman (1998), Roberge et al. (2001, 2002), McPhail (2007) and Barrett and Munkittrick (2010).

3.7.1 Sample Collection

Spring fishing in Polley and Bootjack lakes was completed from April 23 to May 2, 2024, under BCMOWLRS Fish Permit WL24-846725, using hoop nets to capture rainbow trout and longnose sucker (Figure 3.4), as described in Section 3.6.2. Fishing was completed in the spring to support collection of ripe ovary tissue from these two species, which is a key tissue for selenium monitoring (see Section 3.7.3.1).

Fall fishing in Quesnel Lake and Quesnel River was completed from October 16 to 26, 2024, under BCMOWLRS Fish Permit WL24-846725 and Department of Fisheries and Oceans Canada (DFO) Permit XR 145 2024. Hoop nets were primarily used to target small home-range species (i.e., northern pikeminnow and peamouth chub) in the exposed (West Arm [near Hazeltine Creek]) and reference areas (North Arm [near Grain Creek]) of Quesnel Lake (Figure 3.6, Table 3.8). Hoop netting was completed from October 16 to 26, 2024, with hoop nets set for one to three nights. The small home-range species (i.e., northern pikeminnow and peamouth chub) were also targeted using angling at the Quesnel Lake reference area (North Arm [near Grain Creek]) on October 27, 2024, and using minnow trapping at the exposed (West Arm [near Hazeltine Creek]) and reference (North Arm [near Grain Creek]) areas of Quesnel Lake from October 23 to 26, 2024 (Figure 3.6). Gill nets were used to target lake trout in the exposed (West Arm [near Cedar Point]) and reference (East Arm [near Blue Lead Creek]) areas of Quesnel Lake (Figure 3.6) during the daylight hours of October 16 to 21, 2024. The mesh sizes of the gill nets ranged from 3 to 5 inches (stretched mesh) and gill nets were deployed using Summer Profundal Index Netting (SPIN) methods (Sandstrom and Lester 2009) to specifically target lake trout. Angling was used to target rainbow trout in the Quesnel River (Figure 3.6, Table 3.8) on October 19 and 20, 2024. Fall fish collection methods in 2024 were largely consistent with those employed in previous years (i.e., 2018 to 2023).[20] Fish tissue samples collected in 2024 satisfied both the CEMP (MPMC 2019) and the MPMC Phase 4 EEM (Minnow 2024c) fish tissue selenium study monitoring requirements.

For each sampling area, the target sample size for each species (e.g., rainbow trout) and tissue type (e.g., muscle, ovary, liver, and kidney, or whole-body)[21] was n=8 to facilitate meaningful statistical comparison of fish tissue quality between exposed and reference areas (Table 3.8). The target sample size was met for each species from each sampling area in 2024, except for peamouth chub from the reference area (North Arm [near Grain Creek]) of Quesnel Lake where the achieved sample size was n=5. Despite extensive hoop netting effort at this area

[20] Gill netting was not approved under the DFO permit in 2023 due to concerns about salmon bycatch. As such, lake trout were targeting using angling in 2023 (see Minnow 2024a for details).

[21] The tissue types collected varied by species and location; see Table 3.8.

in 2024 (33 trap days; Appendix Table C.6.12) and additional effort via minnow trapping and angling (Appendix Tables C.6.14 and C.6.15), only nine peamouth chub were captured. In an effort to satisfy the requirement for collection of female peamouth chub for the MPMC Phase 4 EEM (i.e., for ovary tissue collection for selenium analysis), only female peamouth chub captured from this area (n = 5) were retained for tissue quality sampling.

Supporting data recorded for the 2024 fish tissue monitoring in lake habitats included GPS coordinates of each fishing location (net set or angling effort), level of effort (net deployment and retrieval times, angling duration), *in situ* water quality measurements (i.e., a depth profile of temperature, pH, dissolved oxygen, conductivity, and specific conductance collected at each fishing area), and habitat data (see Section 3.8.1; for details).

Upon retrieval of fishing gear, captured fish were identified to species. Target species that were captured and were of an appropriate size (relative to historical fish size range data) were retained for processing. Incidental mortalities were disposed of in an approved manner. Non-target fish species were enumerated and released live immediately following capture. Fish retained for lethal sampling were euthanized with a decisive blow to the head and placed in a cooler with ice prior to processing within <12 hours.

Fish retained for lethal sampling were processed as follows. Each fish was measured for fork length, total length, and body weight (as described in Section 3.6.4), then cut open using dissecting scissors and any internal abnormalities were noted. Each dissected fish was examined internally to confirm sex. Internal tissues (liver, kidney, and ovary if available[22]) were then removed using dissecting tweezers and scissors, weighed to the nearest 0.001 g (±1% precision) using an analytical balance and placed in labelled Whirl-Pak™ bags. A boneless, skinless muscle sample was also collected using a filet knife and placed in a clean, labeled Whirl-Pak™ bag. Tissue samples were collected using clean implements (cutting boards, filet knives, and tweezers) which were cleaned between fish. Duplicate (split) samples were collected at a target frequency of 10% for QA/QC purposes and were evenly distributed among fish species and tissue types (excluding whole-body northern pikeminnow samples which could not be split). Whirl-Pak™ bags containing whole carcasses (northern pikeminnow) or individual tissue samples (all other species) were stored frozen until shipment (on ice) to the analytical laboratory.

Aging structures from lethally sampled fish were collected for age determination as follows:

- Otoliths (rainbow trout, lake trout) or whole heads (peamouth chub);

[22] Ovary tissue was only sampled when available (i.e., when fully developed in mature females). Additional fish were not targeted and sacrificed to achieve the target sample size (n = 8) for ovary tissues, except in the case of peamouth chub in 2024.

- Scales (northern pikeminnow)[23];
- Pectoral fins (longnose sucker)[24]; and
- Scales as a secondary age structure (rainbow trout, lake trout, peamouth chub, longnose sucker).

Aging structures (i.e., otoliths, pectoral fins, and/or scales, as above) were removed, wrapped in waxed paper, placed in labelled coin envelopes, and frozen until shipment to the laboratory for aging analyses. For peamouth chub, whole heads were removed, placed in labeled Whirl-Pak™ bags, and frozen prior to shipment (on ice) to the aging laboratory for otolith extraction and age determination.

3.7.2 Laboratory Analysis

Laboratory analysis of fish tissue quality samples was completed by ALS Environmental (Burnaby, BC) using the same methods and QA/QC measures outlined in Section 3.4.2.

Determination of fish ages using aging structures was completed by AAE Tech Services in La Salle, Manitoba. Prior to aging, samples were thawed, and otoliths were extracted from fish heads (i.e., peamouth chub), as required. Otoliths for each relevant fish (rainbow trout, lake trout, and peamouth chub) were examined under magnification for any issues related to structural integrity (e.g., cracks, fractures, etc.) and deformation (e.g., crystallization or misshapen lobes). Based on this evaluation, one otolith from each pair (if a pair of otoliths was collected, otherwise the single available otolith was used) was selected for processing and embedded in Cold Cure epoxy resin and cured for 48 hours before sectioning and polishing. Age estimation was carried out by submerging the otolith section in water under magnification with the polished surface facing up.

Pectoral fin rays from longnose sucker were processed and analyzed using a sectioning method similar to that used for the otoliths. Fin rays were embedded in Cold Cure epoxy resin to increase the structural integrity of the sample and prevent damage or degradation of the sample during processing. Samples were cured for 48 hours before sectioning. A minimum of three sections were taken to compensate for misalignment or staggering of the rays, due to shifting

[23] Aging structures collected for northern pikeminnow have historically (i.e., 2018 to 2023) included whole heads (for laboratory otolith extraction) and scales, consistent with the CEMP (MPMC 2019). In 2024, fish tissue quality samples served to satisfy both CEMP (MPMC 2019) and MPMC Phase 4 EEM (Minnow 2024c) monitoring requirements. As such, scales were the only aging structure collected for northern pikeminnow in 2024 in accordance with the approved MPMC Phase 4 EEM Study Design (Minnow 2024c) to allow for the submission of whole heads with the whole-body northern pikeminnow samples for tissue quality analysis, as stipulated by Environment and Climate Change Canada (ECCC 2024).

[24] Catostomidae (sucker) species are known to have low-quality otoliths for aging, therefore fin rays are the preferred structure with which to derive age estimates.

during the embedding process, or the inherent shape of the structure. The analysis of multiple rays enables age verification and improves the reliability of the age estimate, especially in the case of heavy checking or faint/ thin annuli. The three sections were then submerged in a dish of water under magnification with the ageing surface facing up. Orientation was matched across all three sections to ensure accurate comparison.

Scales from northern pikeminnow were processed for age determination as follows. Scales were isolated, examined for completeness, and placed between two dry standard microscope slides. Between six and twelve scales from each sample were prepared in this manner, then examined under magnification to determine an age estimation by identifying annuli.

For all aging methods (otoliths, pectoral fin rays, or scales), ages were recorded with a corresponding Confidence Index value based on the aging structure condition, annuli assessment, and the likelihood of the age estimate to be reconfirmed by the reader. Scales that were collected as backup structures for age analysis were processed (following the methods outlined above) only if an otolith or pectoral fin was damaged or otoliths were not collected successfully during sample processing. Data reports were provided to Minnow and Mount Polley as an Adobe Acrobat PDF file (methods) and Microsoft Excel spreadsheet (age results; Appendix G).

3.7.3 Data Analysis

Fish catch data were compiled and summarized to provide a catch list for each sampling area and gear type. The catch compilations, along with data on fishing efforts completed in April/May and October 2024, were used to calculate CPUE for each species and sampling area. For hoop netting, gill netting, minnow trapping, and angling efforts, CPUE was expressed as number of fish per day. For angling, CPUE was calculated as the number of fish per angler day. Fish length, weight, and age data were also compiled and summarized by calculating the mean, median, SD, and total range (minimum and maximum) by species and area.

Upon receipt of the fish tissue quality data from ALS and the fish aging data from AAE, a DQR was performed. For the fish tissue quality data, this included the assessment of field precision, laboratory precision, and laboratory accuracy against data quality objectives (DQOs) established at the outset of the project. For the fish aging data, this included the assessment of laboratory precision through evaluation of original and reassessed age estimates. Following the DQR, summary statistics for tissue quality data were calculated for each analyte, species, tissue type (i.e., muscle or whole-body, liver, ovary, and kidney), and area. Summary statistics included the sample size, % of samples less than the LRL, mean, SD, minimum, median, and maximum. Summary statistics were calculated using the K-M method as described in Section 3.8.3.1.

3.7.3.1 Data Screening

Fish muscle and whole-body data were evaluated in comparison to tissue quality guidelines for human health and/or for aquatic ecosystem health (available for mercury and selenium) and the tissue quality of fish collected from reference areas. Tissue quality guidelines included the Canadian Food Inspection Agency/ Health Canada (CFIA) mercury guideline for the protection of human health (0.5 mg/kg ww; CFIA 2015) and the BC selenium guidelines (BCMOE 2014). British Columbia selenium guidelines for the protection of human health for subsistence consumers (7.3 mg/kg dw) and for the general population (14.5 mg/kg dw) were selected as most relevant for evaluation of Polley Lake, Quesnel Lake, and Quesnel River fish tissue quality and applied in data screening. Selenium guidelines for BC also exist for the protection of aquatic life, with guidelines of 4 mg/kg dw in muscle tissue and whole-body samples, and 11 mg/kg dw in egg/ ovary tissues (BCMOE 2014).

Scientific consensus is that the best tissues for evaluating the potential adverse effects of selenium to fish (which are considered the most selenium sensitive organisms) are ripe ovaries or eggs (Luoma and Presser 2009; Janz et al. 2010; Stewart et al. 2010; DeForest et al. 2012; Janz 2012). Therefore, ovary tissues were used as the primary basis for evaluating potential effects of selenium on aquatic life. The BC guideline for selenium in egg/ ovary tissue (11 mg/kg dw) includes a two-fold uncertainty factor that may not be justified given a very steep dose-response curve (DeForest et al. 2012), therefore selenium concentrations in fish ovaries were also compared to the threshold (5th percentile of the distribution of 10th percentile Effect Concentrations [EC10]) for reproductive effects in eggs and ovaries (20 mg/kg dw; DeForest et al. 2012).

3.7.3.2 Statistical Analyses

Statistical analyses of analyte concentrations in fish tissues were conducted using post-breach data (i.e., 2015 to 2024) to answer the following questions:

1. Have mean analyte concentrations at the exposed area changed over time relative to the reference area?
2. Were there differences in mean analyte concentrations between exposed and reference areas, and does the difference depend on year?

To answer these questions, data were grouped into two categories for separate tabular and graphical presentation and statistical analyses:

1. Polley Lake (exposed) compared to reference (Bootjack Lake).

2. Quesnel Lake exposed (near Hazeltine Creek or near Cedar Point) compared to an un-impacted reference (near Grain Creek or East Arm).[25]

Questions 1 and 2 were answered by conducting a two-way ANOVA assessing the relative differences between exposed relative to reference areas, with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year.* The two-way ANOVA was completed as detailed in Section 3.1.3.2 (for Questions 1 and 2) to address the same questions. Similar statistical comparisons were also completed for fish ages, lengths, and weights to answer the question: is there a difference in mean fish length between exposed and reference areas, and does the difference depend on year? The comparisons of lengths, weights and age followed the two-way ANCOVA methods detailed in Section 3.6.5.1 with log10(fork length) as a covariate and data were analyzed as $\log_{10}$-transformed (length and weight) or untransformed (Age) response variables.

When reference area data were not collected concurrently with the exposed area in 2024 or over time (i.e., 2018 to 2024), or when sample sizes were insufficient for a two-way ANOVA approach (i.e., < 2 samples from either the exposed or reference area), statistical comparisons of concentrations of analytes in fish tissues were conducted to answer the following question:

Are there differences in mean analyte concentrations at the exposed area over time?

In 2024, this applied to rainbow trout from Quesnel River (all tissues) for which no reference area exists, and to lake trout from Quesnel Lake (ovary tissue only) for which there were insufficient reference ovary samples collected in 2024 for a two-way ANOVA approach (n = 1). The question was answered by conducting a one-way ANOVA with *Year* as a factor, excluding any years in which there were insufficient samples (i.e., n < 2). Due to the prevalence of analyte results which were below the LRL (i.e., censored data), analyses of tissue analyte concentration data were completed using a censored regression one-way ANOVA fit with MLE and assuming a lognormal distribution. Length, weight, and age data did not contain censored data and thus were analyzed as $\log_{10}$-transformed (length and weight) or untransformed (age) response variables. The MOD between the exposed area in each year relative to the first year of data collection was estimated as:

$$MOD = \frac{MCT_{Year} - MCT_{First\ Year}}{MCT_{First\ Year}} \times 100\%$$

[25] Data for rainbow trout from Quesnel River and lake trout ovary tissues from Quesnel Lake were considered separately since these datasets either do not have an associated reference for comparison (i.e., Quesnel River) or the number of samples collected in 2024 was insufficient for a two-way ANOVA (i.e., Quesnel Lake exposed [near Cedar Point] and reference [East Arm]), and statistical contrasts can be temporal only.

where MCT is calculated as back-transformed marginal means.

R software (R Core Team 2024) was used to conduct all statistical analyses. Censored regressions (i.e., MLE) were completed using the *survreg* function in the survival package (Therneau 2017) in R and contrasts were completed using the methods described in Oehlert (2010). Marginal means were estimated using the *emmeans*() function in R and were used to calculate MODs for the one-way and two-way ANOVA analyses. These estimates of the mean are equivalent to geometric means because the ANOVA analyses were completed on log-transformed concentrations. Consequently, the means used for the MOD calculations were not the same as the K-M mean concentrations reported in Appendix C.7 (see Section 3.8.3.1 for description of the K-M method).

Mercury concentrations were analyzed using units of mg/kg ww, in keeping with the reporting units for mercury guidelines. Mercury analyses were completed using ANCOVA with mean $\log_{10}$(fork length) as a covariate when the covariate was a significant predictor of mercury concentration, since mercury is known to bioaccumulate (i.e., larger fish have higher tissue mercury concentrations; Kidd and Batchelar 2012).

Statistical comparisons were completed for all available analytes; however, data interpretation focused on primary and secondary analytes (see Table 2.4). Plots of data that support the two-way ANOVA were presented for primary and secondary analytes that: 1) had a significant *Area*×*Year* interaction in the analyses and had a positive MOD (i.e., exposed concentrations were significantly higher than reference) for 2024 or negative MOD (i.e., exposed concentrations were significantly lower than reference) for 2024; and 2) lacked a significant *Area*×*Year* interaction in the analyses but had a positive overall MOD (i.e., exposed concentrations were significantly higher than reference and the difference did not depend on year). Plots of data that support the one-way ANOVA were presented for primary and secondary analytes that had a significant *Year* effect. Years with more than 50% of the data reported below the LRL for both the exposed and reference areas (for two-way ANOVAs) or from the exposed area only (for one-way ANOVAs) were excluded from the analyses.

3.8 Supporting Measures

A variety of supporting physical and chemical information was used to support the interpretation of sediment and aquatic biological data collected from lakes as part of the CEMP. This information falls into two categories: 1) supporting information that was collected by Minnow during field collections of sediment, plankton, benthic invertebrates, and fish; and 2) supporting information that was collected routinely by MPMC as part of ongoing CEMP monitoring and provided to Minnow. Unless otherwise specified, the supporting measures outlined below belong to the

first category (measures collected by Minnow). Data analysis approaches for supporting information are also detailed below.

Supporting measures collection and analysis methods specific to 2024 are described herein and are consistent with the CEMP (MPMC 2019). For details pertaining to prior sampling years, refer to the references listed in Tables 3.1 to 3.8.

3.8.1 Supporting Measures

Supporting spot water samples were collected from specific depths using a water sampling device (Beta bottle) in support of data interpretation of the sediment toxicity monitoring. Prior to sediment sampling, spot water samples were collected from just above the sediment water interface (~0.5 m above) at each shallow exposed (QUL LNF; n=5 per area) and reference (QUL LREF1; n=5 per area) sediment sampling station (Figure 3.2) as follows. The sampling bottle was rinsed with site water and then lowered to the desired depth. Once at the appropriate depth, the sampling bottle was moved side to side gently without disturbing the substrate (to ensure a representative sample was collected) prior to tripping the closure mechanism with a steel messenger. Upon retrieval, water samples were collected from a spigot fitted to the bottle. Samples were collected into laboratory provided bottles and preserved immediately (as required). Duplicate (split) water samples were collected at a target frequency of 10% for QA/QC purposes. Water samples were kept on ice in the field and refrigerated until being shipped (on ice) to ALS Environmental (Burnaby, BC). Duplicate (split) depth-integrated water quality samples were collected at a target frequency of 10% for QA/QC purposes.

One depth-integrated water sample was collected at each plankton monitoring area, during each sampling event, to support the interpretation of zooplankton tissue quality results. Samples were collected using a depth-integrated tube sampler (length ~13 m) as described in Section 3.3.1.1. Upon retrieval of the sampler, the water from the tube was emptied into a clean bucket to collect *in situ* measures. Following collection of *in situ* measures, a clean measuring cup was used to fill laboratory provided bottles, which were preserved (as required). Samples were kept on ice in the field and refrigerated until being shipped (on ice) to the analytical laboratory as described above. Duplicate (split) depth-integrated water quality samples were collected at a target frequency of 10% for QA/QC purposes.

In addition to the spot water quality samples collected in 2024 by Minnow, water quality samples were collected routinely by MPMC staff as part of their ongoing water quality monitoring program (MPMC 2019) and were used to support data interpretation (see routine water quality monitoring station locations in Figures 3.1 to 3.3). These data were subjected to an internal DQR by MPMC, including screening of laboratory QA/QC data, sample integrity issues, detection limits achieved,

data accuracy, as well as potential outliers/extreme values. As such their quality was not further assessed in this report. Data were provided to Minnow by MPMC as a Microsoft Excel file.

Additional supporting information collected at each lake monitoring station in 2024 included GPS coordinates, date and time of sampling efforts, sampling depth, *in situ* field meter measurements of temperature, specific conductance, dissolved oxygen, and pH (at mid-column for shallow areas and at surface and bottom for deep areas)[26] and sample photographs (Appendix Tables A.1.1 to A.1.3). For sediment, plankton, and fish monitoring areas, a minimum of one vertical depth profile of *in situ* water quality measures was recorded at one station per area per monitoring event (Appendix Figures A.1.1 to A.1.7), as well as at least one Secchi depth measure. *In situ* water quality measures were collected using a YSI EXO™ handheld portable field meter equipped with a YSI EXO™ sonde which was calibrated at least every second day. Field notes that would aid interpretation were also recorded. For sediment quality and benthic invertebrate sampling these included notes on the presence or absence of aquatic vegetation in sediment and additional physical observations of sediment texture, colour, density, etc. For fish monitoring programs, these included notes on the habitat present (Appendix Tables A.1.4 and A.1.5).

3.8.2 Laboratory Analysis

Upon receipt of water samples, ALS opened the coolers, measured temperature to verify the maintenance of cold samples, logged each sample, and assigned each sample a unique identification code. A SRN was then sent to MPMC and Minnow for verification.

Laboratory analyses included the parameters in the CEMP routine surface water quality monitoring program (MPMC 2019): dissolved organic carbon (DOC), total metals, dissolved metals, anions (nitrate, nitrite, sulphate, chloride, and fluoride), ammonia, total nitrogen, total phosphorus, dissolved phosphorus, orthophosphate, alkalinity, hardness, turbidity, total suspended solids, total dissolved solids, pH, and conductivity. Upon completion of the analyses, a data report was provided by ALS to MPMC and Minnow as an Adobe Acrobat PDF file and Microsoft Excel spreadsheet (Appendix G)[27].

[26] Mid-column or surface and bottom *in situ* water quality measures were collected at each monitoring station sediment and benthic invertebrate community sampling stations only.

[27] Data reports for spot water quality sampling are included in Appendix G. Data from routine water quality monitoring completed by MPMC were provided to Minnow in Microsoft Excel format from the MPMC database and these are not included in Appendix G.

3.8.3 Data Analysis

3.8.3.1 Summary Statistics

Summary statistics (means, percentiles, and SDs) were calculated for select chemical parameters using the K-M method (Helsel 2012). Additional information about the application of this summary statistic calculation method (i.e., which monitoring components and analytes this method was applied to) are found within the methods sections for analysis of chemical data above (Sections 3.1.3, 3.4.3, and 3.7.3).

The K-M method (Helsel 2012) involves transforming left-censored data (i.e., data prefaced with a "<" symbol) to right-censored data (i.e., values prefaced with a greater than [>] symbol), and then using the K-M estimator (used to estimate the mean survival time in survival analysis) to estimate the mean. The calculation was completed using the *survfit*() function in the survival package (Therneau 2017) in R software (R Core Team 2024) and involves calculating the area under the K-M survival curve.

The K-M method is non-parametric and can accommodate multiple LRLs. This method of estimating the mean is equivalent to using the distribution of detected values below the maximum LRL to represent values that are <LRL. For example, the mean of the data set {1, 2, <4, 5} is estimated as the mean of 1, 2, [½×1 + ½×2], and 5 which is 2.375. The value <4 is replaced by the distribution of values below 4 (i.e., 1 and 2 with equal weight of ½). Similarly, the mean of the data set {1, 1.6, 2, 2.1, <4, 5} is estimated as the mean of 1, 1.6, 2, 2.1, [¼×1 + ¼×1.6 + ¼×2 + ¼×2.1], and 5 which is 2.229. Again, the value <4 is replaced by the distribution of values below 4 (i.e., 1, 1.6, 2, and 2.1 with equal weight of ¼). If the minimum value in the data set is <LRL, it is replaced with the LRL. Therefore, if there is only one LRL and no detected values <LRL, the K-M estimate of the mean is equivalent to replacing the value <LRL with the LRL (i.e., the best guess for the values <LRL is the LRL). If a SD could not be estimated (e.g., all data <LRL), then one was not reported.

For percentiles, estimates were first calculated using K-M estimator based on survival analyses. The percentiles were calculated using the quantile() function for a survival model generated in the survival package in R software (R Core Team 2024). Estimates of percentiles cannot be generated for highly censored data using the K-M method, and so a second method was used to provide practical estimates of the percentiles. For example, for the data set: <2, <2, <2, <2, 5; the K-M method will not produce an estimate of the median. However, the median value of this data set is clearly <2. The second method of estimating percentiles was used whenever the K-M method could not generate an estimate. This method involved calculating the percentile after

substitution with the LRL, then identifying the value in the dataset equal to this value (or the next detected value in the dataset that is below this value).

Summary statistics for biological endpoints (sediment toxicity, plankton community and productivity, benthic invertebrate community, and fish community and population health; Sections 3.2.3, 3.3.3, 3.5.3, and 3.6.5) were calculated using standard methods and formulae.

3.8.3.2 Water Quality Guideline Screening

Results of spot and routine water quality samples were screened against available approved or working BCWQGs (collectively termed "BCWQGs;" Appendix Table C.1.1; BCMOWLRS 2024, 2025). For guidelines that are dependent on other water quality parameters (e.g., hardness based, pH, temperature), concurrent water quality parameter values were used in their calculation (BCMOWLRS 2024, 2025). If concurrent data were not available, the conservative values were chosen using the historical data for that station (e.g., the minimum hardness recorded for that station was used). If hardness was outside the accepted range, then the bound of that range (either upper or lower) was used to calculate the guideline (BCMOWLRS 2024, 2025). Spot water quality samples collected in 2024 were screened against BCWQG in tabular form. Surficial water quality samples collected by MPMC staff from Polley, Bootjack, and Quesnel Lake routine water quality stations (Figures 3.1 and 3.2) from 2015 to 2024 were screened against BCWQG in plots of total and dissolved concentrations of primary and secondary analytes (Table 2.4). In addition, temperature and nutrient results (total phosphorus, dissolved phosphorus, orthophosphate, total nitrogen, and nitrate) were plotted for Polley, Bootjack, and Quesnel Lake routine water quality stations (Figures 3.1 and 3.2) to help support the interpretation of plankton community results. Tabular and graphical screening against BCWQG was completed using R (R Core Team 2024).

3.8.3.3 Biotic Ligand Model-derived BCWQG

The BCWQG Biotic Ligand Model (BLM) guideline lookup tables were used to calculate acute (short-term) and chronic (long-term) guidelines for dissolved copper and nickel (BCMOWLRS 2025). This was used to support interpretation of zooplankton tissue quality by evaluating surface waters of Polley Lake and Quesnel Lake.

The BLM integrates exposure and toxicity modifying factors that are known to modify copper and nickel bioavailability. Using this approach, the BLM defines concentrations below which chronic adverse effects would not be expected under the specific water quality that co-occurs with the copper or nickel concentration. Specifically, the BCWQG BLM guideline lookup tables produce acute and chronic guidelines based on the three required modifying water chemistry inputs for

dissolved copper (pH, DOC, and hardness) and four water chemistry inputs (pH, DOC, hardness and temperature) for dissolved nickel (BCMOWLRS 2025).

If required input parameters for the BCWQG BLM were missing for a data set, these data were replaced to increase the sample size, when possible. This was done using professional judgement to replace the missing data as closely as possible or by using a conservative replacement value. Data missing for the parameters pH, and DOC were replaced by substituting the mean value from sampling events conducted in close temporal proximity to the missing data or using the most conservative values (e.g., using the minimum value collected at a station).

3.8.3.4 Water Quality Trends

Temporal trends in surface water quality data were evaluated to support interpretation of chemical monitoring components. Specifically, surface water quality data collected routinely by MPMC post-breach (i.e., 2015[28] to 2024) in Polley Lake and Quesnel Lake were evaluated to support the interpretation of zooplankton tissue quality from these areas (refer to Section 3.4.3). This evaluation was completed using the Seasonal Kendall test detailed below and included evaluation of aqueous total and dissolved concentrations of primary and secondary analytes (Table 2.4), and acute and chronic Guideline Exceedance Factors (GEFs) for copper (the ratio of observed dissolved copper concentrations divided by BCWQG BLM-derived guidelines).

The non-parametric Seasonal Kendall test described by Hirsch et al. (1982) was used to evaluate temporal trends in surface water quality data from the north and south basins of Polley Lake (P1 and P2, respectively) and from three stations in Quesnel Lake (QUL-18 and QUL-2a [exposed], and QUL-120a [reference]; Figures 3.1 to 3.3). The Seasonal Kendall test assesses temporal trends separately for each season (or month in this case, for routine water quality samples collected throughout the year) and combines the results for each season into an overall test for trend. The test is non-parametric and assesses whether there is a monotonic increasing or monotonic decreasing trend over time. The test is conducted by calculating the test statistic S_i which is equal to the sum of the number of increases and decreases from a time period t_i to all time periods after t for each observation in season i. The overall test statistic S is computed as the sum of S_i for all seasons. The significance of the observed S is determined by comparing it

[28] Routine water quality data prior to 2015 are available for Polley Lake, Bootjack Lake, and Quesnel Lake but were excluded from plots and statistical analyses to distinguish between short-term effects from potential long-term effects of the breach on water quality trends analysis in these waterbodies. The exclusion of data prior to January 2015 was based on the rationale explained in Minnow (2019a). Briefly, laboratory turbidity data resulting from the suspension of fine particulate matter immediately after the breach were used to qualitatively identify a “breach” period (i.e., a period characterized by short-term effects on water quality). By late 2014, laboratory turbidity had decreased to values more similar to pre- breach. Based on these results, the 'breach” period was defined as beginning on August 4, 2014, and ending in December 2014. Therefore, use of data starting in January 2015 should be effective in excluding short-term breach effects on water quality.

to a critical value of S (at the significance level α = 0.05) determined from the exact sampling distribution of S (calculated by determining all possible permutations and combinations of S based on the increases and decreases from the number of pairwise comparisons made; Hirsch et al. 1982). If more than 45 pairwise comparisons are made (equivalent to the number of pairwise comparisons for n = 10 in a single season), then the normal approximation is used to calculate a p-value and to assess significance (Hirsch et al. 1982). The standard normal deviate Z is calculated as:

$$Z = \begin{cases} \frac{S-1}{\sqrt{\sigma_S}} if\ S > 0 \\ 0 \quad if\ S = 0 \\ \frac{S+1}{\sqrt{\sigma_S}} if\ S < 0 \end{cases}$$

where $\sigma_S = \sum_{i=1}^{k} \frac{n_i(n_i-1)(2n_i+5)-\sum_{T_i} t_i(t_i-1)(2t_i+5)}{18}$ and n_i is the number of samples in month i, t_i is the number of tied values for each tied value T_i, and k is the number of seasons (Hirsch et al. 1982).

An estimate of the trend slope over time was calculated by computing the median of all slopes between data pairs within the same month (Helsel and Hirsch 2002). The slope was reported as a change in concentration per year and as a percentage change in concentration per year. The intercept of a line through the time series was estimated as the median intercept of all lines through each point with the estimated slope (Pohlert 2016). The trend analysis was only conducted with a minimum number of five pairwise comparisons, the minimum number required for all consecutive increases or decreases to be significant at α = 0.05.

4 METHODS – CREEK HABITAT

4.1 Sediment Quality

Sediment quality monitoring was completed at exposed areas of Hazeltine Creek (and associated reference areas) annually between 2022 and 2024, in accordance with the CEMP (MPMC 2019). Post-breach sediment quality monitoring was initiated in Hazeltine Creek in 2014, then completed annually from 2018 to 2024 in accordance with the CEMP (MPMC 2019; Table 4.1). Since 2018, annual sediment quality monitoring in creek habitats has included areas of upper (HAC-U [HAC-R2]) and lower (HAC-D [HAC-R5]) Hazeltine Creek, with areas of upper and lower Edney Creek serving as reference (EDC-U and EDC-D [EDC-REF], respectively; Figure 4.1, Table 4.1)[29]. Channel remediation works in the vicinity of HAC-U (HAC-R2) and HAC-D (HAC-R5) were completed in 2017 and 2021, respectively.

Sample collection and analysis methods for 2024 are described herein and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historical sampling areas, refer to the references listed in Table 4.1.

4.1.1 Sample Collection

Sediment samples were collected from Hazeltine Creek and Edney Creek (upper and lower areas) from August 8 to 13, 2024. Five replicate stations were sampled to represent each monitoring area (Figure 4.1, Table 4.1; Appendix Table A.2.1). One composite sediment sample was collected at each replicate station.

Hazeltine Creek has historically been predominantly erosional with limited locations of true sediment deposition (HKP 1996, 1997a; Minnow 2007). As conditions in Hazeltine Creek stabilize following remediation works, sediment accumulation has occurred in upper and lower Hazeltine Creek areas and continues to occur. The flow of water in Hazeltine Creek has been modified from 2018 to 2024 by controlling the discharge of water to the creek from Polley Lake (using a weir), and by pumping water from below the thermocline in Polley Lake into the creek for the specific purpose of maintaining conditions that support the use of upper Hazeltine Creek as fish habitat. As such, sediment deposition in Hazeltine Creek differs from that in Edney Creek (i.e., reference), with thicker deposition of fines in pool areas of Hazeltine Creek than occurs in Edney Creek. Within Edney Creek, which is subject to a natural flow regime, the limited sediments tend to wash through during spring freshet and deposit as a thin layer of fines in quiescent areas on the lowering hydrograph (i.e., non-uniform sediment deposition). Due to this non-uniform

[29] HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting (Minnow 2025).

Table 4.1: Overview of Sediment Quality Monitoring in Creeks in the Vicinity of the Mount Polley Mine, 1995 to 2024[a]

Waterbody		Area Type	Area Code[b]	Baseline			Pre-Breach					Post-Breach								
				1995 (HKP 1996)	1996 (HKP 1997a)	1999 (Beak 2000)	2007 (Minnow 2009)	2009 (Minnow 2011)	2010 (Minnow 2011)	2012 (Minnow 2013a)	2013 (Minnow 2013b)	2014 (Minnow 2015a)	2015 (Minnow 2015b)	2018 (Minnow 2019a)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Hazeltine Creek	Upper	Exposed (Remediated 2017)	HAC-U (HAC-R2) [W7 in 1995 and 1996; W6 in 1999; UHC in 2007; W7 2009 to 2018; W7 Pond in 2012; ST16 in 2014]	6	6	3	3	5	5	8	8 (W7) 5 (USW7-Pond) 16[c] (W7 Pond)	5	-	5	5	5	5	5	5	5
	Lower	Exposed (Remediated in 2015, 2020, 2021)	HAC-D (HAC-R5) [W11 in 1995, 1996, 1999 and 2010; LHC in 2007; DSW11 in 2012; ST02 in 2014]	6	6	3	3	-	5	5[d]	-	5	-	5	5	5	5	5	5	5
Edney Creek	Upper	Reference	EDC-U [W8, W8a, and W9 in 1995, 1996; W9 and W8 in 1999; UEC in 2007; W8 in 2012]	6 (W9) 6 (W8) 6 (W8a)	6 (W9) 6 (W8) 6 (W8a)	3 (W9) 3 (W8)	3	-	-	5[d]	-	-	-	5	5	5	5	5	5	5
	Lower	Reference	EDC-D (EDC-REF) [W10 prior to 2015]	6	6	-	-	-	-	-	-	-	5[e]	5	5	5	5	5	5	5

Sediment quality samples collected in 1996 had unusually high concentrations for some parameters. Values are suspect and were not used in data analyses, presentation, or interpretation.

Notes: "-" = not sampled/not applicable. Sediment Quality analyses included: metals and Total Organic Carbon (TOC) in <63 µm fraction, moisture, particle size, pH, total nitrogen, and total sulphur, for sampling completed between 2014 and 2024 (post-breach).

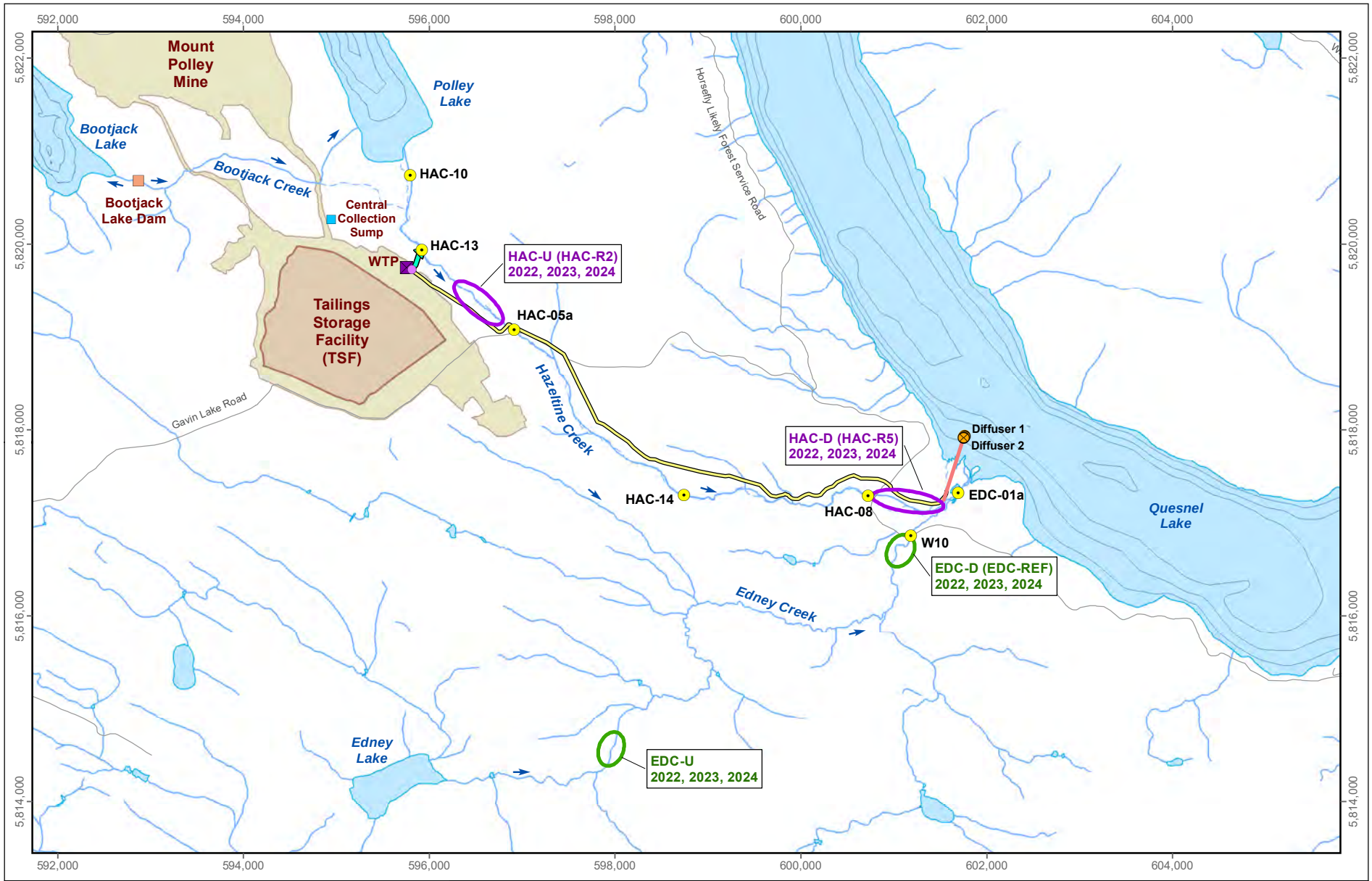
[a] Numbers indicate the number of stations sampled per area. Where multiple areas were sampled in a given year, the area is identified in parentheses after the number of stations. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

[b] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[c] Eight samples were collected in separate spring and fall sampling events.

[d] Selenium was the only parameter reported.

[e] Sediment quality data for EDC-D in 2015 were not used in the calculation of post-breach summary statistics in Minnow (2015b). See Minnow (2019a) for presentation of raw data.



Sediment Quality Monitoring Areas, Hazeltine and Edney Creeks, 2022 to 2024

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Figure 4.1

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 6\24-04 Figure 4.1 Sediment Creeks.mxd

nature of sediment deposition, wetted locations that support some accumulation of fine materials (i.e., pools, backwaters, or interstices between boulders) were selected opportunistically for sample collection in Edney Creek. Collection of true sediment (i.e., fines in the silt and clay size category) could not be completed by conventional grab sampling in all areas (particularly the Edney Creek reference areas) due to the dominant presence of sand, gravel, and cobble in some of the areas. Therefore, sediment fines were therefore targeted at all areas using a clean stainless-steel spoon.

At each sampling station selected, the location was approached by foot in a manner that did not disturb the sediment prior to sampling. Surficial sediment was then collected carefully by slowly inserting the spoon into the sediment (to minimize disturbance), with collection targeting up to 3 cm.[30] The spoon was then moved horizontally until full, and slowly retrieved to the surface to avoid sample washout.

The contents of each spoonful were inspected to ensure that it was predominantly fine sediment (i.e., silt and clay), and, if acceptable, was placed into two or more pre-labelled 250 mL glass sampling jars. This procedure was repeated approximately >20 times at each station to form a composite sample representative of the sampling station and to collect sufficient sample material for analysis. Sampling equipment was rinsed between all stations using site water. Duplicate sediment samples were collected at a target frequency of 10% for QA/QC purposes. Samples were kept on ice in the field then stored in a refrigerator until shipment (on ice) to the analytical laboratory. Supporting information was collected at each sampling station to support data interpretation (see Section 4.6.1 for details).

4.1.2 Laboratory Analysis

Laboratory analysis of sediment quality samples from creek habitats was completed by ALS Environmental (Burnaby, BC) using the same methods and QA/QC measures described for sediment quality samples from lakes (Section 3.1.2).

4.1.3 Data Analysis

4.1.3.1 Data Screening and Analytes of Interests

Upon receipt of the analytical data, a DQR was completed, including an examination of data completeness, LRLs achieved, laboratory precision, laboratory accuracy, and field precision. Following completion of the DQR, raw data were summarized by area by calculating mean,

[30] Collection depth was often less than 3 cm, as fines often settle in a thin layer over coarser material (and sampling seeks to avoid coarse material).

median, SD, minimum, and maximum. Summary statistics were calculated using the K-M method as described in Section 3.8.3.1.

Sediment quality data were evaluated relative to BCWSQG (BCMOWLRS 2024, 2025) and relative to reference and pre-breach 95th percentile concentrations (as described for lake sediment quality samples in Section 3.1.3.1). Guidelines and pre-breach and reference values were used in a two-way screening to identify analytes at exposed areas with mean concentrations that exceeded BCWSQG as well as reference and pre-breach 95th percentile values. Reference and pre-breach data used for screening values were compiled and calculated separately. Reference data included all available post-breach results from Edney Creek (excluding data from 2015), and pre-breach data included all results from Hazeltine Creek prior to 2014 (excluding data from 1996; Table 4.1). The reference and pre-breach data used in the calculation of the 95th percentiles and used in data screening are presented in Appendix Tables D.1 to D.5.

The screening of sediment quality data against BCWSQG and reference and pre-breach 95th percentile values included all analytes (including primary and secondary analytes; as described in Section 3.1.3.1). Analytes at exposed areas with mean concentrations that exceeded all the following criteria were termed “Analytes of Interest”: 1) the BCWSQG, 2) the associated reference 95th percentile value, and 3) the associated pre-breach 95th percentile value. Analytes of Interest were determined separately for each monitoring area (i.e., separately for upper [HAC-U] and lower [HAC-D] areas of Hazeltine Creek). Concentrations of the Analytes of Interest, along with TOC, were the focus of more detailed interpretation which included graphical plots, formal statistical contrasts of temporal changes in concentrations, and examination of relationships to physical and chemical sediment variables.

4.1.3.2 Statistical Analyses

Statistical analyses of Analyte of Interest concentrations and TOC content of creek sediments were conducted using post-breach data from 2018 to 2024 to answer the following questions:

1. Have mean analyte concentrations at the exposed area changed relative to the reference area?
2. Were there differences in mean analyte concentrations between exposed and reference areas, and does the difference depend on year?
3. Have mean analyte concentrations at the exposed area changed over time since the breach?

To answer these questions, data were grouped into two categories for separate tabular and graphical presentation and statistical analyses:

1. Upper Hazeltine Creek (HAC-U [HAC-R2]) compared to an upper creek reference area (Upper Edney Creek; EDC-U).
2. Lower Hazeltine Creek (HAC-D [HAC-R5]) compared to a lower creek reference area (Lower Edney Creek; EDC-D [EDC-REF]).

Questions 1 to 3 were answered by using the same statistical approach (i.e., two-way ANOVA with *Area* and *Year* as factors) described for lake sediments in Section 3.1.3.2. Sediment concentrations from 2014 were excluded from temporal comparisons because this sediment represented freshly deposited breach-material that was removed during remediation efforts in 2015.

Analytes of Interest concentrations and TOC content were plotted to support the two-way ANOVA results and included comparison to BCWSQG and reference and pre-breach 95th percentile values.

Relationships between the Analytes of Interest concentrations and physical variables (particle size) and other chemical variables (TOC, total nitrogen, and total sulphur content) were evaluated using Spearman's rank correlation analysis described for lake sediment (Section 3.1.3.2). Correlation analysis was completed using data from 2018 to 2024 combined from upper and lower areas of Hazeltine and Edney Creeks. In these correlations, differing relationships were apparent for the exposed areas relative to reference. As such, correlations were run separately for two groups of data: 1) the paired exposed and reference areas combined (i.e., HAC-U [HAC-R2], EDC-U, HAC-D [HAC-R5], and EDC-D [EDC-REF]); 2) exposed areas only (i.e., HAC-U and HAC-D). All sediment statistical analyses and plots were completed using R (R Core Team 2024).

4.2 Periphyton Community and Productivity

Periphyton community and productivity monitoring was completed at exposed areas of Hazeltine Creek (and associated reference areas) between 2022 and 2024, in accordance with the CEMP (MPMC 2019). Post-breach periphyton community and productivity monitoring were initiated in 2017 in upper and lower areas of Hazeltine Creek (and associated reference areas; Table 4.2). Since 2018, periphyton community monitoring has been completed annually at two exposed areas of upper Hazeltine Creek areas (HAC-R1 and HAC-U [HAC-R2]) with an area of upper Edney Creek (EDC-U) serving as reference (Figures 4.2 and 4.3, Table 4.2)[31], in accordance with the CEMP (MPMC 2019). In accordance with the CEMP (MPMC 2019),

[31] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting (Minnow 2025).

Table 4.2: Overview of Periphyton Community and Productivity Monitoring in Creeks in the Vicinity of the Mount Polley Mine, 1995 to 2024[a]

Waterbody		Area Type	Area Code[b]	Component	Baseline[c]		Pre-Breach[d]	Post-Breach[e]							
					1995 (HKP 1996)	1996 (HKP 1997)	2011 (Minnow 2012)	2017 (Minnow 2018a)	2018 (Minnow 2019a)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Hazeltine Creek	Upper	Exposed (Remediated in 2016)	HAC-R1	community	-	-	-	-	5	5	5	5	5	5	5
				chlorophyll-a	-	-	-	5	5	5	5	5	5	5	5
				AFDM	-	-	-	5	5	5	5	5	5	5	5
		Exposed (Remediated in 2017)	HAC-U (HAC-R2) [W7 prior to 2018]	community	3	3	1	-	5	5	5	5	5	5	5
				chlorophyll-a	6	3	1	-	5	5	5	5	5	5	5
				AFDM	-	-	-	-	5	5	5	5	5	5	5
		Exposed (Remediated in 2019)	HAC-R3	chlorophyll-a	-	-	-	-	-	-	5	5	5	5	5
				AFDM	-	-	-	-	-	-	5	5	5	5	5
	Lower	Exposed (Remediated in 2015, 2020, 2021)	HAC-D (HAC-R5) [W11 prior to 2017]	community	-	-	1	-	-	5	-	5	-	5	-
				chlorophyll-a	-	-	1	5	-	5	-	5	-	5	-
				AFDM	-	-	-	5	-	5	-	5	-	5	-
Edney Creek	Upper	Reference	EDC-U [W9 prior to 2018]	community	3	3	-	-	5	5	5	5	5	5	5
				chlorophyll-a	6	3	-	-	5	5	5	5	5	5	5
				AFDM	-	-	-	-	5	5	5	5	5	5	5
	Lower	Reference	EDC-D (EDC-REF)	community	-	-	-	-	-	5	-	5	-	5	-
				chlorophyll-a	-	-	-	5	-	5	-	5	-	5	-
				AFDM	-	-	-	5	-	5	-	5	-	5	-
		Exposed (Remediated in 2015, 2020, 2021)	E1	community	-	-	-	-	-	5	-	5	-	5	-
				chlorophyll-a	-	-	-	4[f]	-	5	-	5	-	5	-
				AFDM	-	-	-	4[f]	-	5	-	5	-	5	-
Frypan Creek		Reference	FPC-R3	chlorophyll-a	-	-	-	3	5	5	5	5	5	5	5
				AFDM	-	-	-	3	5	5	5	5	5	5	5

Notes: "-" = not applicable/ not sampled, AFDM = Ash Free Dry Mass.

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas.

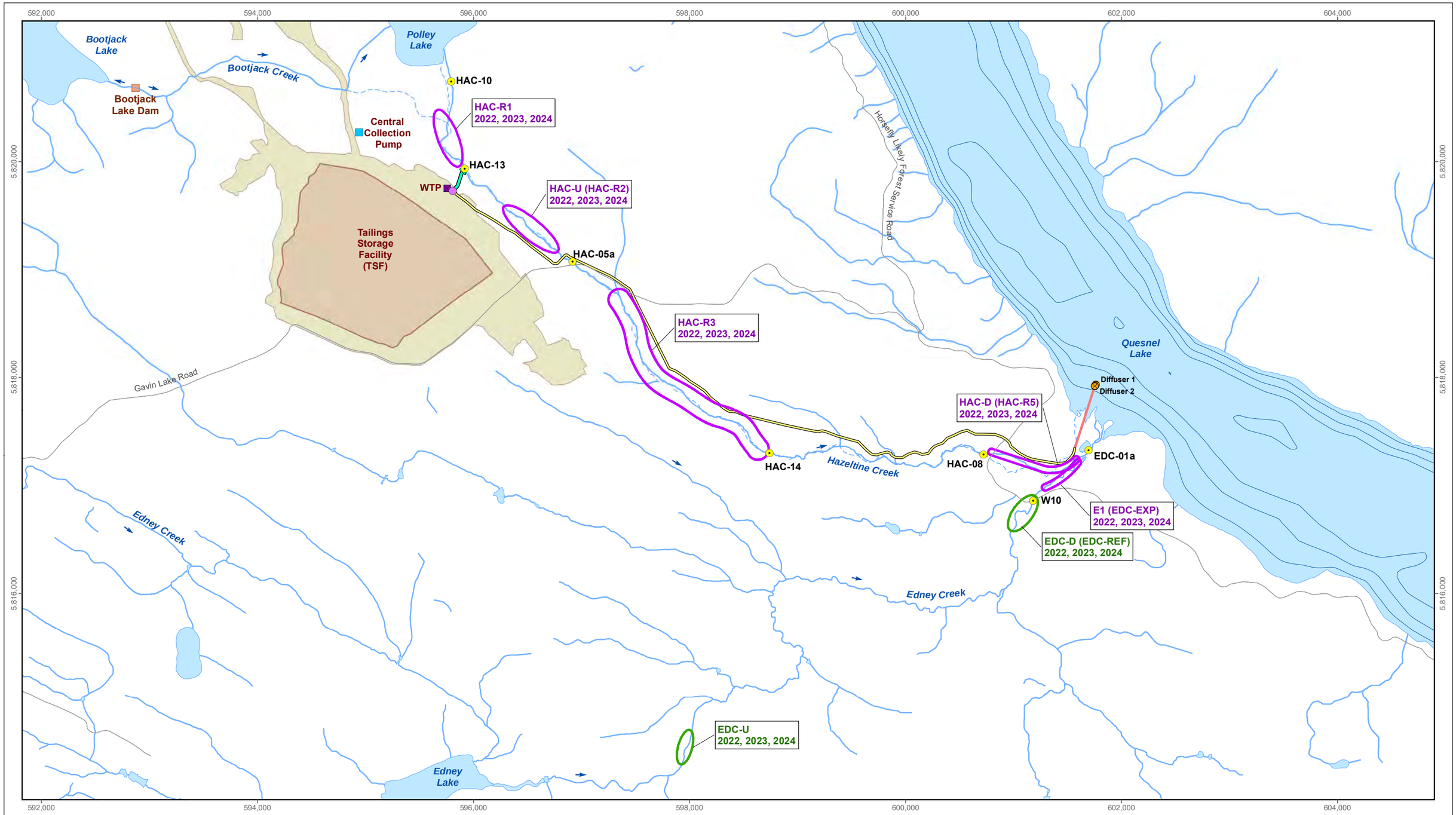
[b] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[c] Baseline community and chlorophyll-a samples collected by Stockner sampler from n=1 rocks per station, total scraped area = 4.91 cm²

[d] Pre-Breach community and chlorophyll-a samples collected by scraping n=10 rocks per station, scraped area = 3.3 cm² per rock

[e] Post-Breach community, chlorophyll-a and AFDM samples collected by scraping from n=5 rocks per station, total scraped area = 4 cm² per rock

[f] Five (5) replicates targeted for analysis but only 4 samples were received by laboratory.



LEGEND

- Exposed Area
- Reference Area
- Routine Water Monitoring Station
- Water Treatment Plant (WTP)
- Diffuser (Treated Effluent Discharge, December 2015 to present)
- Effluent Mixing Tank
- Discharge to Diffusers (2015 to present)
- Discharge to Hazeltine Creek (Apr 10 2014 to Aug 14 2014 and Nov 29 2015 to Sept 30 2017)
- Effluent Discharge Pipeline (January 2018 to present)
- Historic Watercourse

[a] Not all monitoring components were completed at all areas shown. Monitoring at each area included one or more of the following components: periphyton community, productivity, and/or tissue quality, and benthic invertebrate community, productivity, and/or tissue quality. See Tables 4.2, 4.3, and 4.4 for details of monitoring components.

0 0.5 1 2 km

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Periphyton and Benthic Invertebrate Monitoring Areas, Hazeltine and Edney Creeks, 2022 to 2024[a]

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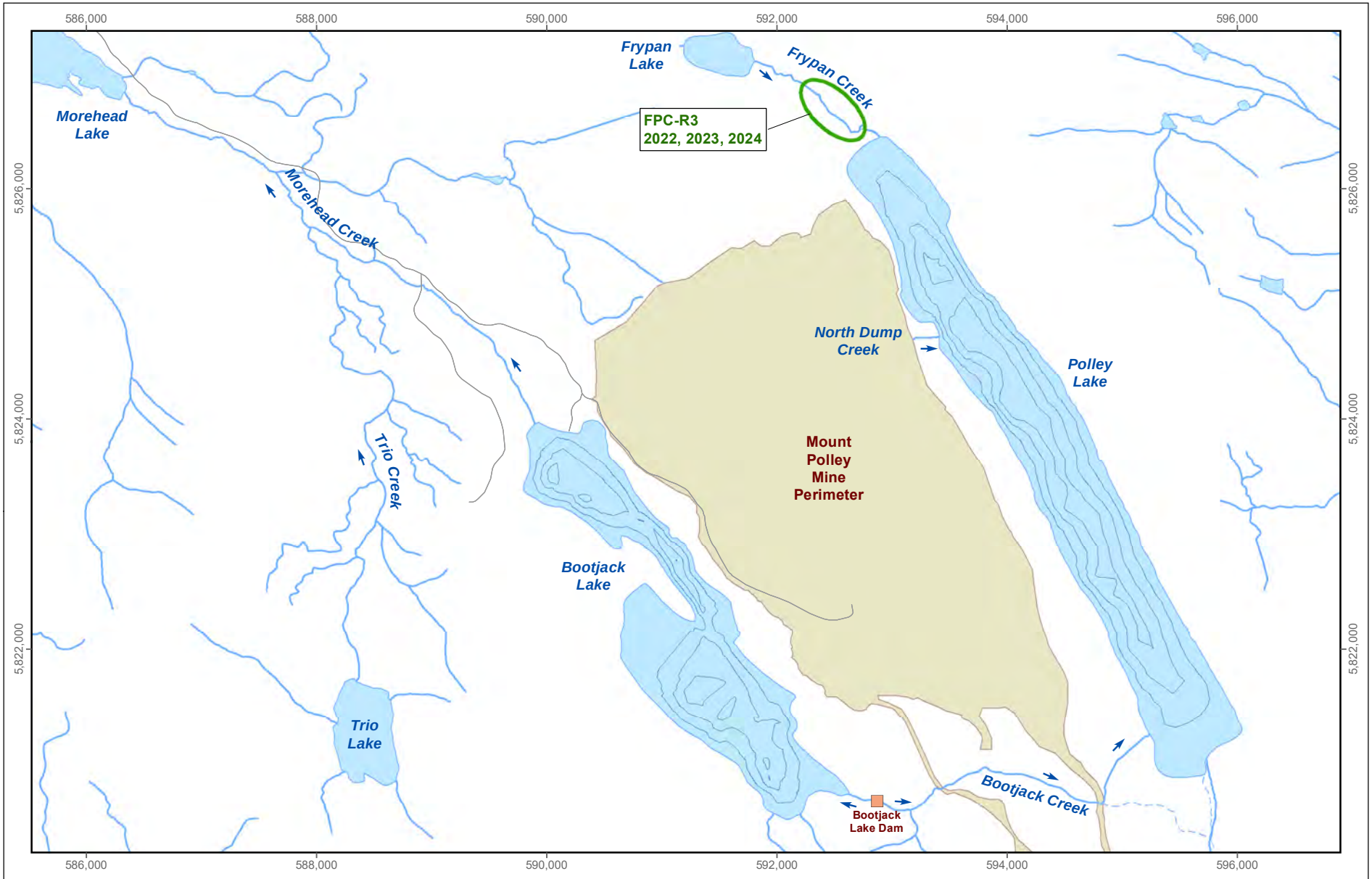
Figure 4.2

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 6\24-04 Figure 4.2 Periphyton and BI Creeks.mxd



LEGEND

Reference Area

Historic Watercourse

[a] Not all monitoring components were completed at all areas shown. Monitoring at each area included one or more of the following components: periphyton community, productivity, and/or tissue quality, and benthic invertebrate community, productivity, and/or tissue quality. See Tables 4.2, 4.3, and 4.4 for details of monitoring components.

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Projection: North American Datum 1983 UTM Zone 10U

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Periphyton and Benthic Invertebrate Monitoring Areas, Frypan Creek, 2022 to 2024[a]

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Figure 4.3

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 6\24-04 Figure 4.3 Periphyton and BI, Frypan Creek.mxd

periphyton productivity monitoring has also been completed annually since 2018 at the upper Hazeltine Creek areas (HAC-R1 and HAC-U [HAC-R2]), the upper Edney Creek reference area (EDC-U) and at a reference area in Frypan Creek (FPC-R3). Although not a requirement of the CEMP (MPMC 2019), periphyton productivity monitoring was initiated at an additional exposed area of upper Hazeltine Creek (HAC-R3) in 2020 and has been completed annually since then. The upper reference areas EDC-U and FPC-R3 serve as the reference areas for HAC-R3 (Table 4.2). In lower creek areas, periphyton community and productivity monitoring has been completed biennially since 2019 in accordance with the CEMP (MPMC 2019). This biennial monitoring has been completed at an exposed area of lower Hazeltine Creek (HAC-D [HAC-R5]) and an exposed area of lower Edney Creek (E1), with an unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as reference for both exposed lower creek areas (Figure 4.2, Table 4.2).[32] Monitoring at these lower creek areas was last completed in 2023 (Table 4.2).

In addition to satisfying CEMP (MPMC 2019) monitoring requirements, periphyton productivity monitoring in Hazeltine Creek (and associated reference areas) serves to support the evaluation of fish habitat in upper Hazeltine Creek as part of HRWG monitoring objectives (e.g., Minnow 2025). Supporting the evaluation of fish habitat is the sole purpose of the annual periphyton productivity monitoring completed at areas HAC-R3 and FPC-R3 since 2020 and 2018, respectively. As such, previous CEMP Sediment and Aquatic Life reports (e.g., Minnow 2024a) have presented periphyton productivity data from HAC-R3 and FPC-R3 in tabular form only, with analyses and interpretation of data from these two areas presented in a separate report focused on the assessment of fish habitat in Hazeltine Creek (i.e., HRWG report; Minnow 2024b). In the present report, periphyton productivity results from both HAC-R3 and FPC-R3 from all years of monitoring have been incorporated throughout data tabulation, analyses, and interpretation for the purposes of improving reporting clarity and efficiency.

Channel remediation works at HAC-R1, HAC-U (HAC-R2), and HAC-R3 were completed in 2016, 2017, and 2019, respectively. Channel remediation works in the vicinity of HAC-D (HAC-R5) and E1 were initiated in 2015 and completed in 2021. Initial remediation works in the breach-impacted areas of lower Hazeltine and Edney creeks (i.e., near HAC-D [HAC-R5] and E1) included reconstruction of the two creeks as separate watercourses in 2015. Edney Creek conflowed with Hazeltine prior to the breach, and remediation works undertaken in summer 2020 rejoined the two waterbodies. Further remediation works were completed in August 2021 and encompassed the entirety of the established HAC-D (HAC-R5) monitoring area (Minnow 2022a).

[32] HAC-R5 and EDC-REF are the alternate names used for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting (Minnow 2025).

In 2021, HAC-D (HAC-R5) monitoring stations were therefore relocated as far upstream in lower Hazeltine Creek as possible (Minnow 2022a).[33] Final remediation works in lower Edney Creek were also completed in August 2021 but were undertaken after the 2021 biological sampling had been completed (Minnow 2022a). Given the rejoining of lower Edney and Hazeltine creeks in 2020, the E1 monitoring area was relocated in 2021 to upstream of the confluence of the two creeks (Figure 4.2) to ensure that stations were not influenced by Hazeltine Creek.[34] The HAC-D (HAC-R5) and E1 monitoring areas sampled in 2023 were consistent with those established in 2021 following the completion of final remediation works in these areas.

Sample collection and analysis methods for 2024 are described herein and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historical sampling areas, refer to the references listed in Table 4.2.

4.2.1 Sample Collection

Periphyton samples for the assessment of community and productivity (chlorophyll-a and ash free dry mass [AFDM]) were collected between August 11 and August 15, 2024. Five stations were sampled in each area (Figures 4.2 and 4.3, Table 4.2), and one chlorophyll-a and one AFDM sample were collected at each replicate station. Periphyton sampling stations were established at a minimum distance of approximately three bankfull widths from adjacent stations and coincided with those for benthic invertebrate community monitoring. Sampling was completed at each station by selecting five representative submerged rocks (excluding those that were too small, highly angular, or uncharacteristic in surface texture). Selected rocks were taken to shore for processing as described below for productivity and community sample collection (Sections 4.2.1.1 and 4.2.1.2, respectively).

A concerted effort was made to ensure that habitat characteristics (water depth, velocity, and substrate characteristics) were comparable among sampling stations and areas to minimize natural influences on the variability of productivity and community endpoints. As outlined in Section 4.1.1, the discharge of water in Hazeltine Creek from 2018 to 2024 was modified by controlling the discharge of water to the creek from Polley Lake (using a weir), and by pumping water from below the thermocline in Polley Lake into the creek to decrease water temperatures

[33] HAC-D monitoring stations were relocated in 2021 with the intention of completing sampling in areas that had been allowed some recovery following the completion of remediation works weeks prior to monitoring. Specifically, stations were relocated upstream into areas with noticeably greater periphyton coverage (indicative of some established biological growth) relative to areas further downstream that were either actively undergoing remediation during biological sampling or where remediation had been completed within days prior to biological sampling efforts (and therefore had lower periphyton coverage; Minnow 2022a).

[34] The monitoring area E1 sampled up to and including 2019 was located downstream of the future confluence of Hazeltine and Edney Creeks (Minnow 2022a).

in the creek. This supplemental pumping increased water depth and velocity in Hazeltine Creek relative to natural conditions which made matching habitat conditions between the exposed (Hazeltine Creek) and reference (Edney Creek and Frypan Creek) areas particularly challenging. Despite these challenges, exposed and reference sampling locations were matched for habitat as closely as possible in 2024. The flow augmentation to Hazeltine Creek also presented challenges for matching exposed and reference area conditions in previous years of monitoring (2018 to 2023; Table 4.2).

Supporting measures were collected at each periphyton sampling station to support data interpretation. Refer to Section 4.6.1 for additional details about supporting measures.

4.2.1.1 Productivity

Periphyton samples were collected for chlorophyll-a analysis using methods consistent with technical guidance (BCMOE 2013, 2016) and the CEMP (MPMC 2019). Briefly, samples were collected at each station by firmly placing a thin acetate template with a 2x2 cm (4 cm²) opening in the middle of each selected rock and scraping off the periphyton within this area using a stainless steel razor blade or scalpel. This was completed for the five rocks selected at each sampling station. Sample material scraped from each of the five rocks was then transferred from the razor blade or scalpel to a large MCE filter paper (filter diameter 47 mm, pore diameter 0.45 µm) until a single composite sample was obtained per station. The total area scraped at each station was recorded (0.002 m²: 4 cm² x 5 rocks) to allow calculation of chlorophyll-a concentration per-unit area for comparison to the BCWQG (100 mg/m²; BCMOWLRS 2025). The filter paper was then folded and placed into a pre-labeled opaque centrifuge tube. This process was repeated for each of the five stations per monitoring area.

The same five rocks sampled for chlorophyll-a analysis were used to collect separate scrapings for analysis of AFDM. Sampling methods for AFDM followed those outlined above for chlorophyll-a (0.002 m² per station); however, material on the razor blade or scalpel from scraping of each rock was rinsed into a pre-labelled plastic scintillation vial with site water added to cover the tissue (as necessary).

Immediately after collection, all chlorophyll-a and AFDM samples were stored in a cooler with ice packs until being frozen prior to shipment (on ice) to the analytical laboratory.

4.2.1.2 Community

Periphyton community samples were collected from the same five rocks used for productivity sampling whenever possible, or from rocks of a similar size collected from the same general location and habitat (i.e., depth and velocity). Sample collection methods were similar to those outlined for AFDM (Section 4.2.1.1). Periphyton was collected from a 2x2 cm (4 cm²) area on five

rocks at each station to form a single composite sample representing 0.002 m² surface area (4 cm² x 5 rocks). The periphyton was removed from each rock using a razor blade or scalpel, then rinsed into a pre-labelled plastic scintillation vial using site water, with additional site water (as necessary) to ensure the sample was fully immersed. (BCMOE 2013, 2016; Stevenson and Bahls 2006). This process was repeated for each of the five stations per monitoring area. Immediately after collection, the sample was preserved with Lugol's iodine solution until the sample was the colour of weak tea (approximately 1 mL of Lugol's per 250 mL of sample; BCMOE 2013, 2016) and was mixed gently by inverting the sampling jar. All periphyton community samples were stored at room temperature prior to shipment to the laboratory for taxonomic analyses.

4.2.2 Laboratory Analysis

4.2.2.1 Productivity

Laboratory analysis of periphyton productivity (chlorophyll-a and AFDM) was completed by ALS Environmental (Burnaby, BC). Upon receipt, laboratory staff opened the coolers, measured temperature to verify the maintenance of cold samples, logged each sample, and assigned each sample a unique sample identification code. A SRN was then sent to MPMC and Minnow for verification.

Analysis of chlorophyll-a followed procedures outlined in Section 3.3.2.1.2. Determination of total AFDM followed procedures adapted from American Public Health Association (APHA) Method 10200 I (APHA 2010). Total AFDM was calculated as the difference between the dried sample weight and the ash weight, both determined gravimetrically. Dry weight was determined following drying at 105°C. The remaining sample was subsequently ignited at 500°C, rewetted to hydrate clays and minerals and brought to a constant weight at 104°C to determine ash weight.

Laboratory QA/QC included reagent blanks and laboratory control samples. Upon completion of the analyses, data reports were provided by ALS Environmental to MPMC and Minnow electronically as an Adobe Acrobat PDF file and a Microsoft Excel spreadsheet (Appendix G).

4.2.2.2 Community

Taxonomic identification and enumeration of periphyton community samples was completed by Biologica in Victoria, BC. Briefly, sample volumes were standardized by adding distilled water. Samples were then homogenized by sonication, settled in Ütermohl chambers for three hours, and all cells within randomly selected FOV were enumerated until a minimum count of 300 algal units (1 unit = >1 cell for colonial or filamentous taxa) were enumerated or until 80 FOV were scanned. Cell units were enumerated rather than individual cells, due to colonial/filamentous algae species containing hundreds of cells per unit. Identification was

performed using an inverted phase contrast microscope at 400x magnification, and algal taxa were identified to a minimum of genus-level (whenever possible) according to the most up-to-date taxonomic references (see laboratory methods description in Appendix G). Periphyton density (cells/cm^2) was determined using the number of units counted, number of cells per unit, proportion sub-sampled, and the total area of the selected FOV.

Laboratory QA/QC included a re-analysis of at least 10% of samples and a calculation of percent agreement among results. Upon completion of the analyses, the data and quality control reports were provided by Biologica to MPMC and Minnow electronically as an Adobe Acrobat PDF file and a Microsoft Excel spreadsheet (Appendix G).

4.2.3 Data Analysis

Upon receipt of the 2024 analytical data, a DQR was performed, including assessments of laboratory internal quality control checks, data completeness, calculations and unit conversions, and laboratory precision. Following completion of the DQR for the periphyton productivity endpoints, productivity results were analyzed as described below. In 2021, the DQR of periphyton community resulted in a request for an investigation of the data by the laboratory that ultimately led to the reissuing of periphyton cell density data from 2018 to 2021 (see Minnow 2022a for details). Once the quality of the 2024 periphyton community data were confirmed through the DQR process, periphyton community results were analyzed as described below, with the corrected periphyton community results from 2018 to 2021 used for all analyses (Minnow 2022a).

4.2.3.1 Metrics

The periphyton community was evaluated using the metrics of organism density (cells/cm^2), taxon richness (No. of taxa), Simpson's Evenness and Diversity, diatom richness, and the relative densities (%) and densities (cells/cm^2) of dominant taxa groups. These metrics were calculated using LPL taxonomy as outlined in Section 3.3.3.1.1. Taxonomic groups evaluated included one or more of the following major ecological groups (based on the presence of these taxa at each sampling area): Diatoms, Chlorophytes (green algae), Chrysophytes (golden algae), Cyanobacteria (blue-green algae), Dinoflagellates, Phaeophytes (brown algae), and Rhodophytes (red algae)[35].

[35] Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 and although the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), they were suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxa (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018.

Periphyton productivity was evaluated using chlorophyll-a and AFDM data, which were converted to standard area-based measurements (mg/m^2 and g/m^2, respectively). Chlorophyll-a measurements were compared to water quality guidelines for eutrophic conditions (BCWQG = 100 mg/m^2; BCMOWLRS 2025) and a classification for moderately enriched streams (21 mg/m^2; Biggs 1996). Periphyton and community endpoints were summarized by area and year, including sample size, mean, median, minimum, maximum, and SD.

Total richness, diatom richness, Simpson's Evenness, and Diversity were calculated under the assumption that each taxonomic group identified by the lab was unique. As a result, richness values reported herein differ slightly from those reported directly by the laboratory (see Appendix G), which only considers taxa that are certainly unique. For example, for the purposes of this report, the taxa Pennate Diatoms and *Diatoma* species were considered as two separate taxa, whereas the richness calculations completed by the laboratory were considered as one taxon. Although this approach may slightly overestimate richness, this is consistent across data sets.

Evaluation of the periphyton community and productivity included comparison to baseline and pre-breach samples collected at the same areas as post-breach samples, where possible. However, the comparability of 2018 to 2024 periphyton community data with historical (1995, 1996, and 2011) datasets is limited due to differences in taxonomic practices and sampling effort across these years. Specifically, the use of multiple taxonomic laboratories since 1995 may have resulted in problems related to misidentifications and/or the use of multiple naming conventions for a single taxon (see Minnow 2019a for details). Furthermore, the taxonomic resolution of historic data was lower than 2018 to 2024 taxonomic analysis, limiting the potential for comparison. The periphyton community data from 2018 to 2024 has greater taxonomic resolution and is considerably more reliable than the historic datasets. The use of varying degrees of qualitative taxonomic analysis (categorizing the degree to which taxa were present as opposed to enumerating them) in 1995 (HKP 1996), 1996 (HKP 1997a), and 2011 (Minnow 2012), substantially limited comparisons that could be made with these data.[36] Due to these data limitations, periphyton metrics for baseline (1995 and 1996) and pre-breach (2011) data excluded Simpson's Evenness and Diversity, and excluded baseline results (but included

[36] Periphyton taxonomy data from 1995, 1996, and 2011 were qualitative, mostly consisting of characterization of presence/absence ("predominant", "common", "abundant," etc.) as opposed to discrete density values. In 1995 and 1996, proportions were reported for some dominant genera and groupings, however the degree to which those data represent quantitative data is unknown without density data. Even in 2011, when data were presented as density, many taxa were presented with "less than" values because the methodology employed by the taxonomist (Fraser Environmental Services) involved some qualitative elements.

pre-breach results) for density based metrics. Statistical comparisons that included baseline and pre-breach data were limited to chlorophyll-a results only.

4.2.3.2 Statistical Analyses

Statistical comparisons of periphyton community and productivity metrics were conducted using baseline (1995, 1996) and pre-breach (2011) data (for chlorophyll-a only) and post-breach data (i.e., 2017 to 2024) to answer the following questions:

1. Were there differences in periphyton community and productivity between exposed and reference areas in 2024?
2. Have the periphyton community and productivity of exposed areas changed among years relative to changes at the reference area over this time, and where pre-breach data exist, has the community recovered to pre-breach conditions?

To answer these questions for community endpoints, results from upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]) were compared to reference (EDC-U). For productivity endpoints, results from upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], and HAC-R3) were each compared to two reference areas (EDC-U and FPC-R3) and to pre-breach results for upper Hazeltine Creek (W7; 1995, 1996, 2011, for chlorophyll-a only). Comparisons for periphyton community and productivity included calculation of community metrics, tabular and graphical presentation, and statistical analyses.

Statistical comparisons of community endpoints and AFDM were completed using two-way ANOVAs with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year*. The analyses were completed using the two-way ANOVA methods and pairwise contrasts described in Section 3.3.3.1.2 with exposed and reference post-breach data from the creeks (2018 to 2024 for community endpoints; 2017 to 2024 for AFDM).

Statistical comparisons of chlorophyll-a were completed using a two-way ANOVA with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year* (as described in Section 3.3.3.1.2), and included baseline, pre-breach, and post-breach (exposed and reference) chlorophyll-a data. Specifically, periphyton chlorophyll-a results from post-breach monitoring (i.e., 2017 to 2024) were compared to baseline data from 1995 (HKP 1996) and 1996 (HKP 1997a), and pre-breach data from 2011 (Minnow 2012) where possible (see Table 4.2). In addition, baseline data (1995 and 1996) were compared between upper Hazeltine (W7) and upper Edney (W9) creeks to evaluate the baseline condition in these areas. Pre-breach data from upper Hazeltine Creek (W7; 2011) were treated as a separate area from HAC-R1, HAC-U (HAC-R2), and HAC-R3 in the two-way ANOVA of chlorophyll-a because baseline and pre-breach data from W7 (2011) were used in comparison to each of the HAC-R1, HAC-U (HAC-R2),

and HAC-R3 areas. The pairwise contrasts for chlorophyll-a differed from those described in Section 3.3.3.1.2. If the *Area* term was significant for the ANOVA, temporal pairwise contrasts were completed among the areas (FPC-R3, EDC-U, W9, W7, HAC-R1, HAC-U [HAC-R2], and HAC-R3; as though a significant interaction had been detected) due to the inherent temporal contrasts of the *Area* term (i.e., baseline and prebreach data for W7 compared to post breach data for HAC-R1, HAC-U [HAC-R2], and HAC-R3). Results of the contrasts of chlorophyll-a from HAC-R1 and HAC-U [HAC-R2] to data from W7 were shown on plots with an "*" for 1995, a "†" for 1996, and a "‡" for 2011. Pairwise comparisons to pre-breach data in tables are shown using the standard letter display (years that share a letter were not significantly different).

All statistical comparisons were conducted using R (R Core Team 2024). Statistically significant differences in periphyton community and productivity between areas were identified using an α of 0.1 (as used for evaluation of all biological data in this report). Significant differences with a MOD that exceeded ±2 SD/MAD were identified as potentially ecologically meaningful in both statistical analyses results and in data interpretation (Environment Canada 2012b[37]), although all statistically significant differences (e.g., including those with a MOD < ±2 SD/MAD) were discussed in the data interpretation. Densities and relative densities (%) of major periphyton taxon groups were plotted as stacked bar charts.[38] Periphyton community and productivity metrics were plotted to support the two-way ANOVA results. Untransformed data were plotted for ease of interpretation and plots were generated using R (R Core Team 2024). As outlined above, periphyton community endpoints for baseline and pre-breach were excluded from statistical contrasts due to data quality limitations but were included in plots for visualization purposes only.

4.3 Benthic Invertebrate Community and Productivity

Benthic invertebrate community and productivity monitoring was completed at exposed areas of Hazeltine Creek (and associated reference areas) between 2022 and 2024, in accordance with the CEMP (MPMC 2019). Post-breach benthic invertebrate community and productivity monitoring at two upper Hazeltine Creek areas (HAC-R1 and HAC-U [HAC-R2]) and at associated reference areas (upper Edney Creek [EDC-U] and Frypan creek [FPC-R3]) was initiated in 2018

[37] Environment Canada (2012b) identifies a CES of ± 2 SDs for evaluating ecologically meaningful changes in benthic invertebrate community. This criterion has been applied here to the interpretation of periphyton community.

[38] In 2018 and earlier, Chrysophytes, Phaeophytes, and Rhodophytes were grouped into an 'Other' category in stacked bar charts. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018."

(Figures 4.2 and 4.3, Table 4.3)[39] and has continued annually since then, in accordance with the CEMP (MPMC 2019). Although not a requirement of the CEMP (MPMC 2019), benthic invertebrate community and productivity monitoring was initiated at an additional exposed area of upper Hazeltine Creek (HAC-R3) in 2020 and has been completed annually since then. The upper reference areas EDC-U and FPC-R3 serve as the reference areas for HAC-R3 (Table 4.3). In lower creek areas, post-breach benthic invertebrate community (but not productivity) monitoring was initiated in 2016 at exposed (E1) and unimpacted (EDC-D [EDC-REF]) areas of lower Edney Creek only. Post-breach monitoring of both community and productivity of benthic invertebrates was initiated in 2017 at an exposed area of lower Hazeltine Creek (HAC-D [HAC-R5]), an exposed area of lower Edney Creek (E1), and an unimpacted reference area in lower Edney Creek (EDC-D [EDC-REF]; Figure 4.2, Table 4.3).[40] Benthic invertebrate community and productivity monitoring at these three lower creek areas has continued biennially since 2017 in accordance with the CEMP (MPMC 2019) and was last completed in 2023 (Table 4.3).

Benthic invertebrate community and productivity monitoring in Hazeltine Creek (and associated reference areas) serves to satisfy the CEMP (MPMC 2019) as well as supporting the evaluation of fish habitat in upper Hazeltine Creek as part of HRWG monitoring objectives (e.g., Minnow 2025). Supporting the evaluation of fish habitat is the sole purpose of the annual benthic invertebrate community and productivity monitoring completed at areas HAC-R3 and FPC-R3 since 2020 and 2018, respectively. As described in Section 4.2 (for periphyton productivity monitoring), a different approach to reporting results from HAC-R3 and FPC-R3 has been used in the present report compared to previous years, with the objective of improving reporting clarity and efficiency with the HRWG report. In the present report, benthic invertebrate community, and productivity results from both HAC-R3 and FPC-R3 from all years of monitoring have been incorporated throughout data tabulation, analyses, and interpretation (rather than tabular data presentation only).

Channel remediation works at HAC-R1 and HAC-U (HAC-R2) were completed in 2016 and 2017, respectively, and at HAC-R3 were completed in 2019. Channel remediation works in the vicinity of HAC-D (HAC-R5) and E1 were initiated in 2015 and completed in 2021; see Section 4.2 for

[39] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting (Minnow 2025). Post-breach benthic invertebrate community and productivity at the Frypan Creek reference area (FPC-R3) was initiated in 2017 (Table 3.4) but monitoring results from this monitoring event are excluded from consideration in the present report (including data analysis; Section 4.3.3) because a single sample was collected in 2017 (n=1).

[40] HAC-R5 and EDC-REF are the alternate names used for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting (Minnow 2025).

Table 4.3: Overview of Benthic Invertebrate Community and Productivity Monitoring in Creeks in the Vicinity of the Mount Polley Mine, 1995 to 2024[a]

Waterbody		Area Type	Area Code[b]	Baseline[c]			Pre-Breach											
				1995 (HKP 1996)	1996 (HKP 1997a)	1999 (Beak 2000)	2002 (Morrow/ Azimuth 2003)	2007 (Minnow 2009)	2016[d] (Minnow 2017a)	2017 (Minnow 2018a)	2018 (Minnow 2019a)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Hazeltine Creek	Upper	Exposed (Remediated in 2016)	HAC-R1	-	-	-	-	-	-	-	5	5	5	5	5	5	5
		Exposed (Remediated in 2017)	HAC-U (HAC-R2) [W7 in 1995 to 1999, UHC in 2007]	3	3	3	-	5	-	-	5	5	5	5	5	5	5
		Exposed (Remediated in 2019)	HAC-R3	-	-	-	-	-	-	-	-	-	5	5	5	5	5
	Lower	Exposed (Remediated in 2015, 2020, 2021)	HAC-D (HAC-R5) [W11 in 1995 to 1999, LHC in 2007]	3	3	3	-	5	-	5	-	5	-	5	-	5	-
Edney Creek	Upper	Reference	EDC-U [W9 in 1995 to 2002, UER in 2007]	3	3	3	3	5	-	-	5	5	-[c]	5	5	5	5
	Lower	Reference	EDC-D (EDC-REF) [W10 in 1995 to 1999]	3	3	3	-	-	5	5	-	5	-	5	-	5	-
		Exposed (Remediated in 2015, 2020, 2021)	E1 (EDC-EXP)	-	-	-	-	-	5	5	-	5	-	5	-	5	-
Frypan Creek		Reference	FPC-R3	-	-	-	-	-	-	1	5	5	5	5	5	5	5

Laboratory analysis did not include determination of total wet and dry biomass.

Notes: "-" = not applicable, LPL = Lowest Practicable Level taxonomy. Only monitoring efforts that used the following methodology are displayed: Surber/ Hess sampler, 3-grab composite, 250 µm sieve, LPL. Prior to 2019, alternate sampling methodologies were employed. See Minnow 2019a for a detailed list of these alternate sampling methods.

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored between 2022 and 2024 are displayed, as well as historical data for these areas. Collection of benthic invertebrate biomass data was initiated in 2017.

[b] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[c] In 1995 and 1996, each sample was a single grab collected by Surber with 243 µm mesh (HKP 1996, 1997a). In 1999, each sample was a composite of 3 Surber grabs with a 250 µm mesh (Beak 2000).

[d] Monitoring was not completed at the upper Edney Creek reference area (EDC-U) in 2020 due to differences in habitat variables (water depth and velocity) relative to the remediated areas of upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], and HAC-R3) for which it is a reference.

details of the remediation timeline and monitoring station placement in these monitoring areas during remediation activities.

Sample collection and analysis methods for 2024 only are described herein and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historic sampling areas, refer to the references listed in Table 4.3.

4.3.1 Sample Collection

Benthic invertebrate community samples were collected between August 7 and 15, 2024. Five stations were sampled in each area (Figures 4.2 and 4.3, Table 4.3) to provide adequate statistical power to detect differences of ± two SDs at α and β of 0.10. One sample was collected at each station, and each sample was a composite of three sub-samples to ensure that each sample was representative of the sampling station. Each sampling station was established at a minimum distance of approximately three bankfull widths from adjacent stations and coincided with those for periphyton monitoring. Sampling methods were in accordance with technical guidance (BCMOE 2013, 2016) and the CEMP (MPMC 2019).

Samples were collected using a Hess sampler (0.1 m^2 cylinder) in upper Hazeltine Creek (HAC-R1, HAC-U, HAC-R3) and a Surber sampler (30.5 x 30.5 cm square; 0.093 m^2) in Edney Creek (EDC-U), and Frypan Creek (FPC-R3). The samplers were each equipped with 250 µm mesh, which was selected to allow comparability to pre-breach data (Minnow 2009). Each sub-sample was collected by carefully inserting the base of the sampler into undisturbed substrate. Cobble and gravel contained within the sampler was carefully washed to remove debris and organisms, allowing the current to carry dislodged organisms and debris into the collection net. Once the organisms were rinsed into the collection net, the sampler was moved to the next sub-sampling location within a station. This procedure was repeated until three sub-samples were collected from each station, forming a single sample (i.e., approximately 0.300 m^2 and 0.279 m^2 of total creek surface area for a Hess and Surber sampler, respectively). Material and organisms retained in the collection net were then carefully transferred to one or more pre-labelled 1 L wide mouth plastic jars. This transfer was completed using a wash bottle over a plastic tub to avoid any potential loss of organisms. Any organisms that fell into the tub or adhered to the sieve bag were removed and added to the sample. Each sample was preserved with buffered formalin solution to achieve a nominal concentration of 10% and stored at room temperature until shipment to the laboratory.

A concerted effort was made to ensure that water depth, water velocity, and substrate characteristics were comparable among sub-samples, stations, and sampling areas, to minimize the influence of natural variability on benthic invertebrate community and productivity endpoints. As outlined for periphyton (see Section 4.2.1 for details), the pumping of water from below the

thermocline in Polley Lake into Hazeltine Creek presented challenges for matching habitat conditions between Hazeltine Creek and reference (Edney Creek and Frypan Creek) areas in 2024 similar to previous years of monitoring (2018 to 2023; Table 4.3).

Supporting measures were collected at each sampling station to support data interpretation. Refer to Section 4.6.1 for additional details about supporting measures.

4.3.2 Laboratory Analysis

Taxonomic identification of benthic invertebrate community samples from creek habitats was completed by Cordillera Consulting using the standard methods and QA/QC measures described in Section 3.5.2 for benthic invertebrate community samples from lakes.

Following taxonomic identification, the wet and dry biomass of each sample was determined as follows[41]. For wet biomass, a piece of fine mesh was weighed, and the weight recorded in an Excel template. The identified organisms were split into the pre-determined groups for weighing and then placed onto the mesh. Excess liquid was absorbed by blotting gently with absorbent paper. The mesh and organisms were then weighed to the nearest 0.0001 g using a digital balance, with weights entered in the Excel spreadsheet. The total sample wet weight was determined by subtracting the weight of the mesh from the total weight. For dry biomass, glass fiber filters were labeled and dried in an oven at 150°F for four hours, then stored until use. Just before use, filters were weighed, and the mesh weight was entered in an Excel template. Organisms were placed on the filter and dried at 150°F for four hours. Following a standardized short period of cooling, samples were weighed as described above, and total sample dry weight was calculated in Excel.

Laboratory QA/QC measures and the delivery of data were completed as described in Section 3.5.2 for lake benthic invertebrate community samples.

4.3.3 Data Analysis

Upon receipt of the analytical data, a DQR was performed, including an examination of data completeness, organism sorting efficiency, sub-sampling precision and accuracy error, and taxonomic identification error (see Appendix B). Following completion of the DQR, benthic invertebrate community results were analyzed as described below.

[41] Total wet and dry biomass analysis was initiated in 2017; benthic invertebrate biomass data do not exist prior to 2017 (Table 4.3).

4.3.3.1 Metrics

Benthic invertebrate community condition was evaluated using metrics of organism density (organisms/m^2), taxon richness (No. of taxa), Simpson's Diversity and Evenness, and the relative density (%) and density of dominant taxa groups. These endpoints were calculated at the LPL of taxonomy, following taxa exclusions, application of the decision key, and the collapsing of taxonomic data to maintain consistency among years as outlined in Section 3.5.3.1. The benthic invertebrate community composition was further examined using CA, using the methods detailed in Section 3.5.3.1. Benthic invertebrate productivity was evaluated using total wet and dry biomass, which was converted to a standard area-based measurement (g/m^2). Benthic invertebrate community metrics (including CA station scores) were calculated for each monitoring area in each year and were summarized by area and year using the following statistics: sample size, mean, median, minimum, maximum, and SD.

Evaluation of the benthic invertebrate community of upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], and HAC-R3) included comparison of post-breach results to samples collected from a similar area of upper Hazeltine Creek during pre-breach monitoring in 2007 (UHC; Minnow 2009; Table 4.3). Methods employed in post-breach monitoring were consistent with those used during pre-breach sampling in 2007, enabling comparisons to pre-breach conditions (Table 4.3). Post-breach results from HAC-U (HAC-R2) and EDC-U in were not compared to baseline results 1995, and 1996 (from W7 and W9, respectively; Table 4.3) because differences in sample collection methods and in taxonomic resolution precluded comparison. Adequate baseline for comparison to post-breach results is provided by the 2007 results.

Despite the consistencies between pre-breach and post-breach data collection methods, comparison of these results is still challenging due to the use of different laboratories for the taxonomic analyses, and the large time span between data collection for the two studies (over which general improvements in laboratory protocols have occurred). A major difference between the pre-breach and post-breach data is that aquatic mites were not identified to a taxonomic level more specific than Subclass (Acari) in 2007 but were identified to genus in post-breach data, and springtails were identified to Class (Collembola) in 2007 but were identified to Family in post-breach data. Therefore, to keep data consistent and comparable to the pre-breach (2007) results, the aquatic mite and spring-tail data were collapsed to Class (Arachnida and Collembola, respectively). These reassignments were all completed prior to calculation of benthic community endpoints described above.

4.3.3.2 Statistical Analyses

Statistical analyses of benthic invertebrate community and productivity metrics were conducted using pre-breach (2007) and post-breach (2018 to 2024) to answer the following questions:

1. Were there differences in benthic invertebrate community and productivity between exposed and reference areas in 2024?
2. Have the benthic invertebrate community and productivity of exposed areas changed among years relative to changes at reference areas over this time, and where pre-breach data exist, has the community recovered to pre-breach conditions?

To answer these questions, results from upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], and HAC-R3) were each compared to the two reference areas (EDC-U and FPC-R3) and to pre-breach results for upper Hazeltine Creek (UHC; 2007). Comparisons for benthic invertebrate community and productivity included calculation of community metrics (including CA), tabular and graphical presentation, and statistical analyses.

Statistical comparisons were completed using two-way ANOVAs with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year*. The analyses were completed using the two-way ANOVA methods described in Section 3.3.3.1.2 with pre-breach and post-breach (exposed and reference) data from the creeks. Comparisons of benthic invertebrate community and productivity endpoints were completed between exposed and reference areas for each year that paired exposed and reference data were available for an endpoint, including pre-breach (see Table 4.3).

Within the two-way ANOVAs, the post-breach data (i.e., HAC-R1, HAC-U [HAC-R2], and HAC-R3; 2018 to 2024) were compared to pre-breach data (i.e., UHC; 2007) as separate areas (as described in Section 4.2.3.2). Pairwise contrasts were conducted as described in section 3.3.3.1.2, except that If the *Area* term was significant for the ANOVA, temporal pairwise contrasts were completed among all the areas (FPC-R3, EDC-U, UHC, HAC-R1, HAC-U [HAC-R2], and HAC-R3; as though a significant interaction had been detected). This approach for pairwise contrasts was used due to the inherent temporal contrasts of the *Area* term (i.e., pre-breach data for UHC compared to post-breach data for HAC-R1, HAC-U [HAC-R2], and HAC-R3). In addition, pre-breach data (2007) were compared between upper Hazeltine (UHC) and upper Edney (UER) creeks to evaluate the pre-breach condition in these areas. Pairwise comparisons to pre-breach data in tables are shown using the standard letter display (years that share a letter were not significantly different). Results of the contrasts of HAC-R1, HAC-U [HAC-R2], and HAC-R3 to pre-breach data from UHC (2007) are shown on figures with an asterisk "*" indicating a significant difference relative to pre-breach.

Interpretation of benthic invertebrate community metrics was enhanced by inspection of raw data and taxonomic proportions to detect patterns of ecologically relevant differences between the exposed and pre-breach areas. Ecological and habitat requirements of benthic invertebrates, as outlined in standard references (Clarke 1981; Edmunds et al. 1976; Weiderholm 1983; Wiggins 1996; Vieira et al. 2006, Merritt et al. 2008) were used in data interpretation. All statistical comparisons were conducted using R (R Core Team 2024). Statistically significant differences in benthic invertebrate community between areas were identified using an α of 0.1 (as used for evaluation of all biological data in this report). Significant differences with a MOD that exceeded ±2 SD/MAD were identified as potentially ecologically meaningful in statistical analyses results and in data interpretation (Environment Canada 2012b[42]). Densities and relative densities (%) of major benthic invertebrate groups were plotted as stacked bar charts. Benthic invertebrate community metrics were plotted to support the two-way ANOVA results. Untransformed data were plotted for ease of interpretation and plots were generated using R (R Core Team 2024).

Correlation analyses were completed to investigate the relationships between benthic invertebrate community metrics and supporting measures of physical and chemical conditions in these areas since initial remediation. The correlation analyses included pre-breach data from upper Hazeltine and Edney creeks (UHC and UER respectively; 2007) and post-breach data (2018 to 2024) from upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3), Upper Edney Creek (EDC-U), and Frypan Creek (FPC-R3). Benthic invertebrate community metrics were compared to the environmental variables water depth, velocity, temperature, dissolved oxygen (concentration and %), pH, specific conductivity, and substrate size using Spearman's Rank correlation (as described in Section 3.5.3.2). A Bonferroni-type correction (i.e., α [0.05] divided by the total number of independent variables) was applied to minimize the risk of declaring false positive correlations. Statistically significant correlations found at the Bonferroni-adjusted p-value were further investigated using scatter plots to determine if a continuous distribution of data was realized (possible causal relationships) or if these relationships were leveraged by outlying points (or groups of points).

4.4 Periphyton and Benthic Invertebrate Tissue Quality

Periphyton and benthic invertebrate tissue quality monitoring was completed at exposed areas of Hazeltine Creek and Edney Creek (and associated reference areas) annually between 2022 and 2024, in accordance with the CEMP (MPMC 2019). Post-breach benthic invertebrate tissue quality monitoring was initiated in 2015 at exposed areas of upper (HAC-U [HAC-R2]) and lower (HAC-D [HAC-R5]) Hazeltine Creek, and at an unimpacted reference area of lower Edney Creek

[42] Environment Canada (2012b) identifies a CES of ± 2 SDs for evaluating ecologically meaningful changes in benthic invertebrate community.

(EDC-D [EDC-REF]; Figure 4.3, Table 4.4).[43] Tissue quality monitoring in creek habitats was expanded in 2017 to include the initiation of periphyton tissue quality sampling and the inclusion of another exposed area of upper Hazeltine Creek (HAC-R1; Figure 4.3, Table 4.4). Periphyton and benthic invertebrate tissue quality monitoring was initiated at the upper Edney Creek reference area (EDC-U) and at the exposed lower Edney Creek area (E1) in 2018 and 2019, respectively. Monitoring of periphyton and benthic invertebrate tissue quality has continued annually at exposed areas of upper and lower Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-D [HAC-R5]) and unimpacted reference areas of Edney Creek (EDC-U, EDC-D [EDC-REF]) since 2018, and has continued annually at the exposed area of lower Edney Creek (E1) since 2019 (Table 4.4). This annual periphyton and benthic invertebrate tissue quality monitoring since 2018/2019 has been in accordance with the CEMP (MPMC 2019).

Some temporal differences exist in the composition of benthic invertebrate samples, including the collection of composite-taxa and/ or single taxon (caddisfly) sample types (Table 4.4). Composite-taxa samples are representative of the range of taxa present at a sampling area and are reflective of dietary exposure for fish, therefore may be used in assessment of fish habitat. Single-taxon samples represent one taxon group and were collected to decrease the potential variability in results related to differences among benthic invertebrate taxa in tissue quality. Both single taxon (caddisfly) and composite-taxa samples have been collected at each sampling area from 2018 to 2024, consistent with the CEMP (MPMC 2019). Prior to 2018, either composite-taxa (2009 to 2015) or single taxon (2016 and 2017) benthic invertebrate tissue quality samples were collected (see Table 4.4 and Minnow 2018c, 2019a for details).

Sample collection and analysis methods for 2024 are described herein and are consistent with those outlined in the CEMP (MPMC 2019). For details pertaining to prior sampling years, including equivalent historic sampling areas, refer to the references listed in Table 4.4.

4.4.1 Sample Collection

Periphyton and benthic invertebrate tissue samples were collected from eight replicate stations within each area (n=8; Figure 4.2, Table 4.4) between August 8 and 15, 2024. Three tissue quality samples were collected at each replicate station: one periphyton sample, one single taxon (caddisfly) benthic invertebrate sample, and one composite-taxa benthic invertebrate sample (Table 4.4).

A periphyton tissue sample was collected at each station by scraping periphyton from the surface of at least five rocks using a scalpel until a sufficient sample weight (i.e., more than 0.5 g

[43] HAC-R2, HAC-R5, and EDC-REF are the alternate names for HAC-U, HAC-D, and EDC-D for HRWG reporting (Minnow 2025).

Table 4.4: Overview of Periphyton and Benthic Invertebrate Tissue Quality Monitoring in Creeks in the Vicinity of the Mount Polley Mine, 2009 to 2024[a]

Waterbody		Area Type	Area Code[b]	Tissue	Pre-Breach[c]					Post-Breach[c]									
					2009 (Minnow 2011)	2010 (Minnow 2011)	2011 (Minnow 2012)	2012 (Minnow 2013a)	2013 (Minnow 2013b)	2015 (Minnow 2016b)	2016 (Minnow 2017b)	2017 (Minnow 2018b)	2018 (Minnow 2019a)	2019 (Minnow 2020a)	2020 (Minnow 2021a)	2021 (Minnow 2022a)	2022 (Minnow 2023a)	2023 (Minnow 2024a)	2024
Hazeltine Creek	Upper	Exposed (Remediated in 2016)	HAC-R1	Periphyton	-	-	-	-	-	-	-	8	8	8	8	8	8	8	8
				Benthic Invertebrates	-	-	-	-	-	-	-	8	8	8	8	8	8	8	8
		Exposed (Remediated in 2017)	HAC-U (HAC-R2) [W7 prior to 2015]	Periphyton	-	5	5	8	5	-	-	-	8	8	8	8	8	8	8
				Benthic Invertebrates	5	5	-	8	8	5	3	-	8	8	8	8	8	8	8
	Lower	Exposed (Remediated in 2015, 2020, 2021)	HAC-D (HAC-R5) [W11 prior to 2015]	Periphyton	-	5	5	5	5	-	-	8	8	8	8	8	8	8	8
				Benthic Invertebrates	-	5	-	5	5	8	3	12[d]	8	8	8	8	8	8	8
Edney Creek	Upper	Reference	EDC-U	Periphyton	-	-	-	-	-	-	-	-	8	8	8	8	8	8	8
				Benthic Invertebrates	-	-	-	-	-	-	-	-	8	8	8	8	8	8	8
	Lower	Reference	EDC-D (EDC-REF)	Periphyton	-	-	-	-	-	-	-	8	8	8	8	8	8	8	8
				Benthic Invertebrates	-	-	-	-	-	5	3	8	8	8	8	8	8	8	8
		Exposed (Remediated in 2015, 2020, 2021)	E1	Periphyton	-	-	-	-	-	-	-	-	-	8	8	8	8	8	8
				Benthic Invertebrates	-	-	-	-	-	-	-	-	-	8	8	8	8	8	8

Shading indicates only selenium was monitored.
Shading indicates areas were exposed to effluent being conveyed by Hazeltine Creek to Quesnel Lake.

Notes: "-" = not applicable/not sampled.

[a] Numbers indicate the number of stations sampled per area. Only sampling areas that were monitored in 2023 are displayed, as well as historical data for these areas.

[b] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[c] Composite-taxa benthic invertebrate samples were collected from 2009 to 2015. In 2016 and 2017, stoneflies and caddisflies were sampled at reference and exposed areas, respectively. In 2018 to 2023, both composite-taxa samples and single taxon (caddisfly) samples were collected at all areas.

[d] Eight samples for stoneflies and eight samples for caddisflies were sampled at a total of 12 stations.

wet weight) was attained for analysis. The periphyton scrapings were then placed into a pre-labeled plastic scintillation vial without the addition of site water.

Benthic invertebrate tissue samples were collected at each station using a combination of kick-and-sweep and hand picking. The kick-and-sweep method involved a field technician moving upstream and across the stream channel (in a zig-zag pattern) while holding a kick net (a net with a triangular opening and a 400 µm mesh bag) immediately downstream and disturbing the substrate with their feet to dislodge benthic organisms into the net. The net was then rinsed with water to move all debris and invertebrates to the collection cup at the bottom of the net. The collection cup was removed and the contents (i.e., invertebrates and debris) were poured into a white tub. Benthic invertebrates were then picked free of debris and transferred into pre-labelled plastic scintillation vials without the addition of site water. Hand picking entailed overturning rocks in the streambed and collecting any benthic invertebrates observed. Both kick-and-sweep and hand-picking methods were employed at each erosional sampling station to collect benthic invertebrate samples. Two types of benthic invertebrate tissue samples were collected from each station: composite-taxa and single taxon (caddisfly).

Duplicate (split) samples were collected at a target frequency of 10% for QA/QC purposes and were evenly distributed among sampling areas and tissue types. Following collection, samples were stored in a cooler with ice packs until being frozen prior to shipment (on ice) to the analytical laboratory.

4.4.2 Laboratory Analysis

Laboratory analysis of periphyton and benthic invertebrate tissue quality samples was completed by ALS Environmental (Burnaby, BC) using the same methods and QA/QC measures outlined in Section 3.4.2.

4.4.3 Data Analysis

Upon receipt of periphyton and benthic invertebrate tissue quality data, a DQR was completed, including an examination of data completeness, LRLs achieved, laboratory precision, laboratory accuracy, and field precision (Appendix B).

Benthic invertebrate tissue quality data from 2024 were screened against the British Columbia selenium guideline for the protection of aquatic life (for invertebrate tissue) of 4 mg/kg dw (BCMOE 2014). Summary statistics for 2024 were calculated for each analyte by area and tissue type, including mean, SD, minimum, median, and maximum values. Summary statistics were calculated using the K-M method as described in Section 3.8.3.1. Data analysis and interpretation of periphyton and benthic invertebrate tissue quality focused on primary and secondary analytes (Table 2.4).

4.4.3.1 BCF and TTF Calculation

Concentrations of the primary and secondary analytes in periphyton and benthic invertebrate tissues were evaluated relative to concentrations in water. The ratio of ([tissue sample concentration]/ [dissolved water concentration]) is referred to as a Bioconcentration Factor (BCF). These ratios are often used to describe the extent to which an analyte is taken up by an organism from the surrounding environment through exposure routes other than diet (i.e., Arnot and Gobas 2006) and are applicable to erosional areas where sediments are generally rare. The BCFs were calculated using mean tissue analyte concentrations (dry weight) and mean aqueous dissolved analyte concentrations from routine water quality monitoring stations near each tissue sampling area (Figure 4.2). Mean aqueous analyte concentrations were calculated as described in Section 3.8.3.1 using data from the one-year period prior to sampling (i.e., September 2023 to August 2024). Mean values at the LRL were replaced with the LRL for the calculation of the BCF ratios. For EDC-U, routine water quality data were not collected by MPMC, and so BCFs were calculated using data from the spot water samples collected during tissue collection.

Concentrations of primary and secondary analytes in benthic invertebrate tissue were also evaluated relative to concentrations in periphyton tissue. These ratios of concentrations are referred to as Trophic Transfer Factors (TTFs) and can be estimated for benthic invertebrates assuming they inhabit a single trophic level above periphyton (i.e., TTF = [benthic invertebrate sample] / [periphyton sample]). TTFs can be used to describe the extent to which analyte concentrations increase between lower and higher trophic levels (e.g., Presser and Luoma 2010). Paired observations of benthic invertebrate and periphyton tissue quality were used to calculate TTFs for each replicate station in 2024 (i.e., eight replicate TTFs per area in 2024). In addition, data collected pre-breach (2010), and in prior post-breach years (i.e., 2017 to 2023; years when both periphyton and benthic invertebrate tissue samples were collected) were also used to calculate TTFs in Hazeltine Creek (refer to previous reports outlined in Table 4.4). If an analyte concentration for either the nominator (benthic invertebrate tissue analyte concentration) or denominator (periphyton tissue analyte concentration) in the TTF calculation was censored (i.e., < LRL), the TTF was not calculated. The calculated TTFs were then summarized by year and area calculating the mean, SD, median, minimum, and maximum.

4.4.3.2 Statistical Analyses

Statistical analyses of analyte concentrations in 1) periphyton tissue, 2) caddisfly tissue, and 3) composite-taxa benthic invertebrate tissue samples and associated TTFs (for caddisfly and composite-taxa benthic invertebrate tissues) were conducted using pre-breach (2010) and

post-breach (2015 to 2024 for tissue analyte concentrations; 2017 to 2024 for TTFs)[44] data to answer the following questions:

1. Have mean analyte concentrations or TTFs at the exposed area changed over time relative to the reference area?
2. Were there differences in mean analyte concentrations or TTFs between exposed and reference areas, and does the difference depend on year?
3. Do mean analyte concentrations or TTFs at exposed areas differ from pre-breach conditions?

To answer these questions, data were grouped into three categories for separate tabular and graphical presentation and statistical analyses:

1. The exposed areas of upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; 2018 to 2024 for periphyton and composite and single-taxon benthic invertebrates) compared to reference (EDC-U; 2018 to 2024 for periphyton and composite and single-taxon benthic invertebrates).
2. The exposed area of lower Hazeltine Creek (HAC-D [HAC-R5]; 2017 to 2024 for periphyton, 2015 and 2018 to 2024 for composite-taxa and 2018 to 2024 for single-taxon benthic invertebrates) compared to reference (EDC-D [EDC-REF]; 2017 to 2024 for periphyton, 2015 and 2018 to 2024 for composite-taxa and 2018 to 2024 for single-taxon benthic invertebrates).
3. The exposed area of lower Edney Creek (E1; 2019 to 2024 for periphyton and composite and single-taxon benthic invertebrates) compared to reference (EDC-D [EDC-REF]; 2019 to 2024 for periphyton and composite and single-taxon benthic invertebrates).

Questions 1 and 2 were answered by conducting a two-way ANOVA assessing the relative differences between exposed and reference areas, with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year.* The two-way ANOVA was completed *as* detailed in Section 3.1.3.2 (for Questions 1 and 2) to address the same questions.

To answer Question 3, post-breach results (2015 to 2024) were statistically contrasted to pre-breach data, where possible. Pre-breach data were collected for periphyton and composite-taxa benthic invertebrate tissue quality from HAC-U (HAC-R2) and HAC-D (HAC-R5) in 2010 (W7 and

[44] Paired periphyton and benthic invertebrate tissue quality monitoring during the post-breach period was initiated in 2017; post-breach periphyton tissue quality results do not exist prior to this. Therefore, TTFs cannot be calculated prior to 2017.

W11, respectively; Table 4.4).[45] The comparisons to pre-breach were conducted using a censored one-way ANOVA with *Year* as the factor as described in Section 3.7.3.2 and were used to contrast post-breach results for periphyton tissue quality, composite-taxa benthic invertebrate tissue quality, and TTFs to pre-breach conditions. The TTF data (calculated as described in Section 4.4.3.1) did not contain censored (i.e., < LRL) values, therefore the ANOVA models for comparison of TTFs were fit with least-squares estimation (i.e., not MLE) and $\log_{10}$ transformed response variables. Data used in these comparisons included the following:

1. Post-breach periphyton tissue quality, composite-taxa benthic invertebrate tissue quality, and TTF results from HAC-R1 and HAC-U (HAC-R2) compared to pre-breach results from HAC-U (HAC-R2; W7); and
2. Post-breach periphyton tissue quality, composite-taxa benthic invertebrate tissue quality, and TTF results from HAC-D (HAC-R5) compared to pre-breach results from HAC-D (HAC-R5; W11).

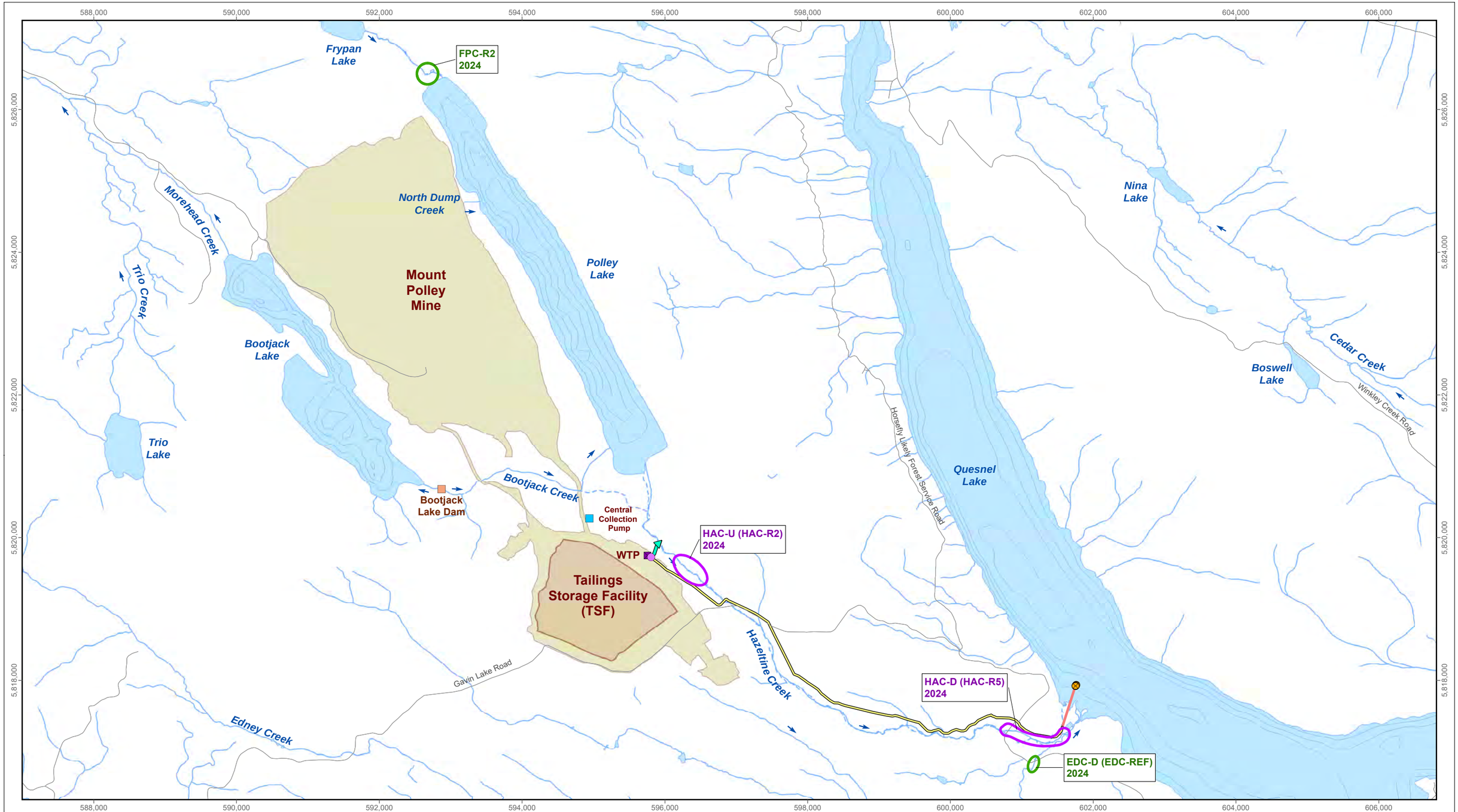
Although statistical analyses were conducted for all analytes detected in the chemical analyses, data presentation, interpretation, and discussion were focused on the identified primary and secondary analytes (see Table 2.4). Plots of data that support the two-way ANOVA were presented for primary and secondary analytes that: 1) had a significant *Area×Year* interaction in the analyses and had a positive MOD for 2024 (i.e., exposed concentrations were significantly higher than reference) or negative MOD for 2024 (i.e., exposed concentrations were significantly lower than reference); and 2) lacked a significant *Area×Year* interaction in the analyses but had a positive overall MOD (i.e., exposed concentrations were significantly higher than reference and the difference did not depend on year). Results of the contrasts to pre-breach (2010) were shown on the two-way ANOVA figures with an "*" indicating a significant difference relative to pre-breach.

All statistical analyses were conducted using R software (R Core Team 2024). A significance level $\alpha = 0.05$ was used for statistical comparisons, as was used for the evaluation of all chemical data in this report.

4.5 Fish Tissue Quality

Fish tissue quality monitoring was completed at exposed areas of Hazeltine Creek (and associated reference areas) in 2024. In upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; exposed) and an associated reference area (Frypan Creek; FPC-R2), post-breach fish tissue quality monitoring was initiated in 2018 and occurred again in 2024 (Figure 4.4, Table 4.5).

[45] Pre-breach periphyton and composite-taxa benthic invertebrate tissue quality samples were also collected in 2011 to 2013 at HAC-U and HAC-D, and from HAC-U in 2009. Reported data for these samples included selenium as the only analyte, therefore these results were not included in statistical contrasts to pre-breach data.



LEGEND

- Exposed
- Reference
- Diffuser (Treated Effluent Discharge, December 2015 to present)
- Effluent Mixing Tank
- Water Treatment Plant (WTP)
- Discharge to Hazeltine Creek (Apr 10 2014 to Aug 14 2014 and Nov 29 2015 to Sept 30 2017)
- Effluent Discharge Pipeline (January 2018 to present)
- Discharge to Diffusers (2015 to present)
- Historic Watercourse

0 0.75 1.5 3 km

N W E S

Projection: North American Datum 1983 UTM Zone 10U

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Fish Tissue Quality Monitoring Areas, Hazeltine, Frypan, and Edney Creeks, 2024

Date: March 2025
Project 247202.0004

minnow environmental inc.

Figure 4.4

Document Path: C:\Users\MLaPalme\Trinity Consultants, Inc\Imperial Metals - 247202.0004 - 2024 MPMC\D - GIS\1-2024 CEMP\Task 6\24-04 Figure 4.4 Fish Tissue Monitoring Areas, Hazeltine, Frypan, and Edney Creeks.mxd

Table 4.5: Overview of Juvenile Fish Tissue Quality Monitoring in Creeks in the Vicinity of the Mount Polley Mine, 2018 to 2024

Waterbody or Area		Area Code[a]	Area Type	Fish Species (Species Code)	Target Tissue	Post-Breach	
						2018 (Minnow 2019d)	2024
Hazeltine Creek	Upper	HAC-R1 (Reach 1)	Exposed (Remediated in 2016)	rainbow trout (RB)	Whole-body	8[b]	-
		HAC-U (Reach 2; HAC-R2) [W7 prior to 2015]	Exposed (Remediated in 2017)	rainbow trout (RB)	Whole-body		8
	Lower	HAC-D (Reach 5; HAC-R5) [W11 prior to 2015]	Exposed (Remediated in 2015, 2020, 2021)	rainbow trout (RB)	Whole-body	-	1[c]
				coho salmon (CO)	Whole-body	-	8
Edney Creek	Lower	EDC-D (EDC-REF)	Reference	rainbow trout (RB)	Whole-body	-	8
				coho salmon (CO)	Whole-body	-	8
Frypan Creek		FPC-R2 (Reach 2)	Reference	rainbow trout (RB)	Whole-body	8	8

Notes: "-" = no data/ no samples collected. Juvenile fish tissue samples were collected as whole-body samples. In 2024, rainbow trout were targeted from upper creek areas (n= 8 per area), while rainbow trout and coho salmon were targeted from lower creek areas (n = 8 per area). Coho salmon are not present in the upper creek areas.

[a] Alternate area identifiers used for HRWG reporting are noted, where applicable.

[b] Rainbow Trout from upper Hazeltine Creek in 2018 were captured from two stations in HAC-R1 and two stations in HAC-U (HAC-R2). See Appendix Table D.6.1 and Minnow (2019d) for details of sampling locations within these two areas.

[c] The target sample size (n = 8) for rainbow trout in lower Hazeltine Creek (HAC-D [HAC-R5]) was not be achieved as only one (n=1) rainbow trout was captured in this area during fishing efforts.

Fish tissue quality monitoring completed in upper creek areas in 2018 and 2024 targeted whole-body samples of juvenile rainbow trout. In lower Hazeltine Creek (HAC-D [HAC-R5]; exposed) and an associated reference area (unimpacted lower Edney Creek; EDC-D [EDC-REF]), post-breach fish tissue quality monitoring was initiated in 2024 (Figure 4.4, Table 4.5). Fish tissue quality monitoring completed in the lower creek areas in 2024 targeted whole-body samples of juvenile rainbow trout and juvenile coho salmon (*Oncorhynchus kisutch*; Table 4.5). Whole-body juvenile fish tissue quality data do not exist for the lower creek areas prior to 2024 (Table 4.5).

Fish tissue quality monitoring in creek habitats is not a requirement of the CEMP (MPMC 2019). The primary purpose of implementing fish tissue quality monitoring in exposed areas of upper and lower Hazeltine Creek (and associated reference areas) in 2024 was to investigate tissue selenium concentrations in juvenile fish species (i.e., rainbow trout and coho) as it relates to dietary exposure to benthic invertebrate tissue selenium concentrations. The fish tissue monitoring completed in creek habitats in 2024 is consistent with Condition 3(g) of the draft CEMP approval conditions dated May 16, 2024 (BCMOECCS 2024), which specified the following:

> *"Conduct annual juvenile fish tissue chemistry sampling in upper and lower Hazeltine creek and corresponding reference locations."*

4.5.1 Sample Collection

Fish collections in upper Hazeltine Creek (exposed; HAC-U [HAC-R2]) and Frypan Creek (reference; FPC-R2) were completed from August 8 to 12, 2024, under BCMOWLRS Fish Permit WL24-846725. Closed-station backpack electrofishing was used to target juvenile rainbow trout at HAC-U (HAC-R2; exposed) and FPC-R2 (reference) as follows. Electrofishing stations were enclosed using 3/8" mesh stop nets installed at the upstream and downstream extent of the station. An electrofishing team, consisting of an electrofishing unit operator and a netter, employed a multiple pass removal method at each station whereby one upstream pass (or "sweep") of the enclosed reach was repeated three or more times. Fish captured during each closed station sweep were placed in buckets of aerated water prior to processing and/or release.

Fish collections in lower Hazeltine Creek (exposed; HAC-D [HAC-R5]) and an unimpacted area of lower Edney Creek (reference; EDC-D [EDC-REF]) were completed from August 7 to 14, 2024 and from October 21 to 25, 2024 under BCMOWLRS Fish Permit WL24-846725 and DFO Fish Permit XR 145 2024 (Appendix Tables D.6.1 to D.6.3). Minnow trapping was used to target juvenile rainbow trout and coho from HAC-D (HAC-R5; exposed) and EDC-D (EDC-REF; reference) because electrofishing was prohibited in the presence of juvenile salmonids (e.g., coho), in accordance DFO Fish Permit XR 145 2024 conditions, and

average water depth in the creeks was too low to effectively implement other fish collection methods (e.g., hoop nets). As such, minnow trapping efforts were completed using standard “Gee Style” traps with 1/8” mesh body that were baited with a suitable attractant in a mesh container. Minnow traps were deployed in sets of two to four for a duration ranging from 22 to 50 hours. Fish captured upon retrieval of each minnow trap were placed in buckets of aerated water prior to processing and/or release.

The closed-station electrofishing efforts in upper Hazeltine Creek (and reference; FPC-R2) and minnow trapping efforts in lower Hazeltine Creek (and reference; EDC-D [EDC-REF]) in 2024 were completed to satisfy fish and fish habitat evaluation objectives of the HRWG. The collections of rainbow trout and coho tissue quality samples in August and October 2024 were coordinated with the HRWG fish collections to maximize efficiency of fishing efforts and minimize fish handling. The fish collection efforts and methods presented herein are a subset of those completed to satisfy HRWG evaluation objectives; see Minnow (2025) for details of the entire fish and fish habitat monitoring program completed in 2024.

The target sample size for each species (e.g., rainbow trout or coho) at each area was n=8 to facilitate meaningful statistical comparison of fish tissue quality between exposed and reference areas (Table 4.5). The target sample size was met for each species from each sampling area in 2024, except for rainbow trout from the exposed lower Hazeltine Creek area (HAC-D [HAC-R5]). A single rainbow trout was captured at HAC-D (HAC-R5) during fishing efforts in August and October (Appendix Table D.6.3) and was retained for tissue quality sampling (n = 1 for this area; Table 4.5).

Supporting data recorded for the 2024 fish tissue monitoring in creek habitats included GPS coordinates of each fishing location (minnow trap set or closed-station electrofishing station), level of effort (deployment and retrieval times for minnow trapping, seconds of fishing effort for electrofishing), and habitat data (e.g., water depth for minnow trapping, mean station length and wetted with for closed-station electrofishing).

Upon retrieval of minnow traps or completion of closed-station electrofishing efforts, captured fish were identified to species. Target species that were captured were retained for processing (up to the target sample size; n = 8 per area). Incidental mortalities were disposed of in an approved manner. Non-target fish species were enumerated and released live immediately following capture. Fish retained for lethal sampling were euthanized with a decisive blow to the head, placed in a cooler, and processed within <12 hours as follows. Each fish was measured for fork length, total length, and body weight (as described in Section 3.6.4). Scales for aging were removed, wrapped in waxed paper, placed in labelled coin envelopes, and frozen until shipment to the laboratory for aging analyses. The whole-body carcass of each fish was then

placed in a pre-labelled Whirl-Pak™ bag and stored frozen until shipment (on ice) to the analytical laboratory. Duplicate (split) samples were not collected since fish tissue quality samples were whole-body samples which could not be split.

4.5.2 Laboratory Analysis

Laboratory analysis of fish tissue quality samples was completed by ALS Environmental (Burnaby, BC) using the same methods and QA/QC measures outlined in Section 3.4.2

4.5.3 Data Analysis

Fish catch data were compiled and summarized to provide a catch list for each sampling area and gear type.[46] The catch compilations, along with data on fishing efforts completed in August and October 2024, were summarized by species and sampling area. Fish length, weight, and age data were also compiled and summarized by calculating the mean, median, SD, and total range (minimum and maximum) by species and area.

Upon receipt of the fish tissue quality data from ALS and the fish aging data from AAE, a DQR was performed. For the fish tissue quality data, this included the assessment of field precision, laboratory precision, and laboratory accuracy. For the fish aging data, this included the assessment of laboratory precision through evaluation of original and reassessed age estimates.

Whole-body fish tissue quality data from 2024 were screened against the BC selenium guideline for the protection of aquatic life (for whole-body fish tissue) of 4 mg/kg dw (BCMOE 2014). Fish tissue quality guidelines for the protection of human health (mercury and selenium; see Section 3.7.3.1) were also applied in the data screening of whole-body juvenile fish samples although human consumption of whole-body juvenile fish is improbable.

Summary statistics for whole-body fish tissue quality data were calculated for each analyte, species, and area. Summary statistics included the sample size, % of samples less than the LRL, mean, SD, minimum, median, and maximum. Summary statistics were calculated using the K-M method as described in Section 3.8.3.1.

[46] Fish collections were completed in creek habitats in 2024 for the purpose of HRWG reporting (Minnow 2025); only fish collection (minnow trapping or electrofishing) stations and events associated with fish tissue quality sample collection are include in the present report. See Minnow (2025) for fishing effort and catch records for all stations sampled in August and October 2024.

4.5.3.1 Statistical Analyses

Statistical analyses of analyte concentrations in whole-body juvenile rainbow trout were conducted using available post-breach data (i.e., 2018 and 2024 for exposed and reference areas) to answer the following questions:

1. Have mean analyte concentrations at the exposed area changed over time relative to the reference area?
2. Were there differences in mean analyte concentrations between exposed and reference areas, and does the difference depend on year?

To answer these questions, results from the exposed area of upper Hazeltine Creek (HAC-U [HAC-R2]) were compared to the Frypan Creek reference area (FPC-R2) using available whole-body tissue quality data for juvenile rainbow trout from 2018 and 2024. Tissue quality data for whole-body juvenile rainbow trout do not exist for these areas prior to 2018 (i.e., pre-breach tissue quality data for juvenile rainbow trout from Hazeltine Creek and Frypan Creek do not exist).

Questions 1 and 2 were answered by conducting a two-way ANOVA assessing the relative difference between the exposed and reference areas, with *Area* and *Year* as factors and assessing the interaction between *Area* and *Year.* The two-way ANOVA was completed as detailed in Section 3.1.3.2 (for Questions 1 and 2) to address the same questions. Similar statistical comparisons were also completed for fish lengths, and weights to answer the question: is there a difference in mean fish length between exposed and reference areas, and does the difference depend on year? The comparisons of lengths, weights followed the two-way Analysis of Covariance (ANCOVA) methods detailed in Section 3.7.3.2.

Statistical analyses of analyte concentrations in whole-body juvenile coho were conducted using available post-breach data (i.e., 2024 for exposed and reference areas) to answer the following question:

Are there differences in mean analyte concentrations at the exposed area over time?

To answer this question, results from the exposed area of lower Hazeltine Creek (HAC-D [HAC-R5]) was compared to the unimpacted lower Edney Creek reference area (EDC-D [EDC-REF]) using whole-body tissue quality data for juvenile coho from 2024. Tissue quality data for whole-body juvenile coho from these areas do not exist prior to 2024. The question was answered by conducting a censored one-way ANOVA with *Year* as a factor as described in Section 3.7.3.2. Statistical analyses of analyte concentrations in whole-body juvenile rainbow trout from HAC-D (HAC-R5) and EDC-D (EDC-REF) in 2024 were not completed because the sample size achieved (n = 1) at HAC-D (HAC-R5) was insufficient for the analyses.

Tissue quality data for whole-body juvenile rainbow trout do not exist for lower creek areas prior to 2024.

Statistical comparisons were completed for all available analytes; however, data interpretation focused on primary and secondary analytes (see Table 2.4). Plots of data that support the two-way ANOVA were presented for primary and secondary analytes that: 1) had a significant *Area×Year* interaction in the analyses and had a positive MOD (i.e., exposed concentrations were significantly higher than reference) for 2024 or negative MOD (i.e., exposed concentrations were significantly lower than reference) for 2024; and 2) lacked a significant *Area×Year* interaction in the analyses but had a positive overall MOD (i.e., exposed concentrations were significantly higher than reference and the difference did not depend on year). Plots of data that support the one-way ANOVA were presented for primary and secondary analytes that had a significant *Year* effect.

Whole-body fish tissue selenium concentrations (2018 and 2024 for rainbow trout; 2024 for coho) from exposed and reference areas were plotted relative to selenium concentrations in composite-taxa and single-taxon (caddisfly) benthic invertebrate tissue samples collected at or near the same time and location as the fish tissue samples. A line representing a one-to-one relationship between fish and benthic invertebrate tissue selenium concentrations was presented on the plot. This one-to-one line represents a TTF, or ratio of consumer (i.e., fish) to dietary (i.e., benthic invertebrate) tissue selenium concentrations, and a TTF ratio of one usually observed in fish tissues relative to dietary exposure concentrations in aquatic food webs (e.g., Presser and Luoma 2010).

All statistical analyses were conducted using R software (R Core Team 2024). A significance level $\alpha = 0.05$ was used for statistical comparisons, as was used for the evaluation of all chemical data in this report.

4.6 Supporting Measures

A variety of supporting physical and chemical information was used to support the interpretation of sediment and aquatic biological data collected from creeks as part of the CEMP. This information falls into two categories: 1) supporting information that was collected by Minnow during field collections; and 2) supporting information that was collected routinely by MPMC as part of ongoing CEMP monitoring components. Unless otherwise specified, the supporting measures outlined below belong to the first category (measures collected by Minnow).

4.6.1 Measures Collection

Supporting single spot water samples were collected from creek stations concurrent with periphyton community, benthic invertebrate community, and tissue quality sampling for

comparison to BCWQG. These samples were collected on August 12, 2024 (not concurrent with biological sample collection) to ensure sample arrival at the laboratory was within the recommended hold times. Water samples were collected by wading into a mid-channel area, moving from downstream to upstream, so as not to collect water downstream of disturbed substrates, and collecting the samples from approximately half of the total water depth. Water quality data collected routinely by Mount Polley staff at stations near to the biological monitoring areas were also used in support of data interpretation (Figure 4.2). Spot and routine water sampling of creek areas in 2024 both included the collection of samples for selenium speciation analysis, which is the first occurrence of this sampling type and analysis at MPMC. These data were subjected to an internal DQR by Mount Polley and were not further assessed for data quality in this report (for details refer to Section 3.8.1). Immediately after collection, both spot and routine water quality samples were placed into a cooler with ice packs before being stored in a refrigerator until shipment (on ice) to the analytical laboratory (as detailed in Section 3.8.1).

Supporting measures and sampling information were collected at each of the creek monitoring stations to support data interpretation (Appendix Figures A.2.1 to A.2.4, Appendix Tables A.2.1 to A.2.5). These included those described in Section 3.8.1 (excluding vertical depth profiles and Secchi depth) as well as the following: water velocity, substrate size (20 randomly selected substrate pieces measured per station), and general habitat characteristics assessed once for each monitoring area (channel measures, canopy cover, instream cover, periphyton coverage, and substrate characteristics) using methods adapted from Environment Canada (2012a).

4.6.2 Laboratory Analysis

Laboratory analyses of supporting spot and routine water quality samples were completed as described in Section 3.8.2 and included the parameters outlined in the CEMP routine surface water quality monitoring program (MPMC 2019) as well as analysis of selenium speciation parameters (selenate, selenite, selenocyanate, and unknown selenium species). Upon completion of the analyses, a data report was provided by ALS to Mount Polley and Minnow as an Adobe Acrobat PDF file and a Microsoft Excel spreadsheet (Appendix G)[47].

[47] Data reports for spot water quality sampling are included in Appendix G. Data from routine water quality monitoring completed by MPMC were provided to Minnow in Microsoft Excel format from the MPMC database and are these not included in Appendix G.

4.6.3 Data Analysis

4.6.3.1 Summary Statistics

Summary statistics were calculated for water, sediment, and tissue quality parameters following the K-M methods described in Section 3.8.3.1. Additional information on specific parameters and applications of the summary statistics for chemical data are found within the methods sections for analysis of these data above (Sections 4.1.3 and 4.4.3 above). Summary statistics for biological endpoints (periphyton and benthic invertebrate community and productivity) were calculated using standard methods and formulae.

4.6.3.2 Water Quality Guideline Screening

Results of spot water quality sampling were screened against BCWQG (Appendix Table D.1.1; BCMOWLRS 2024, 2025) as outlined in Sections 3.8.3.2 and 3.8.3.3. Results of creek water quality sampling completed routinely by Mount Polley staff in the year preceding monitoring (i.e., September 2023 to August 2024) were also screened against BCWQG (see Sections 3.8.3.2 and 3.8.3.3 for details). These routine water quality data were also summarized by calculating sample size, mean, SD, minimum, maximum, and % LRL values as described in Section 3.8.3.1. Plots comparing total and dissolved aqueous concentrations of primary and secondary analytes (Table 2.4) to BCWQG were prepared for routinely collected water quality samples from 2015 to 2024. Aqueous selenium speciation concentrations were also plotted for routinely collected water quality samples in 2024 (the first year of aqueous selenium speciation monitoring), although BCWQG do not exist for these parameters. Tabular screening against BCWQG was completed using Microsoft Excel and plots were generated using R (R Core Team 2024).

4.6.3.3 Water Quality Trends

Temporal trends in routine surface water quality data from Hazeltine Creek and Edney Creek from 2015 to 2024 were evaluated to support interpretation of periphyton and benthic invertebrate tissue quality results from these areas (refer to Section 4.4.3). This evaluation was completed using the Seasonal Kendall test detailed in Section 3.8.3.4 and included evaluation of aqueous total and dissolved concentrations of primary and secondary analytes (Table 2.4), and acute and chronic GEFs for copper (the ratio of observed dissolved copper concentrations divided by BCWQG BLM-derived guidelines). Aqueous selenium speciation results were excluded from the evaluation of temporal trends because 2024 represents the first year of sample collection for these parameters (i.e., aqueous selenium speciation monitoring was initiated in 2024).

5 RESULTS – LAKE HABITAT

5.1 Polley Lake

5.1.1 Sediment Quality

Sediment quality monitoring in 2024 was completed at POL-P1 and POL-P2 of Polley Lake (Figure 3.1, Table 3.1) with BOL-B2 of Bootjack Lake serving as reference. Prior sediment quality monitoring within the 2022 to 2024 period included monitoring at a shallow area in Polley Lake (POL-S) and the corresponding reference area in Bootjack Lake (BOL-S) in 2022 (Figure 3.1, Table 3.1).

A review of 2024 sediment quality results (Appendix B) indicated that the data met the established data quality objectives. Specifically, the data were characterized by good detectability, negligible analyte concentrations in method blank samples, good laboratory and field precision, and excellent laboratory accuracy. Measurement uncertainty for particle size analysis was higher in all sediment samples from Polley and Bootjack Lakes due to high moisture content. However, particle size results were similar among replicate samples and were comparable to those from previous years. Future monitoring efforts will implement strategies to try and avoid the uncertainty associated with particle size analysis (e.g., collection of additional sample material if available, or alternate laboratory processing approaches; see Appendix B for details). Overall, the sediment quality data can be used with a high level of confidence for interpretation.

5.1.1.1 Deep Areas

Sediment collected from the deep monitoring areas of Polley Lake in 2024 were composed almost entirely of silt and clay at both POL-P1 (mean = 74.5% and 24.8%, respectively) and POL-P2 (mean = 74.7% and 24.6%, respectively), which was similar to sediments from the reference lake (mean = 80.5% and 18.8%, respectively; Table 5.1; Appendix Tables C.2.4 and C.2.5). The particle size distribution of sediments from Polley and Bootjack Lakes were also similar to those collected in previous post-breach monitoring years (2014 to 2021; Table 5.1).

The mean TOC content of both POL-P1 (mean = 9.74%) and POL-P2 sediment (mean = 8.16%) in 2024 was lower than 2021 but higher than all remaining post-breach years; however this difference was not statistically significant (Figure 5.1, Table 5.1; Appendix Tables C.2.4 and C.2.5). The relative (exposed-reference) difference of TOC content in Polley Lake sediments (POL-P1 and POL-P2) has not changed significantly between 2014 and 2024 (Figure 5.1; Appendix Table E.1.1), and the slight temporal increase in mean concentrations in Polley Lake sediments may be early evidence of recovery that is not yet statistically significant. Similar to TOC, total nitrogen content of both POL-P1 (mean = 1.06%) and POL-P2 sediment

Table 5.1: Summary of Sediment Quality Data for Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]			Reference Bootjack Lake BOL-B2											
							2014		2015		2016		2018		2021		2024	
		Lower	Upper	Pre-Breach (Bootjack Lake)	Pre-Breach (Polley Lake)	Reference (BOL-B2; 2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																		
Moisture	%	-	-	-	-	96.0	93.4	0.503	95.3	1.06	94.5	0.705	93.3	0.224	94.9	0.965	94.4	0.205
pH (1:2 soil:water)	pH	-	-	-	-	6.60	***6.09***	0.111	***6.58***	0.136	***6.07***	0.234	-	-	***5.87***	0.0766	***5.86***	0.102
Particle Size																		
% Gravel (>2 mm)	%	-	-	<1.0	<1.0	<0.1	<0.1	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	26.4	32.2	1.10	0.493	0.0907	0.256	0.212	0.518	0.179	***1.90***	-	<1	-	1.02	-
% Silt (0.063 mm - 4 µm)	%	-	-	88.0	87.3	86.1	83.5	1.01	82.6	1.42	84.1	1.60	84.8	2.39	83.4	1.40	80.5	0.611
% Clay (<4 µm)	%	-	-	42.6	44.2	19.3	16.0	0.907	17.2	1.43	15.4	1.70	13.7	2.26	16.3	1.29	18.8	0.612
Organic / Inorganic Carbon (<63 µm)[c]																		
Total Organic Carbon	%	-	-	21.5	20.8	16.6	15.7	1.05	15.1	0.351	14.7	0.658	15.5	0.639	15.9	0.706	14.6	0.756
Nutrients (Bulk sediment)																		
Total Nitrogen by LECO	%	-	-	-	-	1.69	1.54	0.0557	1.64	0.0361	1.55	0.0606	1.65	0.0614	1.59	0.0545	1.62	0.0503
Metals, Metalloids, and Non-Metals (<63 µm)[c]																		
Aluminum	mg/kg	-	-	18,690	20,620	22,200	17,700	794	18,667	1,050	***19,100***	579	***18,920***	795	***21,240***	924	***21,120***	1,018
Antimony	mg/kg	-	-	1.70	1.22	1.12	0.800	0.0600	0.963	0.0757	0.988	0.0795	1.07	0.0590	0.982	0.0709	0.894	0.105
Arsenic	mg/kg	5.9	17	7.59	8.94	8.48	6.09	0.182	***7.72***	0.665	6.97	0.471	7.26	0.214	7.38	0.374	***8.30***	0.860
Barium	mg/kg	-	-	292	227	352	243	7.02	289	18.8	269	25.8	289	29.8	***331***	32.3	***297***	25.6
Beryllium	mg/kg	-	-	0.771	0.633	0.790	0.690	0.0100	0.703	0.00577	0.750	0.0274	***0.778***	0.0164	0.748	0.0217	0.746	0.0336
Bismuth	mg/kg	-	-	0.300	0.365	0.140	0.133	0.0208	0.137	0.00577	0.126	0.00894	0.140	0	0.128	0.00447	0.128	0.00837
Boron	mg/kg	-	-	17.0	17.0	17.7	13.3	0.577	15.3	1.15	15.6	1.14	17.0	0.707	15.8	1.71	15.2	1.64
Cadmium	mg/kg	0.6	3.5	0.715	0.690	0.535	0.394	0.0130	0.529	0.0632	0.409	0.0321	0.490	0.0247	0.426	0.0328	0.432	0.0625
Calcium	mg/kg	-	-	12,750	15,890	9,820	7,420	405	8,417	632	8,168	735	9,164	1,044	8,494	854	8,512	681
Chromium	mg/kg	37.3	90	54.6	67.6	47.5	***61.9***	47.7	45.0	2.67	35.2	1.11	40.7	2.58	37.4	1.65	37.0	3.04
Cobalt	mg/kg	-	-	16.4	16.4	13.4	11.0	0.854	13.3	0.666	11.4	0.634	12.5	0.428	11.7	0.522	12.5	0.798
Copper	mg/kg	35.7	197	618	380	409	340	38.4	382	23.9	345	19.1	383	15.3	379	29.4	362	30.1
Iron	mg/kg	21,200	43,766	29,230	39,230	33,400	26,600	2,081	***30,067***	3,024	28,100	3,150	27,780	2,693	***30,080***	3,484	***29,320***	2,029
Lead	mg/kg	35	91.3	16.0	17.7	11.7	10.1	0.415	10.9	0.757	10.3	0.828	11.0	0.480	9.79	0.554	9.63	0.768
Lithium	mg/kg	-	-	12.2	17.8	13.3	11.1	0.100	10.6	0.200	***12.9***	0.593	12.1	0.356	11.9	0.589	***12.3***	0.750
Magnesium	mg/kg	-	-	8,770	12,548	5,920	4,823	359	5,273	112	5,280	272	5,536	276	5,602	222	5,826	253
Manganese	mg/kg	460	1,100	1,720	3,310	3,240	1,303	254	***3,327***	486	1,274	299	1,351	442	1,614	524	1,336	78
Mercury	mg/kg	0.17	0.486	0.358	0.286	0.349	0.255	0.0319	0.302	0.0244	0.310	0.0191	0.335	0.0241	0.245	0.0138	0.239	0.0300
Molybdenum	mg/kg	25	23,000	8.26	6.05	4.85	3.62	0.900	4.32	0.491	3.70	0.633	4.08	0.910	3.56	0.640	3.51	0.489
Nickel	mg/kg	16	75	36.9	42.6	34.8	***47.6***	36.3	33.3	1.31	26.8	1.11	30.7	1.70	28.8	1.42	28.5	1.87
Phosphorus	mg/kg	-	-	2,585	3,405	3,550	2,240	485	2,537	878	1,998	759	1,842	777	2,052	896	1,602	162
Potassium	mg/kg	-	-	1,417	1,591	1,750	1,253	11.5	***1,693***	107	***1,434***	70.2	***1,428***	88.1	***1,454***	145	***1,522***	85.8
Selenium	mg/kg	2	-	3.07	5.37	3.11	2.37	0.172	2.75	0.160	2.67	0.115	2.83	0.130	2.95	0.217	2.69	0.234
Silver	mg/kg	0.5	-	0.500	0.415	0.408	0.355	0.0320	0.377	0.0127	0.383	0.0231	0.389	0.0154	0.353	0.0185	0.355	0.0174
Sodium	mg/kg	-	-	210	560	840	190	10.0	***900***	168	***240***	10.0	***219***	10.7	***239***	21.0	***282***	13.0
Strontium	mg/kg	-	-	147	125	114	88.9	8.08	99.4	5.82	95.4	6.60	102	8.72	108	6.52	95.1	6.48
Sulphur[d]	mg/kg	-	-	7,090	12,980	9,100	-	-	7,000	755	***7,580***	923	***7,340***	730	***7,216***	991	***8,384***	970
Thallium	mg/kg	-	-	0.134	0.112	0.140	0.115	0.0152	0.132	0.0117	0.124	0.00971	0.134	0.00602	0.122	0.00497	0.124	0.0105
Tin	mg/kg	-	-	0.755	0.800	1.23	***1.03***	0.573	0.697	0.0737	0.622	0.0606	***1.02***	0.107	***0.808***	0.0705	0.602	0.232
Titanium	mg/kg	-	-	644	787	566	407	28.0	461	63.2	501	16.9	475	40.6	500	67.7	565	64.4
Uranium	mg/kg	-	-	2.90	1.47	2.40	1.93	0.0777	2.20	0.174	2.22	0.145	2.24	0.0647	1.98	0.0862	2.22	0.139
Vanadium	mg/kg	-	-	75.4	111	81.4	63.7	0.351	***80.3***	4.22	70.6	1.90	75.3	3.78	71.7	2.69	***75.5***	4.08
Zinc	mg/kg	123	315	105	99.0	90.6	80.8	23.6	82.8	3.79	69.4	2.95	78.5	3.82	77.7	2.26	77.5	7.71
Zirconium	mg/kg	-	-		-	4.60	-	-	-	-	-	-	-	-	3.84	0.635	4.12	0.277

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: "-" = no current BC Working Sediment Quality Guidelines/ no data. "SD" = Standard Deviation. ***Bold/ Italics*** indicates exposed value (Polley Lake) is > pre-breach (for Polley Lake) and reference 95th percentile values (<5th percentile value for pH) or reference value (Bootjack Lake) is > pre-breach (for Bootjack Lake) and reference 95th percentile values (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. For calculation of pre-breach 95th percentile values for Bootjack Lake and Polley Lake see Appendix Tables C.2.1 and C.2.2, respectively. For calculation of reference 95th percentile values (2014 to 2024) see Appendix Table C.2.3. Pre-Breach sediment metal concentrations are based predominantly on bulk sediment rather than the fines fraction (<63 µm).

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Tables C.2.1 and C.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 5.1: Summary of Sediment Quality Data for Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]			Exposed Polley Lake POL-P1									
							2014		2016		2018		2021		2024	
		Lower	Upper	Pre-Breach (Bootjack Lake)	Pre-Breach (Polley Lake)	Reference (BOL-B2; 2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																
Moisture	%	-	-	-	-	96.0	87.8	2.44	87.9	2.45	87.3	2.86	90.7	0.882	89.5	1.40
pH (1:2 soil:water)	pH	-	-	-	-	6.60	7.70	0.0495	7.51	0.216	7.16	0.0658	7.11	0.104	6.93	0.0702
Particle Size																
% Gravel (>2 mm)	%	-	-	<1.0	<1.0	<0.1	<0.1	-	<0.1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	26.4	32.2	1.10	0.357	0.0681	0.506	0.299	<1	-	<1	-	1.12	-
% Silt (0.063 mm - 4 µm)	%	-	-	88.0	87.3	86.1	79.7	3.27	73.6	3.58	78.6	3.61	78.4	4.63	74.5	6.59
% Clay (<4 µm)	%	-	-	42.6	44.2	19.3	19.9	3.24	25.9	3.85	21.0	3.43	21.4	4.78	24.8	6.92
Organic / Inorganic Carbon (<63 µm)[c]																
Total Organic Carbon	%	-	-	21.5	20.8	16.6	9.15	2.28	7.58	5.25	6.24	2.62	11.3	1.44	9.74	0.843
Nutrients (Bulk sediment)																
Total Nitrogen by LECO	%	-	-	-	-	1.69	0.628	-	0.939	0.366	0.819	0.194	1.12	0.139	1.06	0.150
Metals, Metalloids, and Non-Metals (<63 µm)[c]																
Aluminum	mg/kg	-	-	18,690	20,620	22,200	***26,967***	643	***25,020***	2,886	***22,420***	3,241	***25,900***	1,463	***26,180***	1,163
Antimony	mg/kg	-	-	1.70	1.22	1.12	0.873	0.146	0.810	0.195	0.734	0.113	0.540	0.0797	0.522	0.0782
Arsenic	mg/kg	5.9	17	7.59	8.94	8.48	***12.4***	0.551	***11.5***	1.96	***11.8***	0.541	***10.6***	0.767	***10.6***	0.303
Barium	mg/kg	-	-	292	227	352	288	23.8	263	56.5	263	49.9	230	25.8	258	19.6
Beryllium	mg/kg	-	-	0.771	0.633	0.790	***0.910***	0.0800	***0.842***	0.0912	***0.802***	0.0817	0.736	0.0378	0.764	0.0251
Bismuth	mg/kg	-	-	0.300	0.365	0.140	0.147	0.0306	0.116	0.00548	0.112	0.00566	0.108	0.00837	0.114	0.00894
Boron	mg/kg	-	-	17.0	17.0	17.7	16.0	2.00	14.2	2.59	13.8	2.17	15.3	2.75	14.6	1.69
Cadmium	mg/kg	0.6	3.5	0.715	0.690	0.535	0.275	0.0835	0.354	0.108	0.314	0.0675	0.411	0.0486	0.395	0.0182
Calcium	mg/kg	-	-	12,750	15,890	9,820	***24,667***	4,100	***19,100***	5,066	***20,760***	2,250	***16,940***	709	15,180	482
Chromium	mg/kg	37.3	90	54.6	67.6	47.5	35.6	10.5	33.0	7.32	31.2	7.47	39.1	5.17	37.6	2.61
Cobalt	mg/kg	-	-	16.4	16.4	13.4	***20.5***	1.51	***18.1***	3.12	***17.8***	2.27	***16.7***	1.16	***18.1***	0.936
Copper	mg/kg	35.7	197	618	380	409	***722***	85.3	***594***	125	***568***	60.9	***526***	43.2	***501***	24.3
Iron	mg/kg	21,200	43,766	29,230	39,230	33,400	29,600	1,323	29,660	1,590	32,460	2,378	35,240	1,184	32,440	1,262
Lead	mg/kg	35	91.3	16.0	17.7	11.7	9.69	0.380	7.96	0.946	7.36	1.04	6.89	0.487	7.55	0.516
Lithium	mg/kg	-	-	12.2	17.8	13.3	***24.3***	2.51	***21.2***	3.84	***19.5***	2.80	***19.4***	1.92	***20.2***	0.912
Magnesium	mg/kg	-	-	8,770	12,548	5,920	***13,967***	1,290	12,026	2,761	11,760	2,016	11,028	1,020	11,800	863
Manganese	mg/kg	460	1,100	1,720	3,310	3,240	847	87.1	1,490	564	1,772	595	1,754	407	1,640	292
Mercury	mg/kg	0.17	0.486	0.358	0.286	0.349	0.117	0.0142	0.142	0.0389	0.132	0.0190	0.131	0.0102	0.128	0.00736
Molybdenum	mg/kg	25	23,000	8.26	6.05	4.85	***6.86***	1.16	***11.4***	1.90	***9.90***	2.51	***6.29***	1.58	5.02	0.312
Nickel	mg/kg	16	75	36.9	42.6	34.8	29.1	7.28	26.3	4.90	24.4	5.72	30.9	3.67	29.1	1.60
Phosphorus	mg/kg	-	-	2,585	3,405	3,550	1,018	94.4	1,200	178	1,478	204	1,526	215	1,510	124
Potassium	mg/kg	-	-	1,417	1,591	1,750	***2,453***	112	***2,210***	378	***1,918***	252	***1,942***	121	***1,976***	115
Selenium	mg/kg	2	-	3.07	5.37	3.11	3.30	0.716	3.60	0.740	3.37	0.756	3.73	0.567	3.55	0.404
Silver	mg/kg	0.5	-	0.500	0.415	0.408	0.354	0.0256	0.352	0.0399	0.320	0.0234	0.338	0.0189	0.333	0.0131
Sodium	mg/kg	-	-	210	560	840	***1,267***	129	***1,084***	355	***993***	154	769	85.4	***872***	54.1
Strontium	mg/kg	-	-	147	125	114	***249***	31.1	***192***	45.7	***193***	22.1	***177***	18.9	***178***	6.31
Sulphur[d]	mg/kg	-	-	7,090	12,980	9,100	-	-	7,940	1,630	7,820	1,869	8,916	1,455	7,210	941
Thallium	mg/kg	-	-	0.134	0.112	0.140	0.0817	0.0231	0.0784	0.0229	0.0678	0.0132	0.0886	0.0121	0.0858	0.00676
Tin	mg/kg	-	-	0.755	0.800	1.23	***3.05***	***1.45***	***1.26***	0.473	***1.37***	0.150	***1.28***	0.236	1.22	0.103
Titanium	mg/kg	-	-	644	787	566	***1,660***	121	***1,278***	391	***1,146***	101	***970***	66.3	***1,103***	144
Uranium	mg/kg	-	-	2.90	1.47	2.40	1.41	0.0907	1.52	0.162	1.35	0.165	1.34	0.194	1.38	0.0495
Vanadium	mg/kg	-	-	75.4	111	81.4	105	3.61	***112***	4.58	***115***	10.4	***116***	8.11	***113***	3.70
Zinc	mg/kg	123	315	105	99.0	90.6	***151***	68.7	80.2	6.43	76.5	12.7	89	5.59	87.0	3.89
Zirconium	mg/kg	-	-		-	4.60	-	-	-	-	-	-	***7.68***	0.838	***7.06***	0.991

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: "-" = no current BC Working Sediment Quality Guidelines/ no data. "SD" = Standard Deviation. ***Bold/ Italics*** indicates exposed value (Polley Lake) is > pre-breach (for Polley Lake) and reference 95th percentile values (<5th percentile value for pH) or reference value (Bootjack Lake) is > pre-breach (for Bootjack Lake) and reference 95th percentile values (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. For calculation of pre-breach 95th percentile values for Bootjack Lake and Polley Lake see Appendix Tables C.2.1 and C.2.2, respectively. For calculation of reference 95th percentile values (2014 to 2024) see Appendix Table C.2.3. Pre-Breach sediment metal concentrations are based predominantly on bulk sediment rather than the fines fraction (<63 µm).

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Tables C.2.1 and C.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 5.1: Summary of Sediment Quality Data for Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]			Exposed Polley Lake POL-P2											
							2014		2015		2016		2018		2021		2024	
		Lower	Upper	Pre-Breach (Bootjack Lake)	Pre-Breach (Polley Lake)	Reference (BOL-B2; 2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																		
Moisture	%	-	-	-	-	96.0	73.9	20.3	87.0	2.32	85.3	5.26	85.6	2.73	89.4	2.87	87.9	2.43
pH (1:2 soil:water)	pH	-	-	-	-	6.60	8.11	0.396	7.47	0.186	7.72	0.240	7.36	0.0879	7.22	0.351	7.12	0.0841
Particle Size																		
% Gravel (>2 mm)	%	-	-	<1.0	<1.0	<0.1	<0.1	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	26.4	32.2	1.10	0.740	0.329	0.162	0.0509	0.444	0.217	1.08	-	<1	-	1.04	-
% Silt (0.063 mm - 4 µm)	%	-	-	88.0	87.3	86.1	79.1	1.37	78.8	7.46	76.6	4.05	73.1	2.48	73.7	4.67	74.7	4.18
% Clay (<4 µm)	%	-	-	42.6	44.2	19.3	20.1	1.69	21.1	7.47	22.9	4.00	26.3	3.00	26.2	4.71	24.6	4.32
Organic / Inorganic Carbon (<63 µm)[c]																		
Total Organic Carbon	%	-	-	21.5	20.8	16.6	7.67	2.89	7.42	2.30	5.05	3.45	6.97	2.76	11.0	3.50	8.16	1.61
Nutrients (Bulk sediment)																		
Total Nitrogen by LECO	%	-	-	-	-	1.69	0.584	0.647	0.943	0.180	0.782	0.330	0.911	0.276	1.13	0.305	0.965	0.144
Metals, Metalloids, and Non-Metals (<63 µm)[c]																		
Aluminum	mg/kg	-	-	18,690	20,620	22,200	***24,100***	2,707	***28,220***	1,318	***26,880***	1,477	***25,240***	1,699	***26,960***	2,446	***28,360***	1,598
Antimony	mg/kg	-	-	1.70	1.22	1.12	0.553	0.116	1.09	0.165	0.832	0.240	0.714	0.0590	0.558	0.0626	0.516	0.0945
Arsenic	mg/kg	5.9	17	7.59	8.94	8.48	***12.6***	1.59	***14.0***	0.766	***12.7***	1.32	***11.4***	1.76	***10.5***	1.48	***11.6***	0.944
Barium	mg/kg	-	-	292	227	352	254	36.4	329	17.9	286	56.0	277	62.8	258	57.2	283	26.7
Beryllium	mg/kg	-	-	0.771	0.633	0.790	***0.857***	0.0723	***1.02***	0.0404	***0.886***	0.0844	***0.842***	0.0926	***0.794***	0.0971	***0.834***	0.0456
Bismuth	mg/kg	-	-	0.300	0.365	0.140	0.117	0.0200	0.118	0.00447	0.110	0.0126	0.118	0.00837	0.112	0.00447	0.110	0.00707
Boron	mg/kg	-	-	17.0	17.0	17.7	14.0	5.29	13.6	0.894	13.4	3.05	16.4	3.36	15.6	1.54	14.7	2.50
Cadmium	mg/kg	0.6	3.5	0.715	0.690	0.535	0.234	0.111	0.218	0.0167	0.232	0.0504	0.321	0.0833	0.382	0.0897	0.328	0.0419
Calcium	mg/kg	-	-	12,750	15,890	9,820	***29,467***	6,671	***24,500***	3,302	***22,320***	6,092	***19,420***	2,556	***18,540***	3,303	***16,800***	579
Chromium	mg/kg	37.3	90	54.6	67.6	47.5	45.4	50.8	26.1	4.87	32.8	9.69	34.0	7.36	37.2	6.40	33.9	4.99
Cobalt	mg/kg	-	-	16.4	16.4	13.4	***21.3***	3.38	***23.1***	2.14	***20.7***	3.29	***20.1***	2.18	***18.2***	2.55	***20.1***	1.10
Copper	mg/kg	35.7	197	618	380	409	***689***	158	***823***	46.1	***685***	153	***599***	127	***574***	96.7	***580***	38.9
Iron	mg/kg	21,200	43,766	29,230	39,230	33,400	32,700	3,811	29,760	1,828	31,420	3,523	30,920	952	31,400	1,733	32,640	1,450
Lead	mg/kg	35	91.3	16.0	17.7	11.7	6.85	1.35	9.35	0.375	8.11	0.542	7.96	0.427	7.36	0.705	7.58	0.138
Lithium	mg/kg	-	-	12.2	17.8	13.3	***24.0***	4.03	***25.4***	2.00	***24.3***	2.87	***21.9***	1.63	***21.8***	4.82	***22.4***	0.997
Magnesium	mg/kg	-	-	8,770	12,548	5,920	***14,333***	3,371	***15,920***	1,542	***14,620***	3,114	***13,420***	2,111	12,362	2,432	***13,840***	1,155
Manganese	mg/kg	460	1,100	1,720	3,310	3,240	855	144	2,574	634	3,170	1,088	3,166	1,096	2,574	1,286	2,148	421
Mercury	mg/kg	0.17	0.486	0.358	0.286	0.349	0.104	0.0330	0.110	0.00643	0.131	0.0299	0.141	0.0197	0.134	0.0143	0.123	0.0128
Molybdenum	mg/kg	25	23,000	8.26	6.05	4.85	5.63	1.99	***10.1***	1.25	***9.87***	2.53	***7.28***	0.635	***6.79***	1.33	5.02	1.30
Nickel	mg/kg	16	75	36.9	42.6	34.8	34.2	32.8	22.0	2.93	26.4	6.00	27.5	6.66	30.6	4.07	27.3	3.30
Phosphorus	mg/kg	-	-	2,585	3,405	3,550	1,317	340	1,200	69.6	1,252	142	1,342	141	1,302	156	1,438	304
Potassium	mg/kg	-	-	1,417	1,591	1,750	***2,110***	279	***2,766***	87.6	***2,436***	271	***2,126***	126	***1,946***	261	***2,168***	218
Selenium	mg/kg	2	-	3.07	5.37	3.11	2.14	1.23	4.43	0.859	3.75	1.13	3.72	0.795	3.64	0.223	3.39	0.567
Silver	mg/kg	0.5	-	0.500	0.415	0.408	0.338	0.0349	0.348	0.0106	0.341	0.0107	0.334	0.0344	0.346	0.00826	0.333	0.0108
Sodium	mg/kg	-	-	210	560	840	***1,143***	250	***1,828***	102	***1,306***	237	***1,078***	254	826	198	***1,015***	107
Strontium	mg/kg	-	-	147	125	114	***214***	31.8	***289***	15.1	***234***	33.8	***211***	38.7	***201***	40.8	***202***	13.4
Sulphur[d]	mg/kg	-	-	7,090	12,980	9,100	-	-	8,420	1,780	9,840	7,844	7,300	2,729	8,460	2,671	5,882	1,314
Thallium	mg/kg	-	-	0.134	0.112	0.140	0.0653	-	0.0580	0.00656	0.0632	0.0149	0.0776	0.0190	0.0854	0.0127	0.0766	0.0107
Tin	mg/kg	-	-	0.755	0.800	1.23	***2.01***	0.182	***2.10***	0.160	***1.86***	0.294	***1.60***	0.450	***1.40***	0.389	***1.28***	0.220
Titanium	mg/kg	-	-	644	787	566	***1,653***	415	***1,832***	192	***1,531***	420	***1,272***	320	***1,018***	308	***1,284***	336
Uranium	mg/kg	-	-	2.90	1.47	2.40	1.49	0.367	1.46	0.0526	1.49	0.191	1.44	0.267	1.43	0.176	1.39	0.131
Vanadium	mg/kg	-	-	75.4	111	81.4	***120***	20.8	***115***	6.04	110	6.99	109	9.03	107	8.94	***116***	11.0
Zinc	mg/kg	123	315	105	99.0	90.6	91.0	25.6	86.4	5.27	78.8	4.40	85.7	1.37	91.3	1.75	89.3	4.10
Zirconium	mg/kg	-	-		-	4.60	-	-	-	-	-	-	-	-	***7.86***	0.279	***6.78***	1.47

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: "-" = no current BC Working Sediment Quality Guidelines/ no data. "SD" = Standard Deviation. ***Bold/ Italics*** indicates exposed value (Polley Lake) is > pre-breach (for Polley Lake) and reference 95th percentile values (<5th percentile value for pH) or reference value (Bootjack Lake) is > pre-breach (for Bootjack Lake) and reference 95th percentile values (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. For calculation of pre-breach 95th percentile values for Bootjack Lake and Polley Lake see Appendix Tables C.2.1 and C.2.2, respectively. For calculation of reference 95th percentile values (2014 to 2024) see Appendix Table C.2.3. Pre-Breach sediment metal concentrations are based predominantly on bulk sediment rather than the fines fraction (<63 µm).

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Tables C.2.1 and C.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

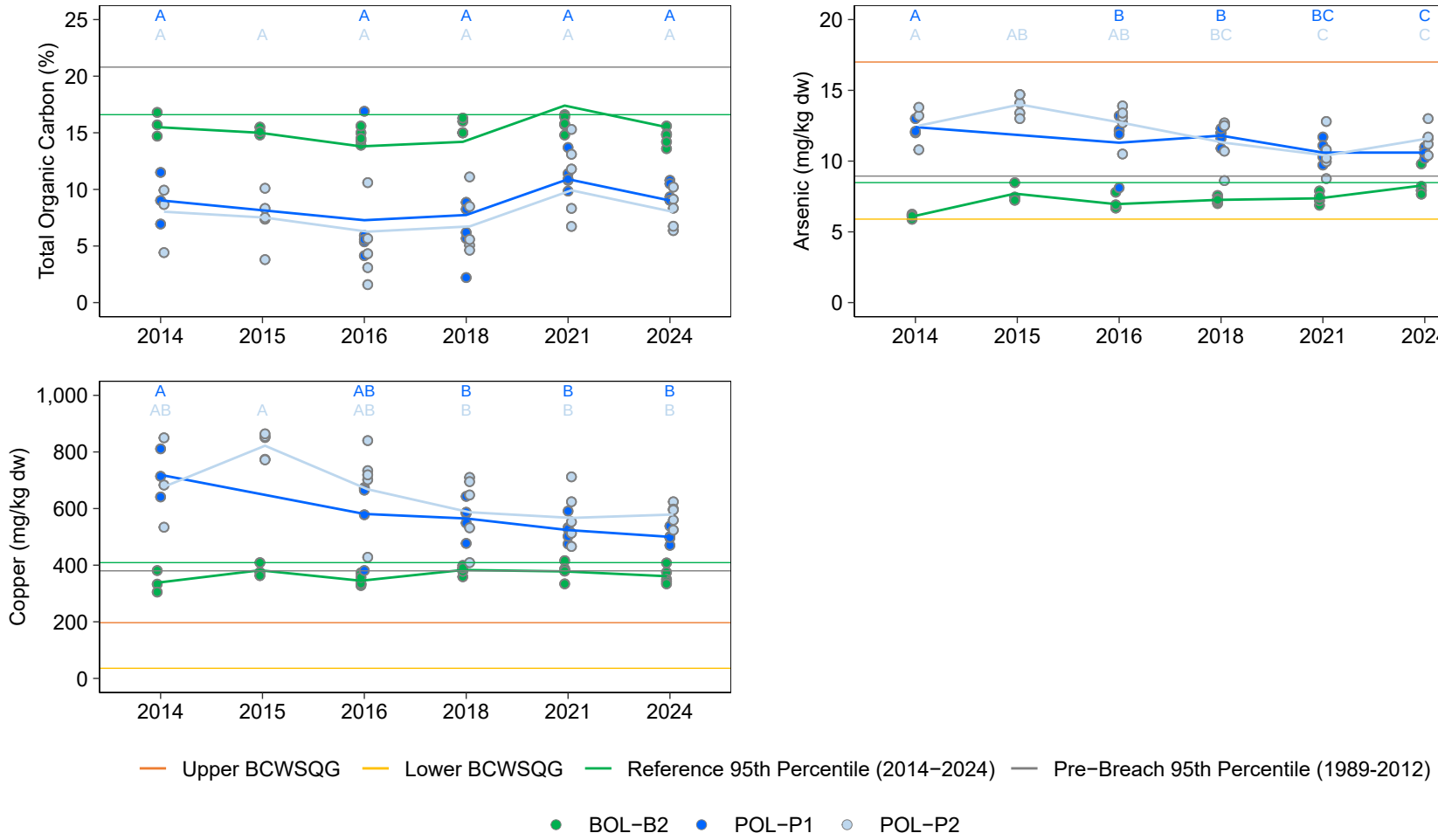


Figure 5.1: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

(mean = 0.965%) in 2024 were higher than in most previous post-breach monitoring years (2014 to 2018), but slightly lower than 2021 (mean = 1.12% and 1.13% for POL-P1 and POL-P2, respectively; Table 5.1; Appendix Tables C.2.4 and C.2.5).

Mean analyte concentrations in the sediments (<63 µm fraction) collected from POL-P1 and POL-P2 in 2024 exceeded the reference and pre-breach 95th percentile values for 11 and 14 analytes, respectively (Table 5.1; Appendix Tables C.2.4 and C.2.5). Among these analytes, arsenic and copper also exceeded the BCWSQG values in 2024. Mean arsenic concentrations in sediments from POL-P1 and POL-P2 exceeded the lower BCWSQG by 1.8- and 2.0-times, respectively, and exceeded the reference 95th percentile value by 1.3- and 1.4-times, respectively (Figure 5.1, Table 5.1). However, mean arsenic concentrations were naturally elevated in Bootjack Lake and exceeded the lower BCWSQG by 1.4-times in 2024 (Figure 5.1, Table 5.1; Appendix Tables C.2.4 and C.2.5). The mean copper concentrations in sediments from POL-P1 and POL-P2 exceeded the upper BCWSQG by 2.5- and 2.9-times, respectively, and exceeded the reference 95th percentile value by 1.2- and 1.4-times, respectively (Figure 5.1, Table 5.1). However, mean copper concentrations were naturally elevated in Bootjack Lake and exceeded the upper BCWSQG by 1.8-times in 2024 (Table 5.1; Appendix Tables C.2.4 and C.2.5). Although concentrations of arsenic and copper in Polley Lake sediments were higher in 2024 than pre-breach conditions[48], pre-breach concentrations of arsenic and copper in both Polley Lake and Bootjack Lake (reference) sediments also exceeded the BCWSQG (Table 5.1). This pre-breach exceedance of BCWSQG indicates that arsenic and copper are naturally elevated in sediments from both Polley and Bootjack lakes.

Analysis of temporal changes in the relative (exposed-reference) differences in sediment arsenic and copper concentrations over time indicated that arsenic concentrations at POL-P1 did not change significantly between 2021 and 2024 (i.e., were temporally stable), but were significantly lower in 2024 than all remaining prior years (2014 to 2018; Figure 5.1; Appendix Table E.1.1). At POL-P2, the relative difference in arsenic concentrations was lower in 2018 to 2024 compared 2014 and has not changed significantly over that period (i.e., 2018 to 2024; Figure 5.1; Appendix Table E.1.1). Arsenic concentrations at the reference area (BOL-B2) were significantly higher in 2024 compared to 2014 (when considered separately from the exposed areas; Appendix Table E.1.2), indicating that the temporal relative differences in arsenic at Polley Lake may be in part due to changes at the reference area. The relative difference of copper concentrations at both POL-P1 and POL-P2 have been temporally stable from 2018 to 2024

[48] TOC and analyte concentrations reported for pre-breach sediments were based predominantly on bulk sediment but were reported for the <63 µm fraction of sediments collected post-breach. This difference in the fraction of sediment evaluated (i.e., bulk sediments for pre-breach and <63 µm fraction for post-breach) should be considered when making comparisons of TOC and analyte concentrations between the two time periods.

(Figure 5.1; Appendix Table E.1.1). At POL-P1, the relative difference of copper concentrations was significantly lower in 2018 to 2024 compared to 2014, while at POL-P2 results were similar among all years except 2015 which was significantly higher than other years (Figure 5.1; Appendix Table E.1.1). Copper concentrations at the reference area (BOL-B2) have not changed significantly since 2014 (Appendix Table E.1.2). In all post-breach monitoring years, arsenic and copper have remained significantly higher than corresponding reference sediment concentrations (Appendix Table E.1.2).

Arsenic and copper concentrations were positively correlated with the clay content of fine sediment (% clay in the silt and clay fraction) and were negatively correlated with TOC and total nitrogen content (Appendix Figure E.1.1, Appendix Table E.1.3). These relationships are consistent with a breach-related influence defined by the input of inorganic sediments with elevated Analyte of Interest concentrations to Polley Lake.

The results of a PCA of sediment quality data from POL-P1, POL-P2, and BOL-B2 between 1999 and 2024 were included in correlations with benthic invertebrate community endpoints from these areas and sampling years (Appendix Figure E.1.2; Appendix Tables E.1.4 to E.1.5; see Section 5.1.5).

Overall, the 2024 sediment quality results indicate that temporal changes in the physical and chemical characteristics of sediments in both the Northwest and Southeast basins of Polley Lake have been limited since the breach in 2014, and no significant changes in sediment characteristics or analyte concentrations have occurred since at least 2021, but there is evidence that recovery is occurring slowly. This is consistent with the low rate of sediment deposition observed, with an average rate of 4.7 mm/yr of fresh sediment deposition in Polley Lake (Minnow 2019a).

5.1.1.2 Shallow Areas

Sediment quality monitoring in 2022 was completed in a shallow exposed area of Polley Lake (POL-S) with a similar shallow area of Bootjack Lake (BOL-S) serving as reference. The results of this monitoring are summarized briefly herein, with detailed methods and results presented in Minnow (2023a).

Sediments from the exposed (POL-S) area in 2022 was composed primarily of silt and sand (mean = 53.7% and 38.5%, respectively), while the reference (BOL-S) sediments had higher sand and lower silt content (mean = 50.7% and 41.9%, respectively). The mean TOC content of Polley Lake shallow sediments in 2022 (1.03%) was significantly lower than reference (8.80%) and did not change from 2019 to 2022, relative to reference. Sediments from the shallow areas of Polley Lake (POL-S) were characterized by concentrations of arsenic, copper, and iron greater than reference 95th percentile concentrations and BCWSQG. Copper had the most substantially

elevated mean concentrations in exposed sediments (3.4-times the upper BCWSQG), followed by iron (1.5-times the upper BCWSQG), and arsenic (2.4-times the lower BCWSQG). Copper was the only Analyte of Interest with concentrations that also exceeded the lower BCWSQG in reference sediments, which it exceeded by approximately 2.5-times. Arsenic, copper, and iron concentrations in shallow Polley Lake sediments in 2022 were similar to those reported in the previous sampling event (i.e., 2019), relative to reference, indicating temporal stability of these analyte concentrations. Overall, the 2022 sediment quality results from the shallow area of Polley Lake indicated temporal stability in the physical and chemical characteristics of these sediments since initiation of monitoring in 2019.

Arsenic, copper, and iron concentrations were significantly negatively correlated with TOC and total nitrogen content, although results were highly leveraged by the highest analyte concentrations and lowest TOC content occurring in POL-S sediments and highest TOC and total nitrogen content occurring in BOL-S sediments. These relationships are consistent with a breach-related influence defined by the input of inorganic sediments with elevated analyte concentrations to Polley Lake.

5.1.2 Sediment Toxicity

Sediment toxicity testing using *C. dilutus* in 2024 (10-day standard test using static methods) was completed at two deep exposed areas of Polley Lake (POL-P1 and POL-P2), with a deep area of Bootjack Lake (BOL-B2) serving as reference (Figure 3.1, Table 3.3). Prior sediment toxicity monitoring within the 2022 to 2024 period included testing of *H. azteca* (14-day standard test using static methods) in 2022 at a shallow area in Polley Lake (POL-S) and a corresponding reference area in Bootjack Lake (BOL-S; Figure 3.1, Table 3.3).

A review of 2024 sediment toxicity results (Appendix B) indicated that all sediment toxicity tests met control acceptability criteria, and all water quality parameters were within acceptable ranges throughout the tests, except for pH in the shallow Quesnel Lake samples (QUL-LNF1 and QUL-LREF1), which marginally exceeded a pH of 8.0 for most tests (Nautilus 2024; Appendix G). Reference toxicant test results fell inside the acceptable range and therefore the sensitivity of organisms used in the tests was considered appropriate (see the DQR for details; Appendix B). All ammonia concentrations were at levels that are not expected to cause adverse effects to *H. azteca* (Appendix G). Examination of laboratory bench sheets indicated that temperature, dissolved oxygen, conductivity, and pH were all stable over the course of the toxicity tests (Appendix G). During sediment toxicity testing, organisms from different test batches were used for the deep exposed and reference area sediments. This laboratory error did not affect test acceptability but did affect the approach for data analysis and interpretation, which is discussed in more detail below (Section 5.1.2.1).

5.1.2.1 Deep Areas

A laboratory error occurred resulting in a different batch of test organisms (*C. dilutus*) being used for the toxicity tests of sediments from the deep basins of Polley Lake (POL-P1 and POL-P2) compared to the batch of test organisms used for toxicity tests of sediments the associated reference area (deep basin of Bootjack Lake [BOL-B2]; see Section 3.2.3). The use of different batches of test organisms for exposed versus reference sediments precluded the direct comparison of exposed test results (i.e., POL-P1 and POL-P2) to reference results (i.e., BOL-B2), which is a key part of the data analysis and interpretation approach used in the present report (see Section 3.2.3). As such, a weight-of-evidence approach was used to assess the toxicity test results of exposed sediments (Nautilus 2024; Appendix G).

Multiple lines of evidence indicated no negative effects on the survival or growth responses in 10-day *C. dilutus* toxicity tests of Polley Lake deep sediments (POL-P1 and POL-P2) both independently of, and relative to, reference sediments (BOL-B2). These lines of evidence are detailed below. First, there was no response of *C. dilutus* to sediments from Polley Lake basins (POL-P1 and POL-P2) compared to test controls. Specifically, the control-normalized survival and dry weight of *C. dilutus* showed no unacceptable survival or growth responses for sediments from either of the Polley Lake basins (POL-P1 and POL-P2; Table 5.2). Second, the survival of *C. dilutus* exposed to deep Polley Lake sediments were within control acceptance criteria (>70% survival), indicating no negative effect (Nautilus 2024). Third, a visual assessment of the survival and dry weight of *C. dilutus* exposed to deep Polley Lake sediments indicated no negative impact relative to the reference sample from deep Bootjack Lake (BOL-B2; Nautilus 2024). Fourth, the mean dry weight of organisms exposed to deep Polley Lake sediments was greater than for reference (Bootjack Lake) sediments and greater than for test control samples used in the testing of Bootjack and Polley Lake sediments (Control A and Control B, respectively; Nautilus 2024). Finally, a statistical comparison showed no differences in test results for reference (Bootjack Lake) sediments and the Control B (control sample from Polley Lake sediment test) despite using different organism batches, and the test also showed no significant adverse effects on survival or dry weight of *C. dilutus* exposed to deep Polley Lake sediments compared to reference sediments (Bootjack Lake; Nautilus 2024). Based on these multiple lines of evidence, there was no unacceptable response of survival or growth of *C. dilutus* exposed to Polley Lake deep sediments in 2024.

Temporal evaluation of sediment toxicity test results at deep areas of Polley Lake (POL-P1 and POL-P2) between 2014 and 2024 indicate that both survival and growth of *C. dilutus*

Table 5.2: Summary of *Chironomus dilutus* 10-day Survival and Growth Responses for Sediment Toxicity Testing of Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2024

Results and Classification	POL-P1		POL-P2	
	Survival	Growth[a]	Survival	Growth[a]
	%	mg	%	mg
Raw Area Result	96 ± 5.5	2.34 ± 0.20	90 ± 17.3	2.32 ± 0.23
Raw Laboratory Control Result [b]	88 ± 11.0	1.77 ± 0.19	88 ± 11.0	1.77 ± 0.19
Raw Laboratory Control Result [c]	100 ± 0.0	1.66 ± 0.12	100 ± 0.0	1.66 ± 0.12
Raw Reference Result (BOL-B2)	98 ± 4.5	2.05 ± 0.22	98 ± 4.5	2.05 ± 0.22
Control Normalized Response	109%	132%	102%	131%
Reference Normalized Response	98%	114%	92%	113%
Statistical Difference from Control	n	n	n	n
Statistical Difference from Reference[d]	n	n	n	n
CLASSIFICATION	**NR**	**NR**	**NR**	**NR**

No unacceptable response (<20% reduction) - **NR**.
Low response (20-50% reduction) and not significantly different than control and reference - **LR**.
Moderate response (20-50% reduction) and significantly different than control and reference - **MR.**
High response (>50% reduction) - **HR**.

Notes: y = yes, n = no.

[a] Growth = dry weight per surviving organism (mg).

[b] Laboratory control data for the control treatment associated with the POL-P1 and POL-P2.

[c] Laboratory control data for the control treatment associated with BOL-B2.

[d] Reference (BOL-B2) samples were run in a different batch than exposed samples (POL-P1, POL-P2). However, statistical analyses comparing exposed results (POL-P1, POL-P2) to reference results (BOL-B2) indicate no statistically significant difference (see Appendix G for details).

have consistently shown no unacceptable responses among all years (excluding one moderate growth response at POL-P1[49]; Figure 5.2; Minnow 2017e, 2019a).

5.1.2.2 Shallow Areas

Toxicity testing was conducted in the shallow area of Polley Lake (POL-S) in 2022 using *H. azteca* (14-day standard test using static methods), with a corresponding shallow area in Bootjack Lake (BOL-S) serving as reference (Minnow 2022a). The results of this monitoring are summarized briefly herein with detailed methods and results presented in Minnow (2023a).

Sediment toxicity testing in shallow areas indicated no unacceptable response (<20% reduction) for survival relative to the reference area or the test control, with a control-normalized survival rate of 97% and a reference-normalized survival rate of 104%. Similarly, *H. azteca* growth in tests of shallow exposed (POL-S) sediment showed no unacceptable response, with growth 14% greater than reference (BOL-S) sediments and 26% greater than the laboratory control. The survival and growth responses observed in 2022 were similar to those in 2019 when sampling was initiated at these shallow areas of Polley and Bootjack lakes.

Aqueous concentrations of dissolved copper in overlying waters of the toxicity test vessels of exposed sediments (POL-S; mean = 0.028 mg/L) were approximately 8-times higher at test conclusion (day 14) than dissolved copper concentrations in field-collected (*in situ*) water from POL-S (mean = 0.0036 mg/L). This difference in aqueous dissolved copper concentrations in toxicity test and *in situ* field-collected overlying water suggests some copper mobilization in the toxicity test set-up that has either not occurred in the field or has attenuated over time.

Condition 9 of the CEMP approval dated February 10, 2021 (BCMOECCS 2021) specified that "*The 14-day sediment toxicity test on H. azteca must be conducted every three years (i.e., next in 2022) using sediment of shallow habitat from Polley Lake unless MPMC can clearly show that copper concentrations in all Polley Lake shallow sediment samples are below the 95th percentile of the copper concentrations in the Bootjack Lake reference area shallow sediment samples.*" This condition was not met in 2022 in Polley Lake shallow sediments (see Section 5.1.1.2), indicating that toxicity testing of these shallow sediments must be completed in three years (in 2025) in accordance with the CEMP conditions.

[49] A moderate growth response was observed at POL-P1 (the Northwest basin) relative to the field reference (BOL-B2) in 2018. However, the same was not observed relative to the laboratory control. This response (21%) was only marginally greater than the specified acceptability criterion (20%).

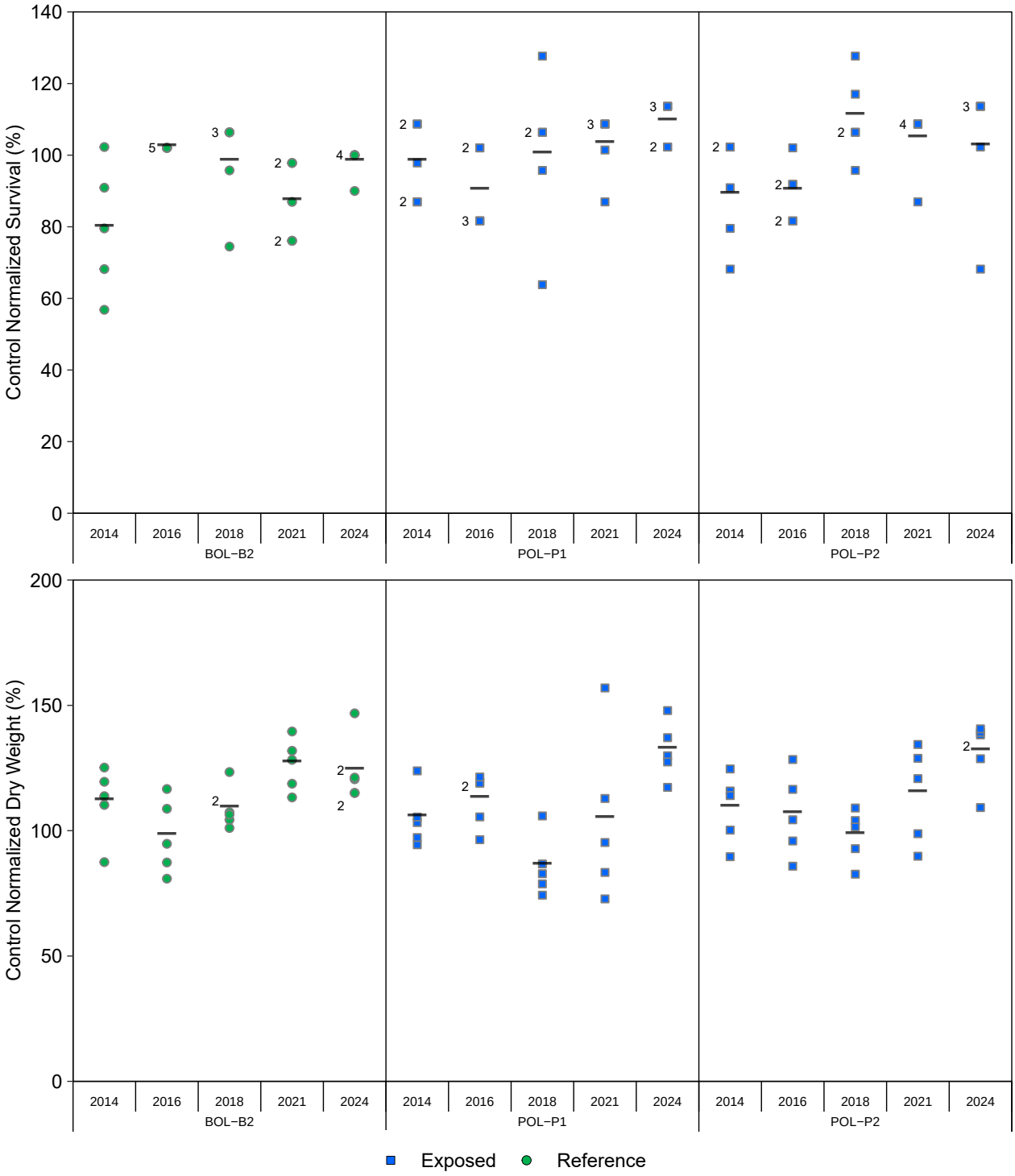


Figure 5.2: *Chironomus dilutus* Survival and Growth Responses (10−day) for Sediment Toxicity Testing at the Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: Green represents reference areas and blue represents exposed areas. Survival and growth data were normalized as a percentage of control performance for the same test batch. Numbers beside points on the plot indicate the number of overlapping results plotted. In 2024, different control sediment was used for Bootjack and Polley Lake; data were normalized to results from the associated control sample.

5.1.3 Plankton Community and Productivity

Plankton community and productivity monitoring was completed annually between 2022 and 2024 with three sampling events per year (June, July, and August) in Polley Lake (POL-P2) and a corresponding reference area in Bootjack Lake (BOL-B2; Figure 3.3, Tables 3.4 and 3.5). Single phytoplankton and zooplankton samples were collected in June and August, whereas replicate samples were collected in July of each year (n = 5 per area; see Section 3.3.1 for details).

A review of the 2024 plankton community and productivity results (Appendix B) indicated that the data met the established laboratory DQOs. Phytoplankton and zooplankton community samples had good laboratory precision and accuracy, and phytoplankton productivity (chlorophyll-a) results had good detectability, high laboratory accuracy, and no evidence of laboratory contamination. Laboratory precision could not be evaluated as the chlorophyll-a analysis required consumption of the entire sample; however, field sampling precision was excellent. Recommended hold times were exceeded by one day in three samples; however, results remained within historic range. Overall, the plankton community and productivity data for Polley Lake can be used with a good level of confidence for data interpretation.

A review of the 2024 supporting spot water quality data collected by Minnow (Appendix B) indicated results were characterized by good detectability, negligible analyte concentrations in laboratory blank samples, field and trip blanks, and good laboratory precision and accuracy. Recommended hold times were exceeded for pH (0.25 hour hold time) in all samples as well as turbidity, dissolved orthophosphate, nitrite, and nitrate (36 hour hold time) in most samples. For pH field measures were used in data analyses, so impacts were negligible. Results for dissolved orthophosphate, nitrite, and nitrate were similar to those that did not exceed hold times in prior years, suggesting that hold time exceedances had a negligible impact on analyte results. Total copper, iron, cadmium, and dissolved manganese and cadmium exceeded the recommended DQO for variation within field duplicate samples of >30% relative percent difference (RPD) in one or more samples (Appendix B). The exceedances were not consistent across all duplicate sets, suggesting water quality data had generally good field precision that was not consistently influenced by collection methods. Overall, the water quality data was of acceptable quality and can be used with a good level of confidence for interpretation.

5.1.3.1 Phytoplankton

5.1.3.1.1 Community

Qualitative evaluation of seasonal data from 2024 indicated that phytoplankton densities were highest in July and August at the exposed (POL-P2) and reference (BOL-B2) areas, with comparatively lower densities occurring in June. In contrast, taxon richness at POL-P2 was

lowest in July compared to June and August 2024 but was similar among months at BOL-B2 (Appendix Figure E.2.1, Appendix Table C.3.1). Statistical analyses of replicated data (from July sampling events) indicated that phytoplankton density and taxon richness at POL-P2 in 2024 were both significantly lower compared to BOL-B2. In contrast, Simpson's Diversity and Evenness at POL-P2 in 2024 were both significantly higher compared to BOL-B2 (Figure 5.3, Table 5.3; Appendix Tables C.3.1 and C.3.2).

Temporal analyses indicated some variability in density, taxon richness, Simpson's Diversity, and Simpson's Evenness at POL-P2 from 2019 to 2024 (Figure 5.3, Table 5.3). Mean phytoplankton density at POL-P2 decreased over time between 2019 to 2022, increased significantly in 2023 to densities similar to 2019, and then decreased significantly in 2024 to densities similar to 2020 and 2021 (Figure 5.3, Table 5.3). Mean densities at POL-P2 have been similar to (2019), significantly lower (2020 and 2024), and significantly higher (2021 to 2023) than those at the reference area, while the densities at BOL-B2 have also varied significantly between 2019 and 2024. This temporal variability in mean phytoplankton densities at both the exposed and reference areas has been driven primarily by significant changes in the densities of Cyanobacteria (Figure 5.3, Table 5.3; Appendix Figures E.2.2 and E.2.3). Taxon richness at POL-P2 in 2024 was similar to prior years except for being significantly lower than 2023 and was significantly lower than the reference in all years except 2020 (Figure 5.3, Table 5.3). However, taxon richness at POL-P2 remained within the range of post-breach results (2015 onward) for the same area, but was lower than baseline (1996) at both exposed and reference areas (Appendix Figure E.2.1). Some variability in taxon richness among the baseline (1996), early post-breach (2015 to 2018), and recent post-breach (2019 to 2023) results may be attributed to changes in phytoplankton taxonomists (see Minnow 2020a for details). Although phytoplankton density and taxon richness at POL-P2 have been significantly different than at the reference area in most years, the lack of a directionally consistent change in either of these endpoints (i.e., consistent increase or decrease over time) compared to the reference area, suggested that the observed temporal variability was likely related to changes and/or differences in local environmental factors (e.g., light exposure, water temperature, nutrient availability) between the lakes. Simpson's Diversity and Evenness at POL-P2 were similar to or significantly higher than at BOL-B2 in all years. Simpson's Diversity at both POL-P2 and BOL-B2 was higher in 2022 to 2024 compared to 2019 to 2021 while Simpson's Evenness was highest in 2022 and 2024 at POL-P2 and was highest in 2022 at BOL-B2 compared to other years (Figure 5.3, Table 5.3).

Qualitative evaluation of seasonal data from 2024 indicated that the phytoplankton community at both POL-P2 and BOL-B2 was dominated by Cyanobacteria throughout the growing season (June, July, and August). At both POL-P2 and BOL-B2, the relative densities (%) of Diatoms, Chlorophytes, Chrysophytes, and Cryptomonads were slightly higher in June compared to later

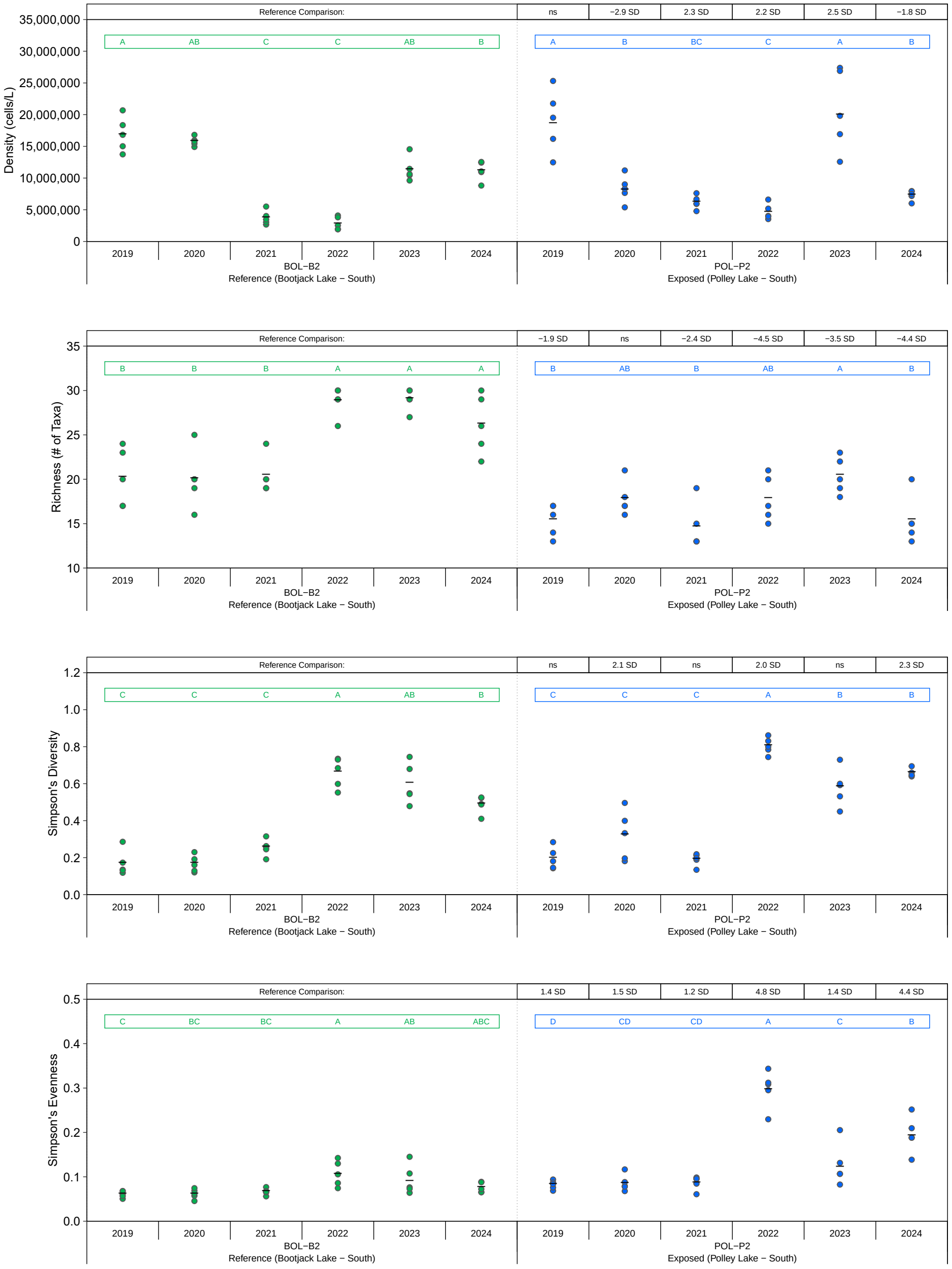


Figure 5.3: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1

Table 5.3: Statistical Comparisons of Phytoplankton Community Metrics for Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
										Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year						2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Density (cells/L)	log10	-	-	<0.001	Reference	BOL-B2	2019	16,920,021	16,745,017	A	AB	C	C	AB	B	Baseline	ns	-6.6	-7.9	ns	-1.8	ns
							2020	15,769,285	15,756,799													-2.9
							2021	3,737,530	3,618,303													2.3
							2022	2,856,805	2,710,389													2.2
							2023	11,334,064	11,216,694													2.5
							2024	11,158,051	11,071,171													-1.8
					Exposed	POL-P2	2019	19,050,107	18,506,530	A	B	BC	C	A	B	Baseline	-3.6	-4.8	-6.1	ns	-4.0	
							2020	8,310,083	8,083,492													
							2021	6,188,644	6,117,587													
							2022	4,657,243	4,534,837													
							2023	20,717,024	19,879,396													
							2024	7,301,833	7,265,135													
Richness (# of Taxa)	none	-	-	<0.001	Reference	BOL-B2	2019	20	20	B	B	B	A	A	A	Baseline	ns	ns	3.5	3.6	2.4	-1.9
							2020	20	20													ns
							2021	20	20													-2.4
							2022	29	29													-4.5
							2023	29	29													-3.5
							2024	26	26													-4.4
					Exposed	POL-P2	2019	15.4	15.4	B	AB	B	AB	A	B	Baseline	ns	ns	ns	2.0	ns	
							2020	17.8	17.8													
							2021	14.6	14.6													
							2022	17.8	17.8													
							2023	20.4	20.4													
							2024	15.4	15.4													
Simpson's Diversity	none	-	-	0.002	Reference	BOL-B2	2019	0.168	0.168	C	C	C	A	AB	B	Baseline	ns	ns	6.7	5.8	4.3	ns
							2020	0.166	0.166													2.1
							2021	0.254	0.254													ns
							2022	0.660	0.660													2.0
							2023	0.599	0.599													ns
							2024	0.487	0.487													2.3
					Exposed	POL-P2	2019	0.196	0.196	C	C	C	A	B	B	Baseline	ns	ns	8.3	5.2	6.3	
							2020	0.321	0.321													
							2021	0.190	0.190													
							2022	0.804	0.804													
							2023	0.580	0.580													
							2024	0.657	0.657													
Simpson's Evenness	log10	-	-	<0.001	Reference	BOL-B2	2019	0.0607	0.0603	C	BC	BC	A	AB	ABC	Baseline	ns	ns	2.6	1.8	ns	1.4
							2020	0.0615	0.0606													1.5
							2021	0.0664	0.0660													1.2
							2022	0.108	0.105													4.8
							2023	0.0932	0.0889													1.4
							2024	0.0758	0.0751													4.4
					Exposed	POL-P2	2019	0.0819	0.0814	D	CD	CD	A	C	B	Baseline	ns	ns	6.0	1.8	4.0	
							2020	0.0859	0.0845													
							2021	0.0869	0.0856													
							2022	0.298	0.295													
							2023	0.126	0.120													
							2024	0.195	0.192													
Chlorophyll-a (µg/L)	log10	-	-	<0.001	Reference	BOL-B2	2019	2.76	2.75	A	CD	D	BCD	AB	ABC	Baseline	-2.2	-3.5	-2.0	ns	ns	ns
							2020	2.05	2.01													ns
							2021	1.68	1.67													-2.2
							2022	2.08	2.07													2.1
							2023	2.66	2.65													2.5
							2024	2.20	2.20													-3.8
					Exposed	POL-P2	2019	2.46	2.45	B	C	D	B	A	D	Baseline	-2.4	-5.0	ns	3.0	-4.6	
							2020	1.76	1.75													
							2021	1.23	1.22													
							2022	2.82	2.78													
							2023	3.76	3.75													
							2024	1.32	1.29													

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available, ns = non significant, µg/L = micrograms per litre.

[a] MCT = Measures of Central Tendency. Mean, geometric mean, or median depending on if analysis was conducted on untransformed, $\log_{10}$-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

in the summer (July and August) when Cyanobacteria (%) were more dominant in both lakes (Figure 5.4, Appendix Figure E.2.3, Appendix Table C.3.1). The pattern of increasing dominance of Cyanobacteria as the summer progressed from June to August was similar to that observed in previous years and was likely related to higher water temperatures which occurred later in the growing season, and which promoted Cyanobacteria growth (Appendix Figures A.1.2 and C.1.1; Schnurr and Allen 2015). Statistical analyses of replicated data (from July sampling events) indicated that the community composition at POL-P2 in 2024 differed from that at BOL-B2 in terms of significantly higher relative densities (%) of Chrysophytes, and significantly lower relative densities of Diatoms, Cryptomonads. Cyanobacteria, the dominant taxa in both lakes, had relative densities (%) that were similar between POL-P2 and BOL-B2 in 2024, as were Chlorophytes (%; Appendix Figure E.2.2, Appendix Table E.2.1). Dinoflagellates, Euglenophytes, and Radiophytes represented < 5% of the phytoplankton community in each year, thus changes in the relative densities of these taxa were less likely to be ecologically meaningful and were not considered further (Appendix Tables C.3.2 and E.2.1).

Temporal analyses indicated that the relative densities (%) of Cyanobacteria (the dominant taxa in both Polley and Bootjack lakes) at POL-P2 have been similar to or significantly lower than at the reference area throughout the monitoring period (2019 to 2024). The temporal variability in the differences in Cyanobacteria (%) between POL-P2 and BOL-B2 were driven mainly by temporal changes at BOL-B2 since Cyanobacteria (%) has been largely temporally stable at POL-P2 (except for a significant decrease in 2022 compared to all other years; Appendix Figure E.2.2, Appendix Table E.2.1). The relative densities (%) of Chrysophytes at POL-P2 have consistently been significantly higher than at the reference area from 2020 to 2024, and Cryptomonads (%) at POL-P2 have been significantly lower than at BOL-B2 in most years from 2021 to 2024 (except 2022 when there was no difference; Appendix Figure E.2.2, Appendix Table E.2.1). For the less dominant taxa (Chlorophytes and Diatoms), the results at POL-P2 have been more temporally variable compared to BOL-B2, but these taxa represented < 3% of the phytoplankton community in 2024 (Appendix Figure E.2.2, Appendix Table E.2.1).

Overall, the phytoplankton community in Polley Lake in 2024 was characterized by total density and taxon richness that were significantly lower, and Simpson's Diversity and Evenness that were significantly higher, than at the reference area (Bootjack Lake). Phytoplankton density has varied temporally, both within Polley Lake and relative to the reference area, and this variability is attributable to significant changes in Cyanobacteria densities in both Polley and Bootjack lakes which were likely driven by natural changes in environmental parameters (e.g., light exposure, water temperature, nutrient availability). Taxon richness in Polley Lake has consistently been significantly lower than at the reference area (except in 2020), while Simpson's Diversity and Evenness have been similar to or significantly higher than at the reference area in all years.

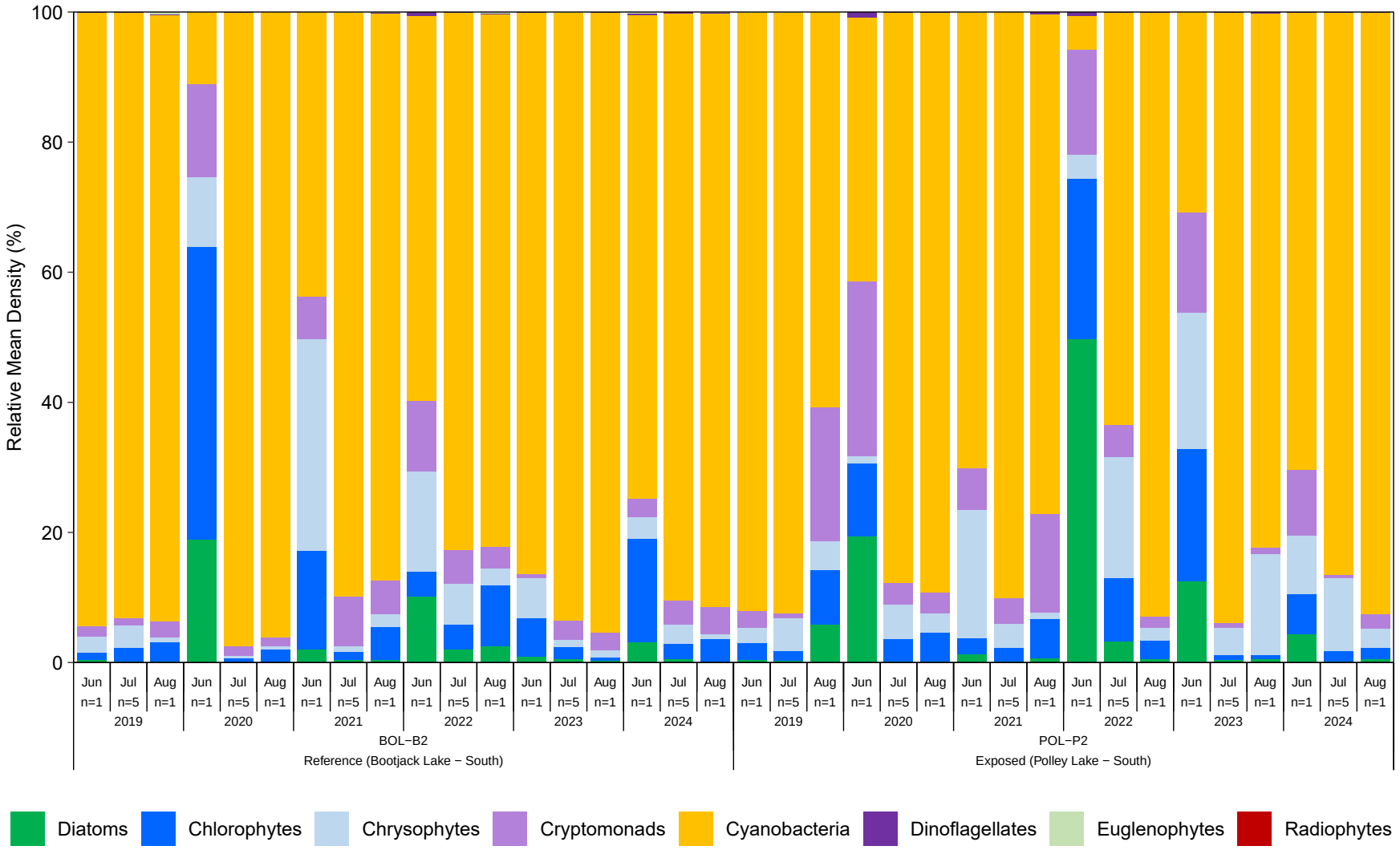


Figure 5.4: Relative Mean Densities of Major Phytoplankton Taxa for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 2019 to 2024

Cyanobacteria were the dominant taxonomic group in both Polley and Bootjack Lakes from June to August in all years, with succession to greater Cyanobacteria dominance in late summer (July and August) of each year, and the relative densities of Cyanobacteria in Polley Lake have been similar to or significantly lower than in Bootjack Lake in all years. The less dominant taxa in Polley Lake have consistently shown significantly higher and lower relative densities (%) of Chrysophytes and Cryptomonads compared to Bootjack Lake, respectively, in most years since 2021. Collectively, the lack of a directionally consistent change in the differences of the Polley Lake community endpoints, relative to the reference area (i.e., no obvious consistent increasing or decreasing patterns), suggested that the observed differences were likely related to environmental factors (e.g., light exposure, water temperature, nutrient availability).

5.1.3.1.2 Productivity

Qualitative evaluation of seasonal data from 2024 indicated chlorophyll-a concentrations were lowest in June and highest in July and August at both POL-P2 (exposed) and BOL-B2 (reference; Appendix Figure E.2.1, Appendix Table C.3.1).

Statistical analyses of replicated data (from July sampling events) indicated that chlorophyll-a concentrations at POL-P2 in 2024 were significantly lower compared to BOL-B2, consistent with results observed in 2021. Chlorophyll-a concentrations at POL-P2 in 2024 were significantly lower than the remaining prior years (i.e., excluding 2021) when results at POL-P2 were similar to or significantly higher than at BOL-B2 (Figure 5.5, Table 5.3). The pattern of significant temporal changes in chlorophyll-a concentrations at POL-P2 from 2019 to 2024 was similar to those observed at BOL-B2, however, the magnitude of these differences was larger at POL-P2 (Figure 5.5, Table 5.3). The similarity in the pattern of temporal changes in chlorophyll-a concentrations between Polley Lake and Bootjack Lake suggests that natural variability in physical variables (e.g., light exposure, water temperature, nutrient availability) affected phytoplankton productivity similarly in both lakes, despite the temporal variability in the significant differences in chlorophyll-a concentrations between the lakes (Appendix Figure C.1.1 and Appendix Table C.1.2). The chlorophyll-a concentrations for Polley Lake from 2019 to 2024 were generally within the range of baseline conditions (1995 and 1996) and early post-breach years (i.e., 2015 to 2018), indicating that there has not been an obvious increase in phytoplankton productivity over the long-term (Appendix Figure E.2.1).

A lake's trophic status classification corresponds to its overall productivity in terms of sestonic algal biomass (chlorophyll-a concentrations) and nutrient concentration (Wetzel 2001). In 2024, Polley Lake and Bootjack Lake were classified as oligotrophic (<2.5 µg/L; Vollenweider and Kerekes 1982) based on mean July chlorophyll-a concentrations (1.32 µg/L for POL-P2 and 2.20 µg/L for BOL-B2; Figure 5.5; Appendix Table C.3.2). This was consistent with the trophic

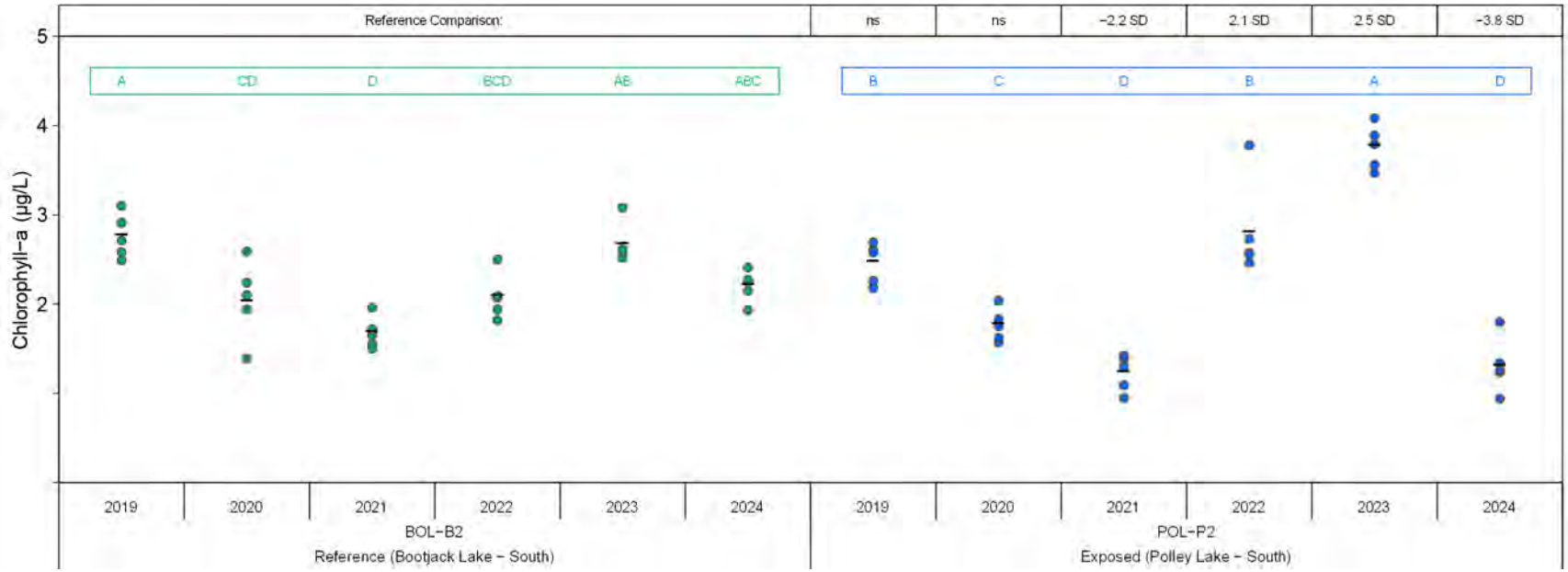


Figure 5.5: Phytoplankton Chlorophyll−a Concentrations for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: µg/L = micrograms per litre. Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1.

status of the lakes in 2020 and 2021, but not in 2019, 2022, and 2023, when both lakes were classified as mesotrophic (Minnow 2020a, 2021a, 2022a, 2023a, 2024a).

5.1.3.2 Zooplankton

5.1.3.2.1 Community

Qualitative evaluation of seasonal data from 2024 indicated that zooplankton densities at POL-P2 (exposed) and BOL-B2 (reference) in 2024 were the highest in June and lowest in August in both lakes. In contrast, taxonomic richness in 2024 was highest in August in both lakes (Appendix Figure E.2.4, Appendix Table C.3.3). Statistical analyses of replicated data (from July sampling events) indicated that zooplankton density, Simpson's Diversity, and Simpson's Evenness in July 2024 were significantly lower at POL-P2 compared to BOL-B2, whereas taxon richness did not differ significantly between lakes in 2024 (Figure 5.6, Table 5.4; Appendix Tables C.3.3 and C.3.4). The significantly lower mean density at POL-P2 compared to BOL-B2 in 2024 was driven by significantly lower mean densities of Rotifera and Cladocera at POL-P2 (Appendix Figures E.2.5 and E.2.6, Appendix Table E.2.2). The 2024 results for both Simpson's Diversity and Evenness suggested differences in zooplankton community composition between POL-P2 and BOL-B2.

Temporal analyses indicated significant year-over-year decreases in zooplankton density at POL-P2 between 2022 and 2024, with the mean density in 2024 being significantly lower than all previous years (2019 to 2023; Figure 5.6, Table 5.4). However, a similar pattern was observed at BOL-B2 with significantly lower mean zooplankton density in 2024 compared to all previous years (except 2019). The similar temporal pattern in densities at POL-P2 and BOL-B2 was reflected in the MODs between the two areas that were smaller in 2024 (-2.0 SD) than in 2023 (-2.9 SD) despite the significant decrease in density at POL-P2, and suggests that natural regional environmental factors (e.g., air temperature) influenced zooplankton density at both lakes (Appendix Figures A.1.2 and C.1.1, Appendix Table C.1.2). Zooplankton densities at POL-P2 were similar to reference in 2022, then decreased to densities that were significantly lower than reference in 2023 and 2024. While the decrease in total density from 2022 to 2024 at POL-P2 was primarily driven by significantly decreased densities of Calanoida, Cladocera, and Copepod Nauplii in 2023 and 2024 compared to 2022, Cladocera and Rotifera were the only taxa at POL-P2 in 2024 with densities that were significantly lower than at the reference area (Appendix Figures E.2.5 and E.2.6, Appendix Table E.2.2). Zooplankton taxon richness and Simpson's Diversity at POL-P2 in 2024 were both similar to most prior years but were significantly lower than in 2023 (Figure 5.6, Table 5.4). Taxon richness at POL-P2 was similar to or significantly higher than the richness at BOL-B2 in all years except 2020. Simpson's Diversity at POL-P2 was significantly lower than BOL-B2 in 2019, 2002, and 2024 but similar to or significantly higher than at BOL-B2

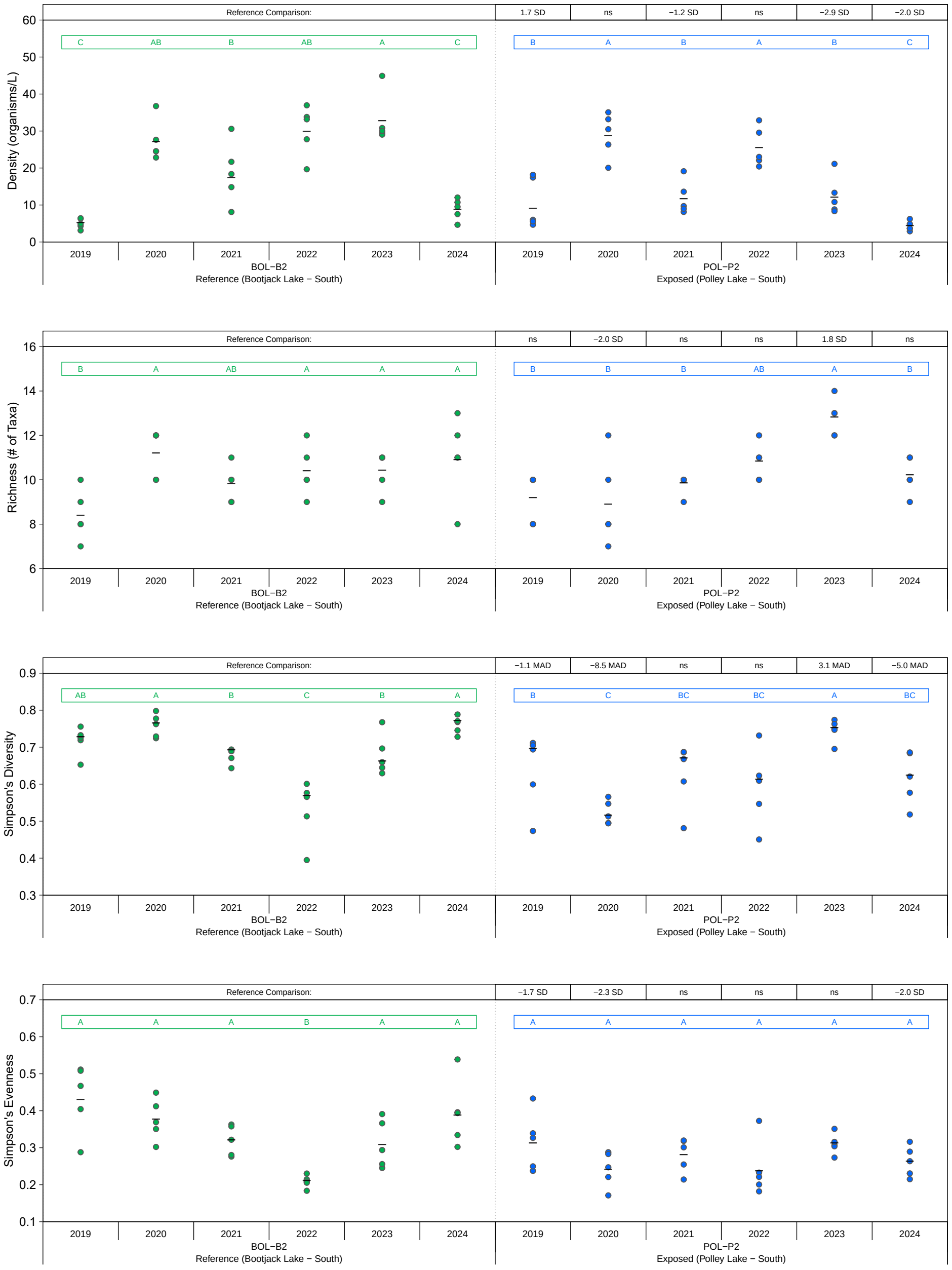


Figure 5.6: Zooplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.3.

Table 5.4: Statistical Comparisons of Zooplankton Community Metrics for Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within
										Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year						2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Density (#/L)	log10	-	-	<0.001	Reference	BOL-B2	2019	5.01	4.85	C	AB	B	AB	A	C	Baseline	4.9	3.6	5.1	ns	ns	1.7
							2020	27.2	26.8													ns
							2021	18.7	17.1													-1.2
							2022	30.3	29.6													ns
							2023	32.9	32.4													-2.9
							2024	8.89	8.45													-2.0
					Exposed	POL-P2	2019	10.4	8.68	B	A	B	A	B	C	Baseline	3.4	ns	ns	0.86	-2.1	
							2020	29.0	28.5													
							2021	11.9	11.3													
							2022	25.6	25.1													
							2023	12.5	11.7													
							2024	4.26	4.11													
Richness (# of Taxa)	log10	-	-	0.004	Reference	BOL-B2	2019	8	8	B	A	AB	A	A	A	Baseline	2.5	ns	1.8	1.8	2.2	ns
							2020	11	11													-2.0
							2021	10	10													ns
							2022	10	10													ns
							2023	10	10													1.8
							2024	11	11													ns
					Exposed	POL-P2	2019	9	9	B	B	B	AB	A	B	Baseline	ns	ns	1.4	ns	ns	
							2020	9	9													
							2021	10	10													
							2022	11	11													
							2023	13	13													
							2024	10	10													
Simpson's Diversity	rank	-	-	<0.001	Reference	BOL-B2	2019	0.717	0.725	AB	A	B	C	B	A	Baseline	ns	ns	ns	ns	ns	-1.1
							2020	0.758	0.762													-8.5
							2021	0.677	0.689													ns
							2022	0.530	0.566													ns
							2023	0.679	0.659													3.1
							2024	0.760	0.768													-5.0
					Exposed	POL-P2	2019	0.637	0.694	B	C	BC	BC	A	BC	Baseline	-6.2	ns	-2.9	ns	ns	
							2020	0.523	0.513													
							2021	0.626	0.668													
							2022	0.592	0.609													
							2023	0.746	0.749													
							2024	0.617	0.621													
Simpson's Evenness	log10	-	-	0.008	Reference	BOL-B2	2019	0.436	0.427	A	A	A	B	A	A	Baseline	ns	ns	ns	ns	ns	-1.7
							2020	0.377	0.373													-2.3
							2021	0.320	0.318													ns
							2022	0.208	0.208													ns
							2023	0.310	0.305													ns
							2024	0.393	0.385													-2.0
					Exposed	POL-P2	2019	0.317	0.310	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	
							2020	0.242	0.238													
							2021	0.282	0.278													
							2022	0.242	0.234													
							2023	0.310	0.309													
							2024	0.263	0.260													
Dry Weight Biomass (mg/L)	log10	-	-	<0.001	Reference	BOL-B2	2019	0.00544	0.00516	C	A	BC	A	AB	C	Baseline	3.1	ns	3.7	ns	ns	3.0
							2020	0.0163	0.0160													ns
							2021	0.00631	0.00607													ns
							2022	0.0204	0.0197													ns
							2023	0.0117	0.0109													-1.2
							2024	0.00333	0.00321													2.5
					Exposed	POL-P2	2019	0.0176	0.0155	A	A	B	A	B	B	Baseline	ns	-2.0	0.73	-2.2	-1.8	
							2020	0.0229	0.0226													
							2021	0.00762	0.00756													
							2022	0.0210	0.0202													
							2023	0.00704	0.00693													
							2024	0.00940	0.00795													

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available, ns = non significant, mg/L = milligrams per litre.

[a] MCT = Measures of Central Tendency. Mean, geometric mean, or median depending on if analysis was conducted on untransformed, $\log_{10}$-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

in 2021 to 2023. Simpson's Evenness has not varied significantly among years at POL-P2 and was either similar to or significantly lower than at BOL-B2 over time (Figure 5.6, Table 5.4).

Qualitative evaluation of seasonal data from 2024 indicated that the zooplankton community at POL-P2 was dominated by Rotifera taxa in June (mean = 72.6%), whereas Cyclopoida and Copepod Nauplii taxa were the dominant taxa in July and August. At BOL-B2 in 2024, the zooplankton community was dominated by Rotifera and Copepod Nauplii in June and July, and by Rotifera and Cladocera in August (Figure 5.7; Appendix Table C.3.3). Statistical analyses of replicated data (from July sampling events) indicated that the community composition at POL-P2 in 2024 differed from that at BOL-B2 in terms of significantly higher relative densities (%) of Calanoida and Cyclopoida and significantly lower Rotifera, but no other differences in the relative densities of taxa (Appendix Figure E.2.5, Appendix Tables C.3.4 and E.2.2).

Temporal analyses indicated that the zooplankton community at POL-P2 has consistently had significantly higher and lower relative densities (%) of Cyclopoida and of Rotifera, respectively, compared to BOL-B2 from 2019 to 2024 (except for Cyclopoida [%] in 2022 which was similar between the areas). The relative densities (%) of Copepod Nauplii at POL-P2 were similar to BOL-B2 in 2023 and 2024, which differed from 2019 to 2022 when they were consistently significantly higher at POL-P2 compared to BOL-B2 (Figure 5.7; Appendix Figure E.2.5, Appendix Table E.2.2). The least dominant taxa (Calanoida and Cladocera) at POL-P2 have shown greater temporal variability relative to the reference area, although for Calanoida (%) this has been due to changes at BOL-B2 since Calanoida (%) at POL-P2 has been temporally stable from 2019 to 2024 in the community in POL-P2 (Appendix Figure E.2.5, Appendix Table E.2.2).

Overall, the zooplankton community in Polley Lake in 2024 was characterized by total density, Simpson's Diversity, and Simpson's Evenness that were significantly lower than at the reference area (Bootjack Lake), and taxon richness that was similar to the reference area. These four zooplankton community endpoints have varied temporally, both within Polley Lake (excluding Simpson's Evenness which has been temporally stable), and relative to the reference area. The zooplankton community in Polley Lake has consistently had a higher dominance of Cyclopoida (%) and lower dominance of Rotifera (%) than Bootjack Lake from 2019 to 2024 (excluding 2022 for Cyclopoida), while Copepod Nauplii (%) in Polley Lake were significantly higher than Bootjack Lake from 2019 to 2022 but similar to the reference area in 2023 and 2024. Collectively, the observed temporally variability in most endpoints at both the exposed and reference areas, and the lack of a directional consistency in the differences of the Polley Lake community endpoints, relative to reference (i.e., no consistent increasing or decreasing patterns), suggested that the observed differences between the exposed and reference zooplankton

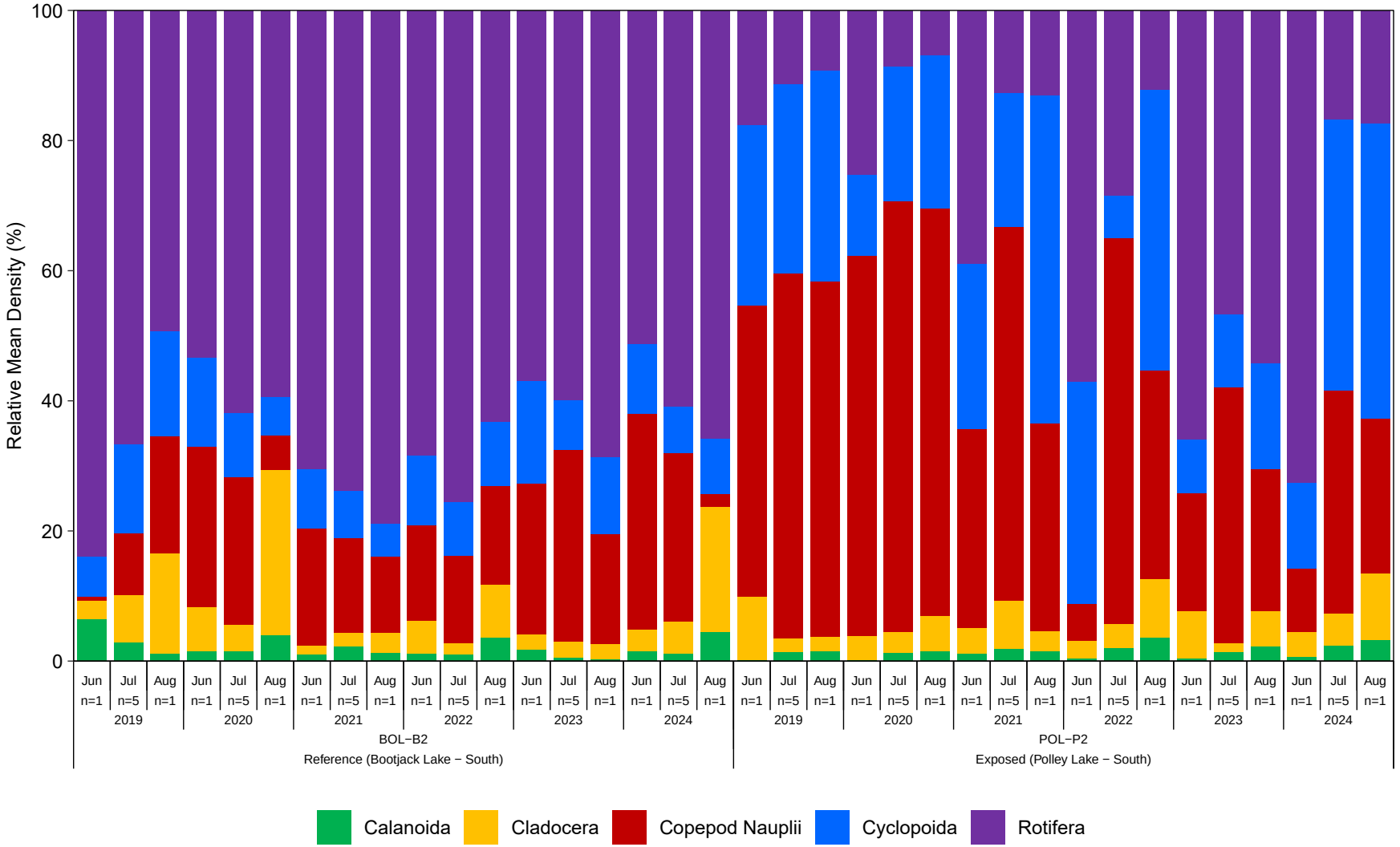


Figure 5.7: Relative Mean Densities of Major Zooplankton Taxa for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 2019 to 2024

Notes: Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

communities were likely related to environmental factors (e.g., water temperature, nutrient availability, phytoplankton community, predation).

5.1.3.2.2 Productivity

Qualitative evaluation of seasonal data from 2024 indicated that zooplankton biomass (dw) at the exposed area (POL-P2) in June and August 2024 were within the range of values observed in July, whereas zooplankton biomass at the reference area (BOL-B2) decreased from June to August (Appendix Figure E.2.4, Appendix Table C.3.3).

Statistical analyses of replicated data (from July sampling events) indicated that mean zooplankton biomass (dw) at Polley Lake (POL-P2) was significantly higher than at the reference area (BOL-B2) in July 2024, similar to the results in 2019 (Figure 5.8, Table 5.4; Appendix Table C.3.4). Zooplankton biomass (dw) at POL-P2 was similar to BOL-B2 between 2020 and 2022 and was significantly lower than at BOL-B2 in 2023 (Figure 5.8, Table 5.4). Within both lakes, there has been variability in zooplankton biomass (dw) over time, and patterns were similar to those for total zooplankton density over time (Figures 5.6 and 5.8, Table 5.4). The general similarity in temporal changes of zooplankton biomass (dw) at POL-P2 compared to BOL-B2 indicated these changes were likely related to natural environmental factors (e.g., water temperature, length of growing season; Shuter and Ing 1997) that have similarly affected zooplankton productivity in both lakes. Despite the significantly lower zooplankton biomass (dw) at POL-P2 in 2023 and 2024 compared to 2022, zooplankton biomass (dw) at POL-P2 has remained similar to or significantly higher than at the reference area (BOL-B2) in all years except 2023 (Figure 5.8, Table 5.4).

5.1.4 Zooplankton Tissue Quality

Zooplankton tissue quality monitoring was completed annually between 2022 to 2024 with three sampling events per year (June, July, and August) in Polley Lake (POL-P2) and at a corresponding reference area in Bootjack Lake (BOL-B2; Figure 3.3, Table 3.6). Replicated results from July (n=5) were used for statistical comparisons (see Section 3.4.3).

A review of the 2024 zooplankton tissue quality results (Appendix B) indicated that the data largely met the established DQOs. Specifically, the data were characterized by appropriate detectability, negligible analyte concentrations in method blank samples, excellent laboratory accuracy; however, laboratory duplicate samples failed the DQO in 5.26% of results. Zooplankton tissue field duplicate samples generally had low agreement, and the recommended DQO for variation within field duplicate samples was exceeded for nickel and tin (both secondary analytes) in duplicate pairs from July and August, while the field duplicate sample in June met the DQO for all analyte comparisons except antimony (Appendix B). Differences in

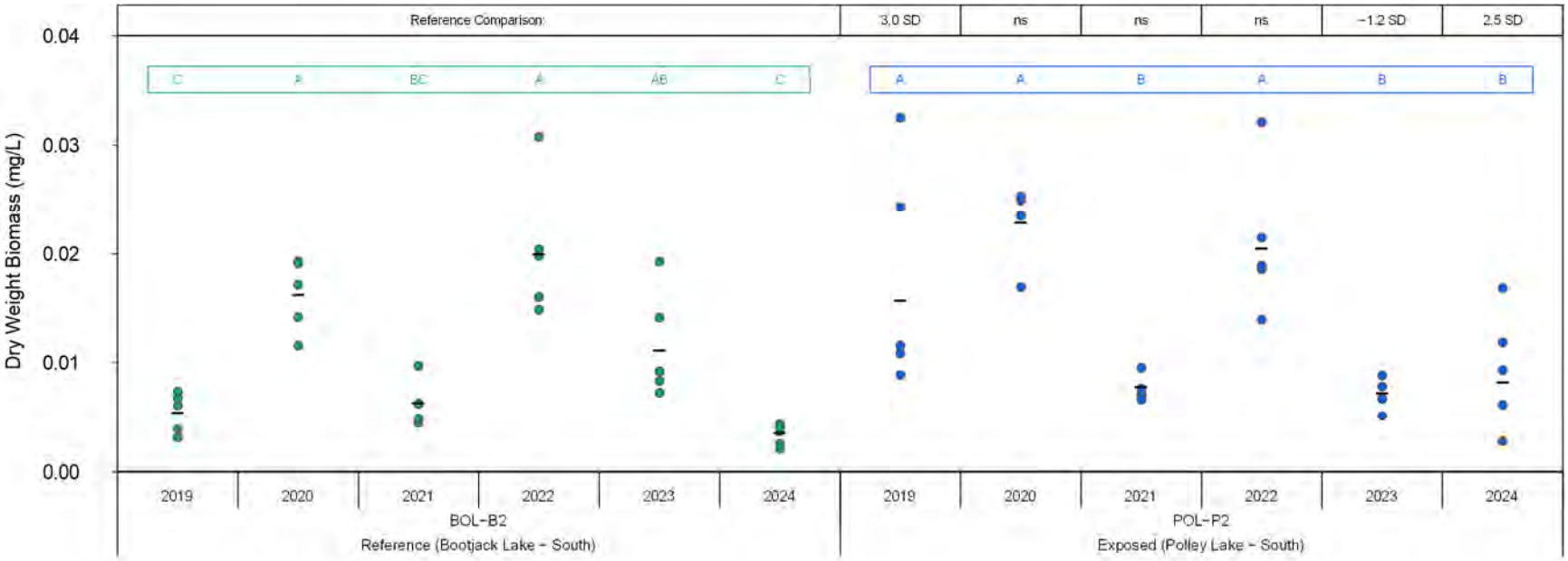


Figure 5.8: Zooplankton Biomass (Total Dry Weight) for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/L = milligrams per litre. Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non− significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.3.

the agreement of field duplicate pairs are likely the result of natural variability in community composition, which may vary among seasons, and variability associated with multi-element scans. One sample from Polley Lake in June had several analyte concentrations that were elevated relative to historic values, with results confirmed by laboratory reanalysis. Overall, the 2024 zooplankton tissue quality data can be used with an appropriate level of confidence for interpretation, although the occurrence of some natural heterogeneity in analyte results were considered during data interpretation. A review of 2024 supporting water data quality indicated that these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

Data interpretation was focused on primary and secondary analytes (Table 2.4) with a significantly positive relative (exposed-reference) difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis *Area*×*Year* interaction was significant) or in all monitoring years (if the *Area*×*Year* interaction was not significant[50]).

Zooplankton tissue from Polley Lake had concentrations of primary or secondary analytes that were either similar to or significantly lower than reference in 2024 (if the *Area*×*Year* interaction was significant) or in all monitoring years (if the *Area*×*Year* interaction was not significant; Appendix Table E.3.1). This result contrasts with prior years (i.e., 2019 to 2021, and 2023) when one or both of two primary analytes (copper and selenium) and one or more of several secondary analytes (cadmium, calcium, molybdenum, phosphorus, strontium, tin, and zinc) were significantly higher at the exposed area than reference (Appendix Table E.3.1). Despite temporal variability over the post-breach monitoring period (i.e., 2019 and 2024), the relative (exposed-reference) differences of all primary and secondary analyte concentrations in 2024 were similar to or significantly lower than the first year of monitoring with replication (i.e., 2019; Appendix Table E.3.1), indicating there is no sustained increase in primary or secondary analyte concentrations in zooplankton tissues from Polley Lake. Rather, the concentrations of copper and several secondary analytes (manganese, mercury, molybdenum, nickel, and tin) in zooplankton tissues from Polley Lake in 2024 were significantly lower than the first year of monitoring with replication (i.e., 2019; Appendix Figure E.3.1, Appendix Table E.3.1).

Mean zooplankton selenium concentrations in 2024 from Polley Lake (4.57 mg/kg dw) exceeded the BC interim guideline for aquatic life (4 mg/kg dw; BCMOE 2014) but were below the guideline at the reference area (Bootjack Lake; Appendix Figure C.4.1, Appendix Table C.4.1). Tissue selenium concentrations in 2024 were within the range of results observed in previous post-breach years (i.e., between 2014 and 2019; Appendix Figure C.4.1, Appendix Table C.4.1).

[50] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from 2019 to 2024 were combined for the analyses.

Despite exceeding the guideline, selenium concentrations in zooplankton tissue from Polley Lake in 2024 did not differ significantly from reference and have not increased significantly since the first year of monitoring with replication (i.e., 2019, as described above).

Temporal evaluation of post-breach (2015 to 2024) surface water quality trends in Polley Lake indicated that, except for dissolved copper and total and dissolved vanadium, the surface aqueous concentrations (total and dissolved) of primary and secondary analytes in Polley Lake either decreased significantly or did not change significantly over time (Appendix Figures C.1.2 to C.1.4, Appendix Table E.3.2). Concentrations of aqueous dissolved copper and total and dissolved vanadium concentrations increased significantly in the surface waters of both the Northwest and Southeast basins of Polley Lake (POL-P1 and POL-P2) between 2015 and 2024 (Appendix Figures C.1.2 to C.1.4, Appendix Table E.3.2). A comparison of dissolved copper to the BCWQG is discussed below. A BCWQG for vanadium does not exist; therefore, aqueous concentrations of this analyte could not be compared to guideline values (Appendix Table C.1.1; BCMOWLRS 2024, 2025). However, concentrations of vanadium in zooplankton tissues in Polley Lake did not differ significantly from reference from 2019 to 2024 (Appendix Table E.3.1), indicating no influence of the increased aqueous concentrations of vanadium on zooplankton tissue quality. The absence of a significant increasing trend in aqueous concentrations of the remaining primary and secondary analytes (including selenium) is consistent with the lack of sustained increase in concentrations of these analytes in zooplankton tissue from Polley Lake, relative to reference (Appendix Tables E.3.1 and E.3.2).

Copper has been identified in sediment quality monitoring as the most elevated analyte relative to pre-breach/reference conditions and BCWSQG in both deep and shallow monitoring areas (Minnow 2022a, 2023a) and exhibited an increasing trend in dissolved aqueous concentrations from 2015 to 2024 in Polley Lake (Appendix Table E.3.2). Therefore, to evaluate the potential impact of copper concentrations on aquatic life in Polley Lake, dissolved concentrations were compared to the relevant BLM-based BCWQG to calculate GEFs for dissolved copper (refer to Section 3.8.3.3 for details). The copper GEFs in surface water did not change significantly from 2015 to 2024 at both the Northwest and Southeast basins of Polley Lake, with observed GEFs for Polley Lake typically within the range of previous years and within the range of copper GEFs reported for Bootjack Lake (reference) which suggests there is little risk to aquatic life in the near term (Appendix Figure C.1.3, Appendix Table E.3.2). Copper concentrations in zooplankton tissue from Polley Lake in 2024 were lower than those in 2019 (when replicated sampling was initiated), relative to reference (Appendix Table E.3.1). This indicates that despite the significant increase in dissolved aqueous copper concentrations, copper concentrations in zooplankton tissue from Polley Lake have not increased.

5.1.5 Benthic Invertebrate Community

Benthic invertebrate community monitoring in 2024 was completed at the Northwest basin (POL-P1) and Southeast basin (POL-P2) of Polley Lake with the Southeast basin of Bootjack Lake (BOL-B2) serving as reference (Figure 3.1, Table 3.7). Previous benthic invertebrate community monitoring in Polley Lake was completed most recently in 2021 (Table 3.7).

A review of the 2024 benthic invertebrate community results (Appendix B) indicated that subsampling precision and accuracy, and taxonomic identification accuracy for most samples achieved all laboratory DQO indicating that the data were of acceptable quality, with one exception. The one exception was a benthic community sample from Quesnel Lake (MP_QUL-PFF1_PON-2_2024-08) that did not meet the laboratory DQO for sorting efficiency which may have been attributed to the low number of organisms recovered in the initial sort. However, the average sorting efficiency for all samples (91.5%) was above the DQO (90%) thus the data is considered acceptable and can be used with a high degree of confidence (Appendix B).

The benthic invertebrate community at POL-P1 in 2024 did not differ significantly from the reference area (BOL-B2) in terms of density, taxonomic richness, and Simpson's Evenness. At POL-P2 in 2024, richness did not differ significantly from the reference area, while density and Simpson's Evenness were significantly lower than reference (Figure 5.9, Table 5.5; Appendix Tables C.5.1 and C.5.2). Simpson's Diversity at both deep basins (POL-P1 and POL-P2) in 2024 was significantly lower than at the reference area (BOL-B2), although the magnitude of difference was smaller (-0.48 SD) at POL-P1 than at POL-P2 (-2.7 SD; Figure 5.9, Table 5.5). The benthic invertebrate community at the two deep basins in 2024 had similar taxonomic richness, but the Southeast basin (POL-P2; closer to the location of the breach) had significantly lower density (-1.4 SD), Simpson's Evenness (-1.4 SD), and Simpson's Diversity (-2.2 SD) compared to the Northwest basin (POL-P1; Table 5.5; Appendix Tables C.5.1, C.5.2).

Benthic invertebrate densities at both basins of Polley Lake (POL-P1 and POL-P2) have decreased consistently since 2018 resulting in densities in 2024 that were significantly lower than in 2018 and 2021 (Figure 5.9, Table 5.5). Despite these significant decreases, density at POL-P1 in 2024 remained significantly higher than all prior year (including pre-breach; 1999). Density at POL-P2 in 2024 was similar to 2016, significantly higher than in 2015 and 2016 (shortly after the breach) and remained similar to pre-breach (1999), indicating a return to pre-breach conditions (Figure 5.9, Table 5.5). At POL-P1, the significant decrease in total density in 2024 (relative to 2018 and 2021) was driven by a significant decrease in Chironomidae density over the same period, while at POL-P2 the decrease was due to a combination of significant

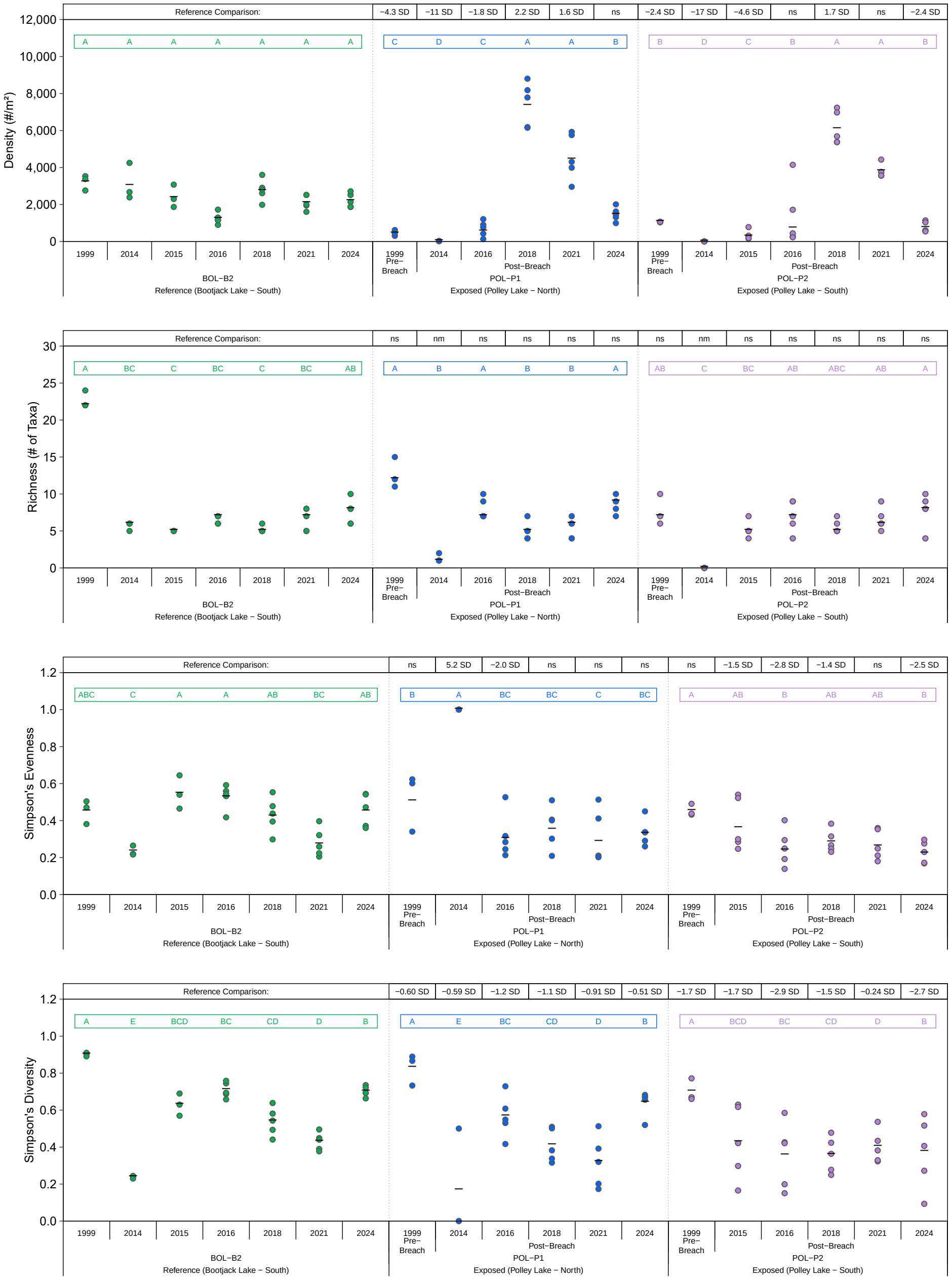


Figure 5.9: Benthic Invertebrate Community Metrics for the Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area.
A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0. Results displayed for post−breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table 5.5: Statistical Comparisons of Benthic Invertebrate Community Metrics for Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
										Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year						1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
Density (#/m²)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	3,237	3,201	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	-4.3	-2.4
							2014	3,117	3,001															-11	-17
							2015	2,424	2,361															nc	-4.6
							2016	1,250	1,215															-1.8	ns
							2018	2,795	2,730															2.2	1.7
							2021	2,115	2,085															1.6	ns
							2024	2,079	2,194															ns	-2.4
					Exposed	POL-P1	1999	467	436	C	D	nc	C	A	A	B	Baseline	-6.8	nc	ns	6.1	5.1	2.6		1.9
							2014	19.2	18.1																-6.4
							2016	689	540																ns
							2018	7,460	7,340																ns
							2021	4,584	4,441																ns
							2024	1,364	1,434																-1.4
						POL-P2	1999	1,058	1,052	B	D	C	B	A	A	B	Baseline	-15	-2.9	ns	3.8	2.8	ns		
							2014	0	0																
							2015	338	281																
							2016	1,366	720																
							2018	6,161	6,076																
							2021	3,811	3,799																
							2024	778	740																
Richness (# of Taxa)	rank	-	-	0.082	Reference	BOL-B2	1999	22	22	A	BC	C	BC	C	BC	AB	Baseline	nm	nm	nm	nm	nm	ns	ns	ns
							2014	6	6															nm	nm
							2015	5	5															nc	ns
							2016	7	7															ns	ns
							2018	5	5															ns	ns
							2021	7	7															ns	ns
							2024	8	8															ns	ns
					Exposed	POL-P1	1999	12	12	A	B	nc	A	B	B	A	Baseline	nm	nc	ns	nm	nm	ns		ns
							2014	1	1																ns
							2016	7	7																ns
							2018	5	5																ns
							2021	6	6																ns
							2024	9	9																ns
						POL-P2	1999	7	7	AB	C	BC	AB	ABC	AB	A	Baseline	nm	ns	ns	ns	ns	ns		
							2014	0	0																
							2015	5	5																
							2016	7	7																
							2018	5	5																
							2021	6	6																
							2024	8	8																

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Note: "-" = no data available. "nc" = no comparison. "ns" = no significance. ANOVA = analysis of variance. SD = standard deviation.

[a] Mean, geometric mean, or median depending on if analysis was conducted on untransformed, log_{10}-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Remediated Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table 5.5: Statistical Comparisons of Benthic Invertebrate Community Metrics for Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
										Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year						1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
Simpson's Evenness	log10	-	-	<0.001	Reference	BOL-B2	1999	0.452	0.449	ABC	C	A	A	AB	BC	AB	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2014	0.223	0.233														5.2	nc
							2015	0.524	0.545														nc	-1.5
							2016	0.514	0.525														-2.0	-2.8
							2018	0.386	0.423														ns	-1.4
							2021	0.249	0.273														ns	ns
							2024	0.424	0.450														ns	-2.5
					Exposed	POL-P1	1999	0.529	0.503	B	A	nc	BC	BC	C	BC	Baseline	2.5	nc	ns	ns	-2.0	ns		ns
							2014	1.00	1.00															nc
							2016	0.311	0.301															ns
							2018	0.326	0.349															ns
							2021	0.261	0.285															ns
							2024	0.309	0.329															-1.4
						POL-P2	1999	0.453	0.453	A	nc	AB	B	AB	AB	B	Baseline	nc	ns	-2.3	ns	ns	-2.5		
							2014	-	-															
							2015	0.379	0.359															
							2016	0.258	0.239															
							2018	0.256	0.284															
							2021	0.244	0.260															
							2024	0.228	0.222															
Simpson's Diversity	none	<0.001	<0.001	0.102	Reference	BOL-B2	1999	0.901	0.901	A	E	BCD	BC	CD	D	B	Baseline	-5.5	-2.3	-1.6	-3.0	-3.9	-1.7	-0.60	-1.7
							2014	0.238	0.238														-0.59	nc
							2015	0.630	0.629														nc	-1.7
							2016	0.708	0.708														-1.2	-2.9
							2018	0.539	0.539														-1.1	-1.5
							2021	0.430	0.430														-0.91	-0.24
							2024	0.701	0.701														-0.51	-2.7
					Exposed	POL-P1	1999	0.834	0.829	A	E	nc	BC	CD	D	B	Baseline	-5.5	nc	-2.2	-3.5	-4.2	-1.6		-1.1
							2014	0.167	0.167															nc
							2016	0.566	0.566															-1.7
							2018	0.409	0.409															-0.42
							2021	0.321	0.320															0.67
							2024	0.642	0.640															-2.2
						POL-P2	1999	0.700	0.700	A	nc	BCD	BC	CD	D	B	Baseline	nc	-2.3	-2.9	-2.8	-2.5	-2.7		
							2014	-	-															
							2015	0.426	0.426															
							2016	0.373	0.356															
							2018	0.358	0.358															
							2021	0.402	0.401															
							2024	0.373	0.373															

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Note: "-" = no data available. "nc" = no comparison. "ns" = no significance. ANOVA = analysis of variance. SD = standard deviation.

[a] Mean, geometric mean, or median depending on if analysis was conducted on untransformed, log_{10}-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Remediated Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

decreases in Arachnida, Chironomidae, and Oligochaeta densities (Appendix Figure E.4.3, Appendix Table E.4.1). Density at both basins has been similar to or significantly higher than at the reference area since 2018, except for density at POL-P2 in 2024 which was significantly lower than reference but was similar to pre-breach (1999; Figure 5.9, Table 5.5).

Taxonomic richness at both basins (POL-P1 and POL-P2) in 2024 was similar to pre-breach conditions (1999), and richness at both basins has not differed from the reference area since 2016. At POL-P1, richness increased significantly between 2021 and 2024, to a richness in 2024 that was similar to both pre-breach (1999) and 2016, and that was significantly higher than all remaining prior years. At POL-P2, richness has been temporally stable (i.e., has not changed significantly) since 2016. (Figure 5.9, Table 5.5; Appendix Tables C.5.1, C.5.2). Simpson's Evenness at POL-P1 has been stable since 2016, similar to the reference area since 2018, and did not differ significantly from pre-breach (1999) conditions in 2024. At POL-P2, Simpson's Evenness has been stable since 2015 but was significantly lower than reference in most of those years (including 2024). Simpson's Evenness at POL-P2 in 2016 and 2024 was also significantly lower than pre-breach conditions (1999; Figure 5.9, Table 5.5).

Simpson's Diversity at the Polley Lake basins has consistently been significantly lower than both reference and pre-breach (1999) conditions since the initiation of post-breach monitoring. However, the magnitude of the difference compared to reference has been relatively small in most years (range = -0.51 to -1.2 SD at POL-P1 and -0.24 to -2.9 SD at POL-P2; Figure 5.9, Table 5.5). In addition, Simpson's Diversity at the reference area (BOL-B2) has been significantly lower than pre-breach conditions throughout the post-breach period (i.e., 2014 to 2024), suggesting that the consistently lower Simpson's Diversity in Polley Lake in the post-breach period compared to the pre-breach conditions is likely of low ecological relevance. Simpson's Diversity at both POL-P1 and POL-P2 increased significantly from 2021 to 2024. While the significant difference at POL-P1 in 2024 compared to reference was slight (-0.51 SD), the difference at POL-P2 was bigger (-2.7 SD) indicating Simpson's Diversity at this area has not yet recovered to a condition similar to reference (Figure 5.9, Table 5.5).

The benthic invertebrate community at both Polley Lake basins (POL-P1 and POL-P2) in 2024 was dominated by Chironomidae (non-biting midges; 51.4% and 84.2% mean relative density, respectively) and to a lesser extent by Oligochaeta (aquatic worms; Figure 5.10; Appendix Figure E.4.3, Appendix Table C.5.2). In most cases, the benthic invertebrate community composition did not differ significantly between the Polley Lake basins and the reference area in 2024. At POL-P1 in 2024, community composition only differed significantly from the reference area (BOL-B2) in terms of a lower Chaoboridae density (phantom midges); a known and pre-existing difference between the exposed and reference areas. At POL-P2 in

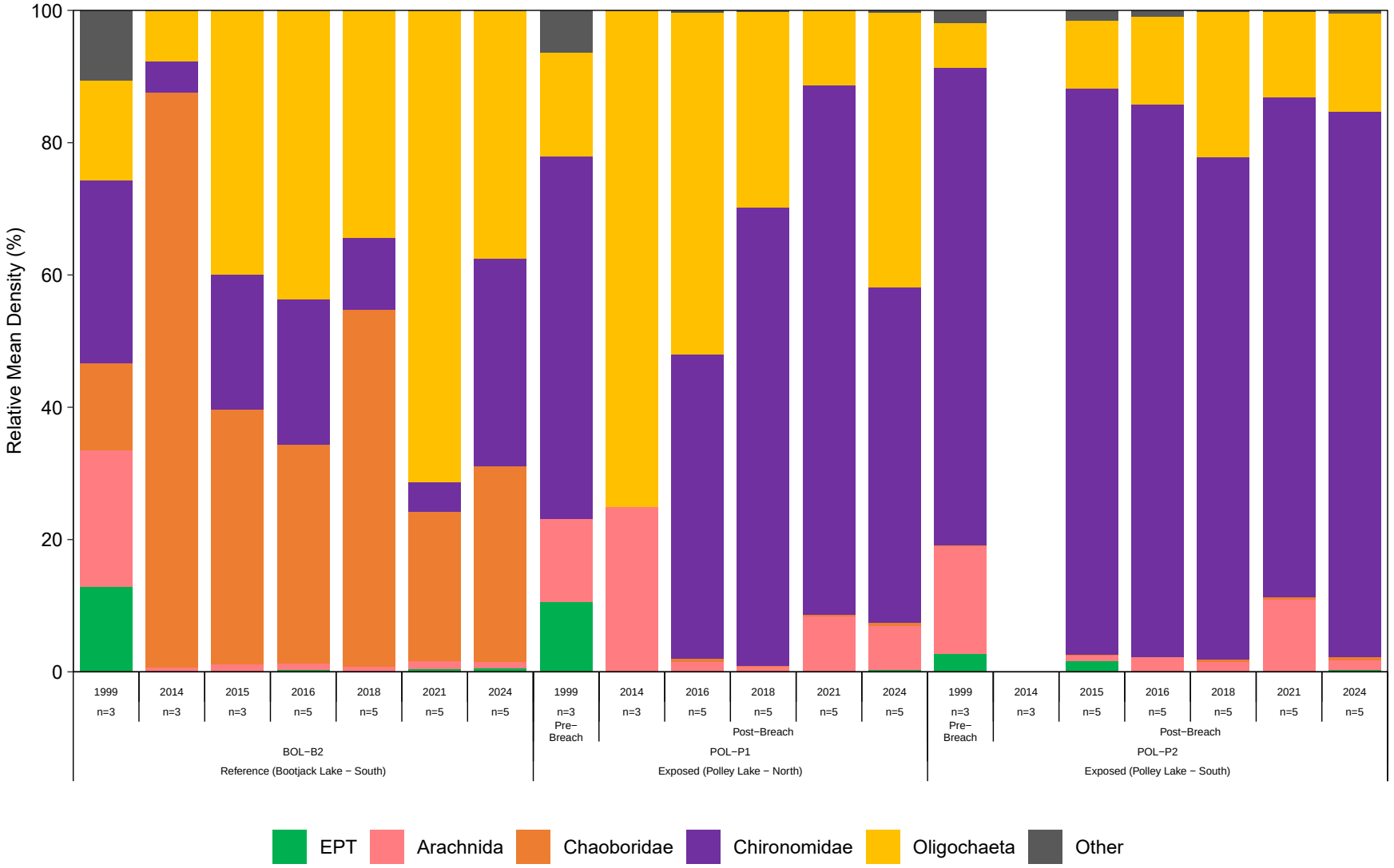


Figure 5.10: Relative Mean Densities of Major Benthic Invertebrate Taxa for the Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Total organism density at POL−P2 was zero in all replicates collected in 2014.

2024, the community composition differed significantly from the reference area in terms of lower density of Chaoboridae, lower density and relative density (%) of Oligochaeta, and higher relative density (%) of Chironomidae (Figure 5.10; Appendix Figures E.4.2 and E.4.3, Appendix Table E.4.1). The community composition of the two Polley Lake basins in 2024 was similar for most taxa apart from significantly lower Arachnida density, lower Oligochaeta (density and %), and higher Chironomidae density at POL-P2 compared to POL-P1 (Appendix Figure E.4.2, Appendix Table E.4.1).

Among the dominant taxa, specifically Chaoboridae, Chironomidae, and Oligochaeta, relative densities in 2024 did not differ from pre-breach conditions (1999) at either basin of Polley Lake or at the reference lake. The relative densities (%) of Arachnida at both Polley Lake basins significantly lower in 2024 than the pre-breach conditions (1999) but did not differ significantly from reference. However, at all monitoring locations, including the reference lake, the relative density (%) of Arachnida has been significantly lower than pre-breach in all years apart from 2021 (Appendix Figure E.4.2, Appendix Table E.4.1). This pattern likely reflects the influence of abiotic factors in the environment, indicating that the community structure at Polley Lake in 2024 was similar to pre-breach composition. The remaining taxa (i.e., EPT taxa [known to be sensitive to habitat disturbances and water pollution]; Lenat 1988, Herman and Nejadhashemi 2015) represented approximately < 5% of the community in both Polley and Bootjack lakes throughout the post-breach period, therefore were not considered further. Overall, the relative density (%) and density of all major taxa groups (EPT, Arachnida, Chaoboridae, Chironomidae, and Oligochaeta) in the basins of Polley Lake in 2024 were similar to reference and/or pre-breach (1999) conditions (Appendix Figure E.4.2, Appendix Table E.4.1).

Multivariate analysis (CA) was used to further evaluate the benthic invertebrate community composition from 1999 to 2024 at the two Polley Lake basins (POL-P1 and POL-P2) and the reference area (BOL-B2). The first two axes of the CA explained a total of 42.5% of the community variation (25.7% and 16.8% for CA Axes 1 and 2, respectively; Appendix Figures E.4.2 and E.4.4, Appendix Tables C.5.1, C.5.2, E.4.1, E.4.3). Benthic invertebrate community composition between the two Polley Lake basins did not differ significantly in 2024 or most prior years, as evidenced by no significant differences in scores along CA Axes 1, 2, or 3 (Appendix Figure E.4.2, Appendix Table E.4.1). Benthic invertebrate community composition, as represented by scores along CA Axes 1 and 3 (explaining 25.7% and 13.0% of the community variation, respectively), did not differ significantly between the exposed areas (POL-P1 and POL-P2) and reference in 2024, but was significantly different at all areas (exposed and reference) in 2024 compared to pre-breach (1999) conditions. In contrast, the community composition represented by CA Axis 2 (explaining 16.8% of community variation) was significantly lower at the Polley Lake basins in 2024 than at the reference area (in 2024)

but did not differ significantly from pre-breach (1999) conditions (Appendix Figures E.4.2 and E.4.4, Appendix Tables E.4.1 and E.4.3).

The benthic invertebrate community showed considerable and significant separation along CA Axis 1, with both exposed (POL-P1 and POL-P2) and reference (BOL-B2) results from 2024 having significantly higher scores than pre-breach (1999) conditions; a difference that indicated higher relative densities (%) of Oligochaetes of the genera *Rhyacodrilus* and *Limnodrilus*, and Chironomids of the genus *Protanypus* in the 2024 results (Appendix Figures E.4.2 and E.4.4, Appendix Tables E.4.1 and E.4.3). The occurrence of this significant difference in CA Axis 1 scores at both the exposed and reference areas in 2024, relative to pre-breach, suggests it is likely related to natural variability in community composition in both waterbodies. Chaoboridae were a key contributor to positive weightings along CA Axis 2 (Appendix Figure E.6.2, Appendix Table E.6.3). Therefore, the consistent difference in the relative density (%) and density of Chaoboridae between Polley Lake and the reference lake likely accounted for at least some of the significant differences between the exposed and reference results observed along on CA Axis 2. This hypothesis that is supported by the absence of a significant difference between 2024 and pre-breach (1999) CA Axis 2 results for the Polley Lake basins. Although the two Polley Lake basins in 2024 differed from pre-breach (1999) results along CA Axis 3 (a difference characterized by Oligochaetes of the genus *Tubifex*), they did not differ significantly from reference along this axis from 2018 to 2024 (Appendix Figures E.4.2 and E.4.4, Appendix Tables E.4.1 and E.4.3). Overall, the CA results indicate that benthic invertebrate community composition at the Polley Lake basins in 2024 was similar to either reference or pre-breach conditions, but not both.

Evaluation of correlation results indicated there were several significant relationships between station water quality characteristics and benthic invertebrate community endpoints (Appendix Figure E.4.5; Appendix Table E.4.2). Specifically, Simpson's Evenness, Simpson's Diversity, and Oligochaeta (%) were negatively correlated with the bottom water dissolved oxygen (DO; % and mg/L) and positively correlated with temperature (excluding a correlation for Oligochaeta [%] and temperature). In contrast the opposite relationships were observed with Arachnida (density and %), Chironomidae (density and %), and CA Axis 1, which were positively correlated with DO and negatively correlated with temperature (excluding a correlation for CA Axis 1 and temperature). The significant correlations between DO and various endpoints (negative relationships with Simpson's Diversity and Evenness and Oligochaeta [%], and positive relationships with Arachnida and Chironomidae) are consistent with a well-documented deficit in DO concentrations near the bottom of the water column at the deep basins of Bootjack Lake which have consistently been lower than those at Polley Lake, including pre-breach (1999; Beak 2000). This indicates a natural phenomenon unrelated to a mine influence (Figure A.1.1, Appendix

Table C.5.3). The occurrence of lower Chaoboridae and Oligochaeta (density and %) at Polley Lake compared to the reference area (Figure 5.10; Appendix Figure E.4.2) likely reflected the established greater tolerance of these taxa to, and their proliferation under, low dissolved oxygen concentrations (Borkent 1981, Chapman 1982a,b) such as those shown at the Bootjack Lake reference area (Appendix Tables A.1.2, C.5.3, Appendix Figures A.1.1, E.4.5). Chaoboridae (density and %) were negatively correlated with bottom water specific conductance and pH, while Oligochaeta (density) and CA Axis 2 were negatively correlated with specific conductance only. Conversely, Chironomidae (% and density) were positively correlated with both specific conductance and pH (excluding a correlation between density and specific conductance; Appendix Figure E.4.5, Appendix Table E.4.2). Sampling station depth was negatively correlated with several endpoints (Simpson's Evenness, Chaoboridae [density and %], Oligochaeta [density], and CA Axis 2) and positively correlated with Chironomidae (%). The significant correlations observed between station depth or bottom water specific conductance and benthic invertebrate community endpoints were strongly leveraged between the lakes, and therefore of limited interpretive value. For both temperature and pH, the narrow range of these variables (mean range = ~0.5 pH units, ~3°C; Appendix Table C.5.3), and the absence of pH values outside the BCWQG, indicated that it was unlikely that differences in benthic invertebrate community endpoints were related to variation in temperature and pH.

In addition to the significant correlations with water quality and station depths described above, Chaoboridae and Oligochaeta (density and %) and CA Axis 2 (which represented the Polley Lake benthic invertebrate community in the negative direction) were positively correlated to sediment TOC and negatively correlated with sediment arsenic and copper concentrations and sediment PCA Axis 1 and 2 (excluding a correlation between Oligochaeta density and PCA Axis 2). The opposite significant relationships were observed with Chironomidae (%); negative correlations with sediment TOC and positive correlations with sediment characteristics (arsenic and copper concentrations and sediment PCA Axis 1 and 2 [representing higher sediment analyte concentrations]). Notably, Chironomidae density was not significantly correlated with any sediment characteristics. Taxa within the Chironomidae and Oligochaeta groups exhibit a relatively high tolerance to elevated metal concentrations in sediment (Gerritsen et al. 1998), and most taxa in both groups occupy a feeding guild specialized in the consumption of organic carbon food sources (i.e., the collector-gatherer Functional Feeding Group; Mandaville 2002). Therefore, the significant correlations observed between Oligochaeta (density) and sediment TOC and analyte concentrations, but notable absence of similar correlations with Chironomidae (density) suggested a factor (or factors) other than concentrations of metals and TOC in sediment which likely contributed to the occurrence of significantly lower densities of Oligochaeta in Polley Lake compared to

Bootjack Lake. The correlations between Chaoboridae and sediment characteristics were a factor of the known and pre-existing difference in the occurrence of this taxa between the reference and exposed areas.

Overall, based on weight-of-evidence, the differences in benthic invertebrate communities between Polley Lake and the reference area in 2024 appeared to be driven largely by differing dissolved oxygen concentrations at the bottom of the water column. The occurrence of higher dissolved oxygen concentrations near the bottom at deep basins of Polley Lake compared to Bootjack Lake has reflected a natural phenomenon unrelated to past or present mine-influence. The benthic invertebrate community at deep basins of Polley Lake in 2024 were largely comparable to either the communities documented in Polley Lake in 1999 (pre-breach) or the reference area (Bootjack Lake) in 2024 (excluding Simpson's Evenness at POL-P2, and Simpson's Diversity at both exposed areas), indicating that the benthic invertebrate community structure of Polley Lake in 2024 has mostly recovered to pre-breach and/or reference conditions since the breach in 2014.

5.1.6 Fish Usage and Population Health

Fish usage and population health were evaluated for rainbow trout, longnose sucker, and redside shiner at Polley Lake annually between 2022 and 2024, with Bootjack Lake serving as a reference (Figures 3.4 and 3.5). Monitoring was completed in spring and in fall of each year (Appendix Tables C.6.1 to C.6.11), consistent with previous years (see Section 3.6 for details).

5.1.6.1 Community and Catch

Spring fishing in 2024 in Polley and Bootjack lakes was undertaken shortly after ice-out (i.e., April 23 to May 2, 2024). From 2016 to 2022, rainbow trout and longnose sucker were caught in both Polley and Bootjack lakes whereas redside shiner were caught in Polley Lake only (Table 5.6; Appendix Table C.6.1). All three species were caught in both Polley and Bootjack lakes in 2023 and 2024 (Table 5.6; Appendix Table C.6.1). A single largescale sucker (*Catostomus macrocheilus*) was also captured in Bootjack Lake during the spring 2024 sampling event, a species which has been observed in most previous monitoring years at low relative abundance (2019, 2021, 2022, and 2023; Minnow 2020, 2022a, 2023a, 2024a).

The CPUE for rainbow trout from Polley Lake in the spring of 2024 was the second highest (after 2023) recorded since 2016 and was almost unchanged from 2023, following consecutive increases in CPUE in 2022 and 2023 (Table 5.6). Rainbow trout CPUE in Bootjack Lake has been higher than in Polley Lake in most years (excluding 2023), including in 2024 (Table 5.6). However, the magnitude of the difference between the lakes in 2024 should be highlighted; whereas the rainbow trout CPUE observed in Polley Lake in 2024 was stable relative to 2023, the

Table 5.6: **Catch-Per-Unit-Effort Results for Hoop Netting Collections in a) Spring and b) Fall for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference) Monitoring Areas, 2016 to 2024**

a)

Species		Spring																
		2016	2017		2018		2019		2020		2021		2022		2023		2024	
		Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake	Bootjack Lake	Polley Lake
Effort (days)		33.5	4.85	0.870	3.38	5.37	7.46	3.71	14.0	8.98	10.4	23.1	11.9	11.0	8.18	13.0	32.0	9.25
Rainbow Trout	Catch	1,737	289	8	76	22	201	35	322	72	319	87	224	207	140	369	3,808	261
	CPUE[a]	51.9	59.6	9.22	22.5	4.10	26.9	9.45	23.1	8.02	30.7	3.76	18.8	18.8	17.1	28.4	117	28.2
Longnose Sucker	Catch	2,422	25	247	25	227	242	37	1,228	901	583	892	339	329	305	361	49	40
	CPUE[a]	72.4	5.15	284	7.39	42.3	32.4	10.0	88.0	100.4	56.2	38.6	28.5	29.9	37.3	27.8	1.51	4.33
Redside Shiner	Catch	1,179	0	0	0	155	0	29	0	15	0	103	0	27	1	12	1	14
	CPUE[a]	35.3	0	0	0	28.9	0	7.83	0	1.67	0	4.46	0	2.46	0.122	0.925	0.0308	1.51

b)

Species		Fall							
		Polley Lake							
		2016	2018	2019	2020	2021	2022	2023	2024
Effort (days)		108	22.2	33.0	32.0	32.4	32.0	33.2	31.9
Rainbow Trout	Catch	497	63	329	291	383	213	233	68
	CPUE[a]	4.58	2.84	10.0	9.13	11.8	6.66	7.02	2.13
Longnose Sucker	Catch	3,288	627	623	429	451	200	514	252
	CPUE[a]	30.3	28.2	18.9	13.5	13.9	6.25	15.5	7.89
Redside Shiner	Catch	8,288	267	787	2,497	923	463	519	1,176
	CPUE[a]	76.3	12.0	23.9	78.3	28.5	14.5	15.6	36.8

[a] CPUE - Catch-per-unit-effort (# fish / trap / day).

CPUE in Bootjack Lake increased approximately 10-fold. This anomalous observation was more likely the result of a sampling effect (e.g., temperature effects on activity) than a true 10-fold increase in the density of fish in Bootjack Lake.

Spring fish collections each year target rainbow trout spawners aggregating near the mouth of Hazeltine Creek (in Polley Lake) and Bootjack Creek (in Bootjack Lake; Figure 3.4). From 2019 to 2021, temporal changes in CPUE indicated progressively fewer rainbow trout aggregated for spawning in Polley Lake (Table 5.6) which is consistent with the observation that most spawners present in 2018 would have reached the end of their life expectancy by 2021, with low replacement by recruits from 2014 to 2017 when Hazeltine Creek was inaccessible to spawning rainbow trout (see Section 3.6 for details). Natural mortality of older age classes and decreasing number of spawners observed in Hazeltine Creek during spawning surveys since 2018 resulted in fewer recruits being added to the population in each year (Minnow 2023b). However, because rainbow trout generally begin spawning between age three and five (Scott and Crossman 1998), it was anticipated that a portion of the 2018 cohort would have reached sexual maturity by 2021 and that most would have been sexually mature by 2022, which was consistent with the observed increase in rainbow trout CPUE in 2022 relative to all prior years since 2017. The increase in CPUE in 2023 and maintenance of a similar CPUE in 2024, can likely be attributed to the 2019 and 2020 cohorts reaching sexual maturity (Table 5.6).

The spring CPUE for longnose sucker in Polley Lake has declined over the past four years (2020 to 2024), and in 2024 was the lowest observed since monitoring began in 2016 (Table 5.6). As described above, spring sampling focuses on specific locations where fish are known to aggregate prior to spawning, therefore differences in CPUE over time may be due in part to the non-random sampling design implemented during this period (Appendix Table C.6.1). It is also possible that the decline observed from 2020 to 2024 are partially dependent on the increasing abundance of rainbow trout over the same period (except for rainbow trout in 2024; Table 5.6). A similar decline in longnose sucker CPUE was observed in Bootjack Lake, with CPUE in 2024 the lowest observed since monitoring began. Variable temperatures throughout the monitoring period (i.e., 2020 to 2024) were observed, such that low CPUE observations may have also been influenced by temperature driven effects on activity (e.g., variability in the timing of spring fish collections relative to ice-out and the initiation of fish aggregation for spawning).

The CPUE for redside shiner in Polley Lake increased in 2024, following consecutive annual declines in 2022 and 2023. The CPUE increase was modest, however, and in 2024 remains at its second lowest recorded value since 2017 (Table 5.6). As with longnose sucker, it is possible that redside shiner CPUE may be partially dependent on population dynamics of co-occurring species and/or temperature driven effects on activity (Table 5.6; Appendix Table C.6.1). As in

2023, a single redside shiner was observed in Bootjack Lake in 2024; the species has now been observed in Bootjack Lake for two consecutive years after being absent/undetected since monitoring began post-breach.

In fall, when a randomized sampling design with a standardized level of effort is used, rainbow trout CPUE in 2024 was the lowest value since monitoring began in 2016 (Table 5.6). From 2016 to 2018, fall rainbow trout CPUE decreased, likely reflecting lower recruitment of YOY throughout this period due to the inaccessibility of Hazeltine Creek as spawning habitat. In 2019, rainbow trout CPUE increased substantially from 2018 (CPUE in 2018 was 2-fold greater than 2016) and was driven primarily by the capture of a relatively higher abundance of age-2 or younger fish (age-1 fish from 2018; Minnow 2020a). Rainbow trout CPUE remained relatively consistent from 2019 to 2021, signaling successful recruitment after restoration of access to Hazeltine Creek spawning habitat in 2018 and survival in Polley Lake, but CPUE then decreased in 2022 and 2023 (Table 5.6; Appendix Table C.6.2). This is consistent with a period of higher population density in 2019 to 2021 (driven by the higher proportion of younger fish) and a lower density in 2022 and 2023 as older age classes had greater representation in catches. Although the fall CPUE of rainbow trout in 2024 was the lowest since monitoring began (2.18 fish/trap/day), it was still comparable to CPUE in 2018 (2.84 fish/trap/day; Table 5.6). The higher CPUE between 2019 and 2023 compared to 2016 could be partly explained by a higher representation of smaller fish (i.e., younger age classes) in catches in these years as the population recovered (Minnow 2023a, 2024a). This was supported by length-frequency distributions which showed a progressive shift over the same period (i.e., 2019 to 2023) from catches dominated by smaller fish to catches dominated by larger fish, to distributions in 2022 and 2023 that more closely resembled the length-frequency distribution in 2016 (Table 5.6; Figure 5.11). This pattern continued in 2024, with larger fish (i.e., ages 3+) being as well represented in the catches in 2024 as they were in 2016 (Figure 5.11). As such, considering the similarity in the representation of older fish (i.e., ages 3+) in 2014 compared to 2016, the CPUE recorded in the fall of 2024 was low but not unexpected, especially considering that declines in CPUE were also observed in the spring, in both Polley and Bootjack lakes. Annual monitoring in Polley Lake is planned to continue and will support the evaluation of longer-term trends in rainbow trout CPUE.

Fall CPUE of longnose sucker in Polley Lake declined in 2024 and was the second lowest recorded value since monitoring began in 2016. Although CPUE has declined overall from 2016, CPUE over the past four years has been quite variable (Table 5.6), which might be attributable to temperature driven activity effects and/or gear efficacy. The fall CPUE of redside shiner increased in 2024 for the third consecutive year but overall has been variable since monitoring began in 2016 (Table 5.6).

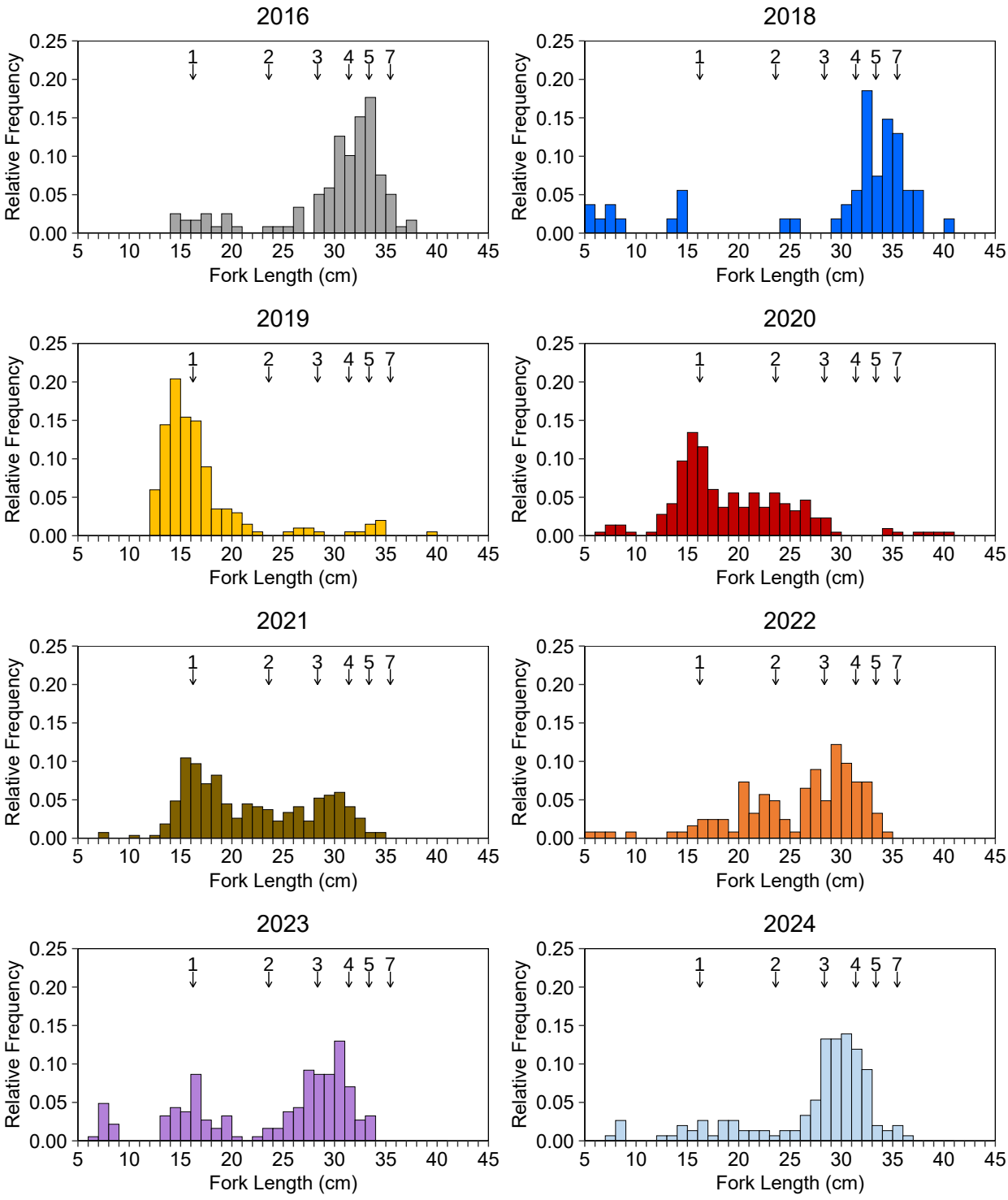


Figure 5.11: Rainbow Trout Length Frequency Distributions for Randomized Fall Hoopnetting in Polley Lake, 2016 to 2024

Notes: Numbers and arrows along the tops of figures represent predicted fork lengths at various ages from a von Bertalanffy growth model with parameters k=0.4415, t0=−0.3103, Linf=36.9021, where k is the growth coefficient, t0 is the theoretical age when size is zero, and Linf is asymptotic size. The von Bertalanffy Growth Model used predicted fork lengths at various ages using fish data collected in spring and fall, but the fork length frequency data plotted for each year includes data from fall only.

5.1.6.2 Fish Population Health

5.1.6.2.1 Spring

Spring condition (weight-at-length) across all rainbow trout captured in Polley Lake in 2024 was greater than in 2022 and 2023, and statistically similar to all other previous years (Table 5.7; Appendix Figure E.5.1, Appendix Tables C.6.3, C.6.11, E.5.1 and E.5.2). When considering either females or males, condition in 2024 was significantly greater than in 2023 but not significantly different from the first year of post-breach monitoring (i.e., 2016; Table 5.7; Appendix Figure E.5.1). Weight-at-age of lethally sampled female rainbow trout in 2024 (n=8; the only group with available age data) was statistically similar to most prior years, including 2016, but significantly lower than in 2020 and 2021 (Table 5.7; Appendix Figure E.5.2).

Spring condition for all longnose sucker caught in Polley Lake in spring of 2024 was significantly lower than all previous years, including the first year of monitoring (17% difference relative to 2016; Table 5.7; Appendix Figure E.5.3, Appendix Tables C.6.4, C.6.10 and E.5.1). The result was the same when the analysis was constrained to a subset of fish greater than 19 cm fork length (i.e., greatest overlap among years; Table 5.7; Appendix Figure E.5.3). For female longnose sucker (n=13), whether constrained to females greater than 25 cm fork length (n = 10) or unconstrained, condition was not statistically different from the previous three years (2021 to 2023) but was significantly lower than all other prior years including 2016 (MOD 12% and 15%, respectively). Weight-at-age of lethally sampled longnose sucker females in 2024 (n=8) was statistically similar to most other years, including 2016, but significantly lower than in 2018 and 2019 (Table 5.7; Appendix Figure E.5.2). For males (n=22), condition in 2024 was statistically similar to 2022 and 2023 but significantly lower than other years including 2016 (19%; Table 5.7).

5.1.6.2.2 Fall

Fall condition of Polley Lake rainbow trout in 2024, whether including or excluding YOY fish (i.e., less than 12 cm FL), was statistically similar to 2022 and 2023, but significantly lower than all other monitoring years including a 15% difference from the first year of post-breach monitoring in 2014 (Table 5.7; Appendix Figure E.5.4, Appendix Tables C.6.7, E.5.1 and E.5.2). Growth dynamics and weight-length relationships of fish species can be quite variable in the life stages that precede maturity (Gregory and Wood 1998, Monnet et al. 2023). Given that the average size of rainbow trout in Polley Lake captured over the duration of post-breach monitoring efforts (for which condition is being reported) is representative of sub-mature fish, the observed differences may simply be the result of natural variance.

Table 5.7: Summary of Statistical Comparisons of Condition and Weight-at-Age of Rainbow Trout and Longnose Sucker for Polley Lake in Spring and Fall, 2014 to 2024

Season	Endpoint	Group	Rainbow Trout										Longnose Sucker									
			2014	2016	2017	2018	2019	2020	2021	2022	2023	2024	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024
Spring	Energy Storage (Condition)	All	na	AB	A	AB	ABC	ABC	BC	CD (-6.2)	D (-8.2)	AB	na	B	A (+14)	AB	B	B	BC	C (-9.1)	C (-9.6)	D (-17)
		All (FL filtered)[a]	na	na	na	na	na	na	na	na	na	na	na	B	A (+13)	AB	B	AB	BC	C (-9.1)	C (-10)	D (-17)
		Female	na	AB	A	AB	AB	A	BCD	CD (-9.5)	D (-12)	BC	na	BC	A (+12)	AB	ABC	ABC	BCD	CD	D (-9.6)	D (-15)
		Female (FL filtered)[b]	na	na	na	na	na	na	na	na	na	na	na	BCD	A (+12)	AB	BCD	ABC	CDE	DE	E (-9.5)	E (-12)
		Male	na	A	AB	AB	AB	AB	BC (-9.5)	na	C (-14)	AB	na	A	na	na	A	AB	AB	BC (-10)	BC (-12)	C (-19)
		Male (FL filtered)[c]	na	A	A	A	A	A	AB	na	B (-15)	A	na	na	na	na	na	na	na	na	na	na
	Energy Use (Weight-at-age)	Female	na	ABCD	ABC	ABCD	ABCD	A	AB	BCD	D	CD	na	ABC	ABC	A	AB	ABC	BC	ABC	ABC	C
Fall	Energy Storage (Condition)	All	A	CD (-10)	na	BC (-8.7)	A	B (-6.6)	B (-5.7)	DE (-13)	CDE (-12)	E (-15)	B	B	na	A (+8.5)	B	BC	BCD	CD (-5.8)	D (-8.8)	D (-8.7)
		All (FL filtered)[d]	A	DE (-9.5)	na	BCDE (-7.6)	AB	CD (-7.2)	BC (-6.0)	F (-13)	EF (-11)	F (-15)	B	BC	na	A (+8.5)	B	BC	BCD	CDE (-5.5)	E (-8.7)	DE (-8.7)

Notes: Different letters signify that an endpoint is significantly different among years while the value in brackets indicates the magnitude of difference between the given year and the baseline year (baseline year is 2016 for spring and 2014 for fall data). FL = fork length. "na" = not applicable or no sampling was conducted in the given year. "-" = insufficient data available to conduct comparisons.

[a] Analysis conducted only on individuals with fork length greater than 19 cm for longnose sucker.

[b] Analysis conducted only on individuals with fork length greater than 25 cm for longnose sucker.

[c] Analysis conducted only on individuals with fork length greater than 22 cm for rainbow trout.

[d] Analysis conducted only on individuals with fork length greater than 12 cm for rainbow trout and 11 cm for longnose sucker.

Aging data for rainbow trout has not been available since the discontinuation of gill netting after 2018 (i.e., prior to this, aging was completed for incidental mortalities from gill netting; see Minnow 2022a for details). In the absence of recent age data, length frequency distributions and predicted length-at-age provide an indication of recruitment and survival over time. Comparison of CRFDs for rainbow trout from 2016 to 2024 showed a trend of continued recruitment to the Polley Lake population, with greater representation of YOY in 2024 than in 2016 and a greater representation of larger fish (age 3+) than the previous five years (2019 to 2023; Appendix Figure E.5.5, Appendix Table E.5.3).

In 2016, the rainbow trout catch in Polley Lake was dominated by age 3+ individuals (Figure 5.11), an artifact of low recruitment from 2014 to 2017 when spawning habitat in Hazeltine Creek was inaccessible. In 2018, the first year after access to Hazeltine Creek was restored, the population continued to be dominated by older fish (age-4+), however YOY recruits from the 2018 cohort were also present. These recruits became the dominant year class in 2019 combined with the likely higher mortality of older fish, most of which had likely reached the end of their life expectancy (Figure 5.11). In 2020 and 2021, the population continued to shift towards a more balanced distribution of size classes with the survival of the 2018 and 2019 cohorts and further successful recruitment of individuals from 2020 and 2021. In 2022, the length frequency distribution more closely resembled 2016 than in previous years (Figure 5.11), albeit with a lower frequency of age 3+ fish in lieu of greater strength of the younger age classes. In 2023 and 2024, there was a further strengthening of the mature age classes complemented by continued recruitment from younger age classes (Figure 5.11) such that the length frequency distrbution of rainbow trout in the fall of 2024 more closely resembled 2016 than any of the previous five years (2019 to 2023; Appendix Table E.5.3).

Condition of longnose sucker in the fall of 2024, whether including or excluding YOY, was statistically similar to the previous three years (2021 to 2023), but significantly lower than all other years, including 2014, although the difference relative to 2014 (8.7%) was relatively slight (Table 5.7; Appendix Figure E.5.4, Appendix Tables C.6.8 and E.5.1). Length frequency distributions of longnose sucker showed fewer age-1 fish and more age-3 fish in 2024 relative to 2023 with both years more closely resembling the size structure in 2016 than in 2020 to 2022 (Figure 5.12). Comparison of CRFDs supported this observation, with fewer smaller longnose sucker caught in 2024 than most prior years (except 2019), and more larger fish caught in 2024 than in 2016, 2018, and 2019 (Appendix Figure E.5.5, Appendix Table E.5.3).

For redside shiner, more smaller fish were caught in 2024 relative to 2016, though the CRFD for 2024 resembled the 2016 size structure more closely than all other years except 2018 (Appendix Figure E.5.5, Appendix Tables C.6.9 and E.5.3). The absence or near absence of

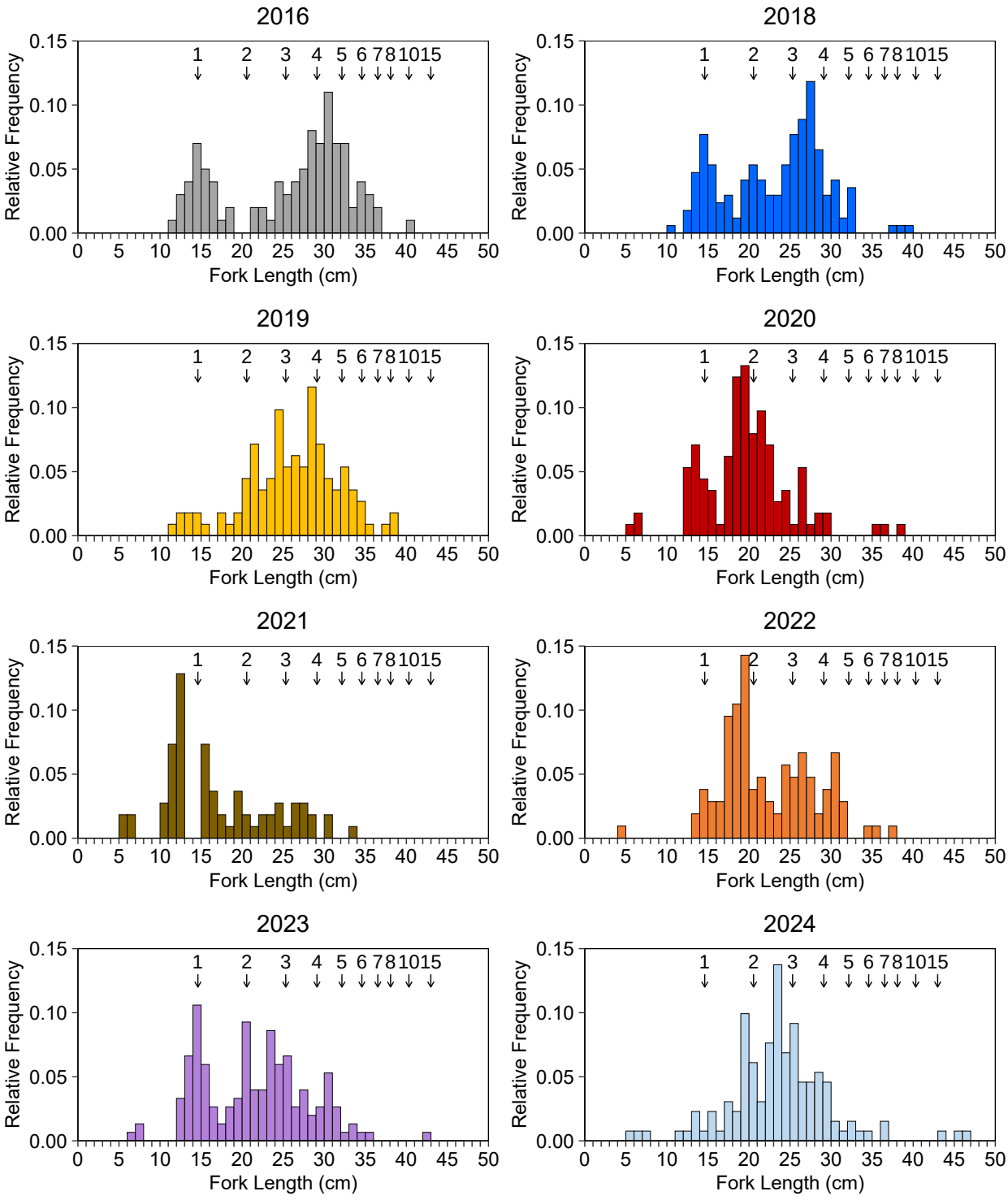


Figure 5.12: Longnose Sucker Length Frequency Distributions from Randomized Fall Hoop Netting in Polley Lake, 2016 to 2024

Notes: Numbers and arrows along the tops of figures represent predicted fork lengths at various ages from a von Bertalanffy growth model with parameters k=0.2237, t0=−0.7904, Linf=44.2718, where k is the growth coefficient, t0 is the theoretical age when size is zero, and Linf is asymptotic size. The von Bertalanffy Growth Model used predicted fork lengths at various ages using fish data collected in spring and fall, but the fork length frequency data plotted for each year includes data from fall only.

smaller redside shiner (e.g., less than 8 cm) in 2016 and 2018 and subsequent lower numbers of larger individuals in 2019 and 2020 is likely indicative of low recruitment in the years immediately following the breach (Appendix Figure E.5.6). The population age structure suggests that a strong age cohort showed good survival from 2019 to 2021, and produced a strong YOY class that dominated catches in fall of 2022 (Appendix Figure E.5.6). In contrast to 2016 and 2018 when younger cohorts were almost entirely absent from Polley Lake, over 50% of the catch in 2022 was comprised of younger fish (e.g., smaller than 7 cm) indicating successful recruitment into the population (Appendix Figures E.5.5 and E.5.6). Recruits from the 2022 and 2023 cohorts continued to be well represented through 2023 and 2024 (8 to 10 cm), and the overall length frequency distribution of the population in 2024 had a more evenly distributed size structure than in prior years, indicating ongoing successful recruitment (Appendix Figures E.5.5 and E.5.6).

5.1.7 Fish Tissue Quality

Fish tissue quality was completed annually between 2022 and 2024 targeting rainbow trout and longnose sucker from Polley (exposed) and Bootjack (reference) lakes (Figure 3.4, Table 3.8).

A review of the 2024 fish tissue results (Appendix B) indicated the data had appropriate detectability, negligible analyte concentrations in method blank samples, and excellent laboratory accuracy. Laboratory duplicate samples failed the DQO in 1.79% of results. Fish tissue field duplicate samples generally had low agreement, and the recommended DQO for field precision was exceeded in 55% of field duplicate pairs (Appendix B). Reanalysis was requested for several duplicate pairs and the results of reanalysis confirmed poor agreement between the parent and duplicate samples. Muscle samples had the greatest number of DQO exceedances while ovary samples had the fewest, except for the Quesnel River rainbow trout ovary field duplicate samples (84.6% of RPDs > DQO). This suggests natural heterogeneity within the tissue samples; however, the level of replication (n=8 per tissue type, species, and area) serves to help capture this variability. One rainbow trout ovary sample from Quesnel River had several analyte concentrations that were elevated relative to historic values, including selenium, iron, manganese, nickel, and vanadium. Laboratory reanalysis did not find any obvious errors in the data nor justification to report the reanalysis results instead than the original data, therefore the original data were reported. Overall, the 2024 fish tissue quality data can be used with an acceptable level of confidence for interpretation, although the occurrence of some natural heterogeneity in analyte results were considered during data interpretation. A review of the 2024 fish aging results (Appendix B) indicated that laboratory accuracy for aging data was excellent, and aging estimates were largely consistent between the primary and secondary analyst.

5.1.7.1 Comparisons to Guidelines and Thresholds

The muscle of rainbow trout and longnose sucker from Polley and Bootjack lakes in 2024 had mercury and selenium concentrations that were below their respective guidelines for human health (0.5 mg/kg ww for mercury, 14.5 mg/kg dw for selenium based on moderate fish consumption; Table 5.8; Appendix Tables C.7.1 to C.7.4). This was consistent with results from 2015 to 2023 for both analytes, except for a single rainbow trout from Polley Lake that had a mercury concentration above the human health guideline in 2021 (Table 5.8). Selenium concentrations in the muscle of rainbow trout and longnose sucker from Polley and Bootjack lakes in 2024 also remained below the human health guideline for high consumption (7.3 mg/kg dw; Table 5.8, Appendix Tables C.7.1 to C.7.4). This represents a change from previous years for longnose sucker muscle samples from Polley Lake, which had selenium concentrations that consistently exceeded the high consumption guideline from 2016 to 2023 (13 to 100% of samples; Table 5.8). However, the likelihood that longnose sucker would be consumed at a high rate (i.e., subsistence consumers) is low.

The mean selenium concentrations in 2024 for rainbow trout muscle (4.22 mg/kg dw) and longnose sucker muscle (6.14 mg/kg dw) from Polley Lake were above the guideline for the protection of aquatic life (4 mg/kg dw; Table 5.9; Appendix Tables C.7.1 to C.7.4). This was consistent with results from previous years (i.e., 2015 to 2023) that reported mean selenium concentrations above the aquatic life guideline in the muscle of rainbow trout and longnose sucker from Polley Lake, except for rainbow trout in 2023 (Table 5.9). Selenium concentrations remained below the aquatic life guideline in all fish muscle samples from Bootjack Lake in 2015 to 2024 (Table 5.9; Appendix Tables C.7.2 and C.7.4). The mercury guideline for fish muscle is specific to human health and a mercury guideline for the protection of aquatic life does not exist.

Egg laying vertebrates are the most selenium-sensitive organisms, with embryo toxicity being the primary mechanism of selenium-associated effects; therefore, the analysis of ovary tissue is recommended for assessing the effects of selenium on fish (e.g., Luoma and Presser 2009, Janz et al. 2010, DeForest et al. 2012, Janz 2012). The mean concentration of selenium in ovary tissue of rainbow trout from Polley Lake in 2024 (9.40 mg/kg dw) was lower than the 11 mg/kg dw guideline for the protection of aquatic life[51], and was also lower than those reported from 2016 to 2021 (excluding 2020; BCMOE 2014; Table 5.10; Appendix Table C.7.1). Of the ovaries collected from Polley Lake in 2024, one rainbow trout sample had a concentration above the guideline for the protection of aquatic life (14.4 mg/kg dw; Appendix Table C.7.1). Furthermore, the mean and individual ovary selenium concentrations of rainbow trout from Polley

[51] This guideline includes a two-fold uncertainty factor (BCMOE 2014).

Table 5.8: Fish Muscle Mercury and Selenium Concentrations from Polley Lake (Exposed) and Bootjack Lake (Reference) Relative to Human Health Consumption Guidelines, 2015 to 2024

Waterbody or Area	Species	Year/Season	Sample Size	Mercury		Selenium		
				Human Health (CFIA 2015)		Human Health (BCMOE 2014)		
				Guideline = 0.5 mg/kg ww		Moderate Consumption = 14.5 mg/kg dw		
						High Consumption = 7.3 mg/kg dw		
				Mean	Frequency > Guideline	Mean	Frequency > Moderate	Frequency > High
Bootjack Lake Tributary 10 (Reference)	Rainbow Trout	Spring 2015 (Minnow 2017e)	8	0.0801	0%	2.46	0%	0%
Polley Lake Tributary (Frypan Creek)	Rainbow Trout		8	0.0861	0%	4.92	0%	0%
Trio Lake (Reference)	Rainbow Trout	Fall 2015 (Minnow 2017e)	8	0.353	0%	0.709	0%	0%
Polley Lake (Exposed)	Rainbow Trout	Spring 2016 (Minnow 2017e)	17	0.0775	0%	5.83	0%	12%
	Longnose Sucker		16	0.0885	0%	7.44	0%	56%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2017 (Minnow 2018e)	8	0.0787	0%	2.13	0%	0%
	Longnose Sucker		8	0.0817	0%	2.03	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.0798	0%	5.49	0%	0%
	Longnose Sucker		8	0.0735	0%	6.64	0%	25%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2018 (Minnow 2019a)	8	0.0930	0%	2.20	0%	0%
	Longnose Sucker		8	0.0790	0%	2.40	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.0920	0%	5.60	0%	0%
	Longnose Sucker		8	0.0950	0%	7.36	0%	38%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2019 (Minnow 2020a)	8	0.0873	0%	2.16	0%	0%
	Longnose Sucker		8	0.0942	0%	2.72	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.0677	0%	5.34	0%	0%
	Longnose Sucker		8	0.0599	0%	8.07	0%	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2020 (Minnow 2021a)	8	0.0704	0%	2.42	0%	0%
	Longnose Sucker		8	0.103	0%	2.51	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.111	0%	5.41	0%	0%
	Longnose Sucker		8	0.0734	0%	8.10	0%	88%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2021 (Minnow 2022a)	8	0.0916	0%	2.12	0%	0%
	Longnose Sucker		8	0.134	0%	2.10	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.274	13%	4.57	0%	0%
	Longnose Sucker		8	0.0714	0%	6.08	0%	13%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2022 (Minnow 2023a)	8	0.101	0%	2.31	0%	0%
	Longnose Sucker		8	0.122	0%	2.61	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.140	0%	4.52	0%	13%
	Longnose Sucker		8	0.0629	0%	7.84	0%	63%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2023 (Minnow 2024a)	8	0.0753	0%	2.39	0%	0%
	Longnose Sucker		8	0.0922	0%	2.36	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.109	0%	3.46	0%	0%
	Longnose Sucker		8	0.0669	0%	6.78	0%	13%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2024	8	0.0898	0%	2.46	0%	0%
	Longnose Sucker		8	0.148	0%	2.35	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	0.124	0%	4.22	0%	0%
	Longnose Sucker		8	0.0615	0%	6.14	0%	0%

Indicates mean mercury concentration greater than Health Canada's Human Health guideline for muscle tissue in fish (0.5 mg/kg dw; CFIA 2015).
Indicates mean selenium concentration greater than the Human Health guideline for moderate fish consumption (14.5 mg/kg dw; BCMOE 2014).
Indicates mean selenium concentration greater than the Human Health guideline for high fish consumption (7.3 mg/kg dw; BCMOE 2014).

Notes: mg/kg ww = milligrams per kilogram wet weight. mg/kg dw = milligrams per kilogram dry weight. BCMOE = British Columbia Ministry of Environment. ">" = greater than; "%" = percent.

Table 5.9: Fish Muscle Selenium Concentrations from Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference) Relative to the British Columbia Guideline for the Protection of Aquatic Life, 2015 to 2024

Waterbody or Area	Species	Year/ Season	Sample Size	Selenium	
				Aquatic Life Guideline (4 mg/kg dw)	
				Mean	Frequency > Guideline
Bootjack Lake Tributary 10 (Reference)	Rainbow Trout	Spring 2015 (Minnow 2017e)	8	2.46	0%
Polley Lake Tributary (Frypan Creek)	Rainbow Trout		8	4.92	63%
Trio Lake (Reference)	Rainbow Trout	Fall 2015 (Minnow 2017e)	8	0.709	0%
Polley Lake (Exposed)	Rainbow Trout	Spring 2016 (Minnow 2017e)	17	5.83	88%
	Longnose Sucker		16	7.44	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2017 (Minnow 2018e)	8	2.13	0%
	Longnose Sucker		8	2.03	0%
Polley Lake (Exposed)	Rainbow Trout		8	5.49	100%
	Longnose Sucker		8	6.64	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2018 (Minnow 2019a)	8	2.20	0%
	Longnose Sucker		8	2.40	0%
Polley Lake (Exposed)	Rainbow Trout		8	5.60	100%
	Longnose Sucker		8	7.40	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2019 (Minnow 2020a)	8	2.16	0%
	Longnose Sucker		8	2.72	0%
Polley Lake (Exposed)	Rainbow Trout		8	5.34	100%
	Longnose Sucker		8	8.07	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2020 (Minnow 2021a)	8	2.42	0%
	Longnose Sucker		8	2.51	0%
Polley Lake (Exposed)	Rainbow Trout		8	5.41	100%
	Longnose Sucker		8	8.10	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2021 (Minnow 2022a)	8	2.12	0%
	Longnose Sucker		8	2.10	0%
Polley Lake (Exposed)	Rainbow Trout		8	4.57	75%
	Longnose Sucker		8	6.08	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2022 (Minnow 2023a)	8	2.31	0%
	Longnose Sucker		8	2.61	0%
Polley Lake (Exposed)	Rainbow Trout		8	4.52	50%
	Longnose Sucker		8	7.84	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2023 (Minnow 2024a)	8	2.39	0%
	Longnose Sucker		8	2.36	0%
Polley Lake (Exposed)	Rainbow Trout		8	3.46	13%
	Longnose Sucker		8	6.78	100%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2024	8	2.46	0%
	Longnose Sucker		8	2.35	0%
Polley Lake (Exposed)	Rainbow Trout		8	4.22	38%
	Longnose Sucker		8	6.14	100%

Indicates mean selenium concentration greater than the BC Aquatic Life guideline for muscle tissue or whole-body in fish (4 mg/kg dw; BCMOE 2014).

Notes: mg/kg dw = milligrams per kilogram dry weight; ">" = greater than; "%" = percent.

Table 5.10: Fish Ovary Selenium Concentrations from Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference) Relative to Guidelines and Thresholds, 2015 to 2024

Waterbody or Area	Species	Year/Season	Sample Size	Selenium		
				Mean	Frequency > Guideline or Threshold	
					BC Aquatic Life Guideline (11 mg/kg dw)	Threshold[b] (20 mg/kg dw)
Bootjack Lake Tributary 10 (Reference)	Rainbow Trout	Spring 2015 (Minnow 2017e)	8	5.87	0%	0%
Polley Lake Tributary (Frypan Creek)	Rainbow Trout		8	40.0[a]	100%	88%
Polley Lake (Exposed)	Rainbow Trout	Spring 2016 (Minnow 2017e)	8	10.3	38%	0%
	Longnose Sucker		8	10.4	25%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2017 (Minnow 2018e)	8	4.52	0%	0%
	Longnose Sucker		8	8.65	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	11.1	25%	0%
	Longnose Sucker		8	3.56	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2018 (Minnow 2019a)	8	4.30	0%	0%
	Longnose Sucker		8	3.70	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	10.1	50%	0%
	Longnose Sucker		8	9.19	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2019 (Minnow 2020a)	8	4.11	0%	0%
	Longnose Sucker		8	3.80	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	11.5	75%	0%
	Longnose Sucker		8	9.36	13%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2020 (Minnow 2021a)	8	4.67	0%	0%
	Longnose Sucker		8	3.72	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	9.04	13%	0%
	Longnose Sucker		8	8.41	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2021 (Minnow 2022a)	8	4.28	0%	0%
	Longnose Sucker		8	3.84	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	9.50	25%	0%
	Longnose Sucker		8	7.78	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2022 (Minnow 2023a)	8	4.88	0%	0%
	Longnose Sucker		8	4.63	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	8.27	13%	0%
	Longnose Sucker		8	8.69	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2023 (Minnow 2024a)	8	5.30	0%	0%
	Longnose Sucker		8	4.64	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	8.96	13%	0%
	Longnose Sucker		8	8.26	0%	0%
Bootjack Lake (Reference)	Rainbow Trout	Spring 2024	8	5.18	0%	0%
	Longnose Sucker		8	3.98	0%	0%
Polley Lake (Exposed)	Rainbow Trout		8	9.40	13%	0%
	Longnose Sucker		8	7.99	0%	0%

Indicates mean selenium concentration greater than the BC Aquatic Life guideline for ovary tissue in fish (11 mg/kg dw; BCMOE 2014).

Indicates mean selenium concentration greater than DeForest et al (2012) threshold for ovary tissue in fish (20 mg/kg dw) and the BC Aquatic Life guideline (BCMOE 2014).

Notes: mg/kg dw = milligrams per kilogram dry weight. ">" = greater than. BCMOE = British Columbia Ministry of Environment. "%" = percent.

[a] Data are considered suspect and are likely influenced by laboratory error or contamination (Golder 2016b; Minnow 2017e).

[b] Ovary selenium threshold as described in DeForest et al. (2012).

Lake in 2024 (mean = 9.40 mg/kg dw) and in previous years were well below the 20 mg/kg dw effect threshold developed by DeForest et al. (2012; Table 5.10). Selenium concentrations in ovaries of rainbow trout from Bootjack Lake (2015 to 2024) were consistently below the tissue-specific selenium guideline for the protection of aquatic life and the threshold for reproductive effects (DeForest et al. 2012; Table 5.10; Appendix Table C.7.2). The mean concentrations of selenium in ovary tissue of longnose sucker collected from Polley Lake (7.99 mg/kg dw) and Bootjack Lake (3.98 mg/kg dw) in 2024 were lower than tissue-specific guideline for the protection of aquatic life, as well as the 20 mg/kg dw threshold for reproductive effects (DeForest et al. 2012, BCMOE 2014; Appendix Tables C.7.3, C.7.4), which was consistent with results from 2016 to 2023 (Table 5.10).

5.1.7.2 Spatial and Temporal Comparisons

Age and morphological measures (fork length and body weight) of rainbow trout and longnose sucker captured from Polley and Bootjack lakes between 2015 and 2024 are summarized in Table 5.11 (see Appendix Tables C.6.10 and C.6.11 for detailed 2024 data). Statistical comparisons of these physical measures and age did not exhibit a significant *Area×Year* interaction for rainbow trout (based on data from 1995 to 2024; Table 5.12; Appendix Table E.6.1).[52] Rainbow trout sampled from Polley Lake were similar in size (fork length and body weight) and age to those sampled those from Bootjack Lake in 2024, which was consistent with previous years (i.e., 1995 to 2023; Table 5.12; Appendix Table E.6.1). Conversely, longnose sucker collected from Polley Lake were significantly younger (38% in 2024), significantly shorter (19% in all years), and lighter (69% in 2024) than those from Bootjack Lake (Table 5.12; Appendix Table E.6.2). In previous monitoring years, longnose sucker from Polley Lake were younger, and either smaller (shorter and/or lighter) or similar in size compared to those from Bootjack Lake, consistent with trends observed during baseline data collection for fork length (i.e., 1995; Table 5.12; Appendix Table E.6.2).

Data interpretation was focused on primary and secondary analytes (Table 2.4) with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 (if the analysis *Area×Year* interaction was significant) or in all monitoring years (if the

[52] Results of the two-way ANOVA for age, fork length, and body size may differ among tissue types for the same species in the same area due to differences in data availability across years for the different tissue types (e.g., rainbow trout kidney data were collected from 2018 to 2024 compared to 1995 to 2024 for rainbow trout muscle tissue). For all species sampled for tissue in 2024, discussion of age and body size is focused on results of two-way ANOVA for muscle tissues (which includes the full sample set [n=8] for each area and year).

Table 5.11: Age and Body Size Data of Fish Collected for Tissue Quality Monitoring from Polley Lake (Exposed) and Bootjack Lake (Reference), 2015 to 2024

Waterbody or Area	Fish Species	Year/Season	Sample Size	Age (Years)		Fork Length (cm)		Body Weight (Grams)	
				Mean	Range	Mean	Range	Mean	Range
Bootjack Lake Tributary 10 (Reference)	Rainbow Trout	Spring 2015 (Minnow 2017e)	8	5.3	4 - 6	28.9	25.3 - 31.3	250	188 - 325
Polley Lake Tributary (Frypan Creek)			8	4.8	4 - 6	24.7	21.8 - 28.0	187	140 - 233
Trio Lake (Reference)	Rainbow Trout	Fall 2015 (Minnow 2017e)	8	4.6	3 - 6	26.3	17.0 - 34.2	197	105 - 280
Polley Lake (Exposed)	Rainbow Trout	Spring 2016 (Minnow 2017e)	18	4.6	3 - 7	31.5	23.6 - 35.7	335	152 - 455
	Longnose Sucker		16	6.3	2 - 12	33.4	24.5 - 42.0	498	145 - 980
Bootjack Lake (Reference)	Rainbow Trout	Spring 2017 (Minnow 2018e)	8	5.4	4 - 6	31.6	29.2 - 33.5	327	250 - 365
	Longnose Sucker		8	8.8	7 - 12	41.6	38.8 - 44.2	1,144	890 - 1,300
Polley Lake (Exposed)	Rainbow Trout		8	5.0	4 - 7	32.3	28.8 - 34.5	376	260 - 430
	Longnose Sucker		8	8.4	7 - 12	38.3	34.2 - 40.8	851	660 - 1,120
Bootjack Lake (Reference)	Rainbow Trout	Spring 2018 (Minnow 2019a)	9	5.1	4 - 7	31.7	29.4 - 33.7	338	278 - 445
	Longnose Sucker		8	6.9	4 - 9	42.1	39.9 - 43.9	1,116	990 - 1,280
Polley Lake (Exposed)	Rainbow Trout		8	4.5	4 - 5	32.8	31.0 - 34.4	335	250 - 420
	Longnose Sucker		8	8.0	4 - 11	40.9	34.1 - 44.2	989	505 - 1,240
Bootjack Lake (Reference)	Rainbow Trout	Spring 2019 (Minnow 2020a)	8	5.1	4 - 7	31.2	27.9 - 33.0	310	225 - 360
	Longnose Sucker		8	7.4	6 - 9	40.2	37.7 - 42.8	983	820 - 1,160
Polley Lake (Exposed)	Rainbow Trout		8	6.3	4 - 7	33.7	32.5 - 35.4	393	350 - 435
	Longnose Sucker		8	5.9	4 - 11	36.5	30.8 - 42.9	691	405 - 1,320
Bootjack Lake (Reference)	Rainbow Trout	Spring 2020 (Minnow 2021a)	8	4.5	4 - 7	31.7	26.5 - 34.5	335	234 - 360
	Longnose Sucker		8	8.5	7 - 10	41.9	39.0 - 46.7	1,035	810 - 1,440
Polley Lake (Exposed)	Rainbow Trout		8	6.0	4 - 7	35.8	31.5 - 38.3	498	315 - 694
	Longnose Sucker		8	9.0	5 - 12	39.9	32.7 - 44.4	920	425 - 1,260
Bootjack Lake (Reference)	Rainbow Trout	Spring 2021 (Minnow 2022a)	8	4.5	4 - 5	33	30.8 - 35.4	348	302 - 445
	Longnose Sucker		8	8.9	6 - 11	43.9	41.7 - 46.8	1,143	860 - 1,380
Polley Lake (Exposed)	Rainbow Trout		8	4.6	3 - 6	34	25.8 - 38.6	389	176 - 590
	Longnose Sucker		8	6.0	3 - 11	34.6	24.8 - 41.6	545	196 - 960
Bootjack Lake (Reference)	Rainbow Trout	Spring 2022 (Minnow 2023a)	8	4.1	3 - 6	29.8	24.1 - 35.0	257	156 - 360
	Longnose Sucker		8	8.9	6 - 12	40.3	32.8 - 44.6	1,017	550 - 1,360
Polley Lake (Exposed)	Rainbow Trout		8	3.8	3 - 4	30.8	24.8 - 34.1	278	160 - 355
	Longnose Sucker		8	7.6	5 - 13	38.4	27.7 - 44.0	733	262 - 960
Bootjack Lake (Reference)	Rainbow Trout	Spring 2023 (Minnow 2024a)	8	4.8	4 - 5	29.5	27.1 - 32.0	258	200 - 340
	Longnose Sucker		8	9.1	8 - 11	43.3	40.8 - 45.0	1,196	1,040 - 1,340
Polley Lake (Exposed)	Rainbow Trout		8	5.0	4 - 6	30.7	26.8 - 32.8	274	210 - 320
	Longnose Sucker		8	6.9	5 - 10	37.8	32.1 - 42.7	659	410 - 950
Bootjack Lake (Reference)	Rainbow Trout	Spring 2024	8	4.8	4 - 6	31.1	28.2 - 33.9	332	260 - 440
	Longnose Sucker		8	9.5	6 - 12	43.9	37.4 - 48.2	1,206	740 - 1,520
Polley Lake (Exposed)	Rainbow Trout		8	4.8	4 - 6	30.0	26.5 - 35.0	280	200 - 380
	Longnose Sucker		8	5.9	3 - 11	33.6	28.3 - 46.1	481	260 - 1,200

Table 5.12: Summary of Statistical Contrasts of Exposed - Reference Relative Differences of Fish Tissue Primary and Secondary Analyte Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024[a]

Parameter		Tissue	Rainbow Trout: Two-way ANOVA																								Longnose Sucker: Two-way ANOVA															
			Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period[c] (%)												Magnitude of Difference for Polley Lake (Exposed) Mean Relative to Bootjack Lake (Reference)[d] (%)												Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period[c] (%)										Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake[d] (%)									
			Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period									Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period									Before Period	Post-Release Period	Post-Breach Period								Before Period	Post-Release Period	Post-Breach Period							
			1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024
Age		muscle	baseline	ns											ns												-	baseline	ns	79	ns	ns	ns	ns	ns	ns	-	ns	ns	ns	ns	ns	-32	ns	-25	-38
Fork Length		muscle	baseline	ns											ns												baseline	ns									-19									
Body Weight		muscle	baseline	ns											ns												baseline	ns	ns	ns	ns	ns	ns	ns	ns	-55	ns	ns	ns	ns	ns	ns	-59	ns	ns	-69
Primary Analytes	Arsenic (non-essential)	muscle	baseline	ns	-	ns									71	-	71										baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	70	-	231	ns	ns	ns	81	ns	97	71
		ovary	-	-	-	baseline	ns	ns	ns	88	ns	82	128	106	-	-	-	ns	ns	ns	ns	76	ns	70	113	93	-	-	baseline	ns	-63	-57	-51	-50	-46	-46	-	-	113	ns	ns	ns	ns	ns	ns	ns
		liver[b]	baseline	-	-	ns	-52	ns	-48	-53	ns	ns	ns	ns	116	-	-	66	ns	ns	ns	ns	99	78	129	105	baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	57	-	119	91	ns	50	ns	88	57	112
		kidney[b]	-	-	-	-	-	baseline	ns						-	-	-	-	-	78							-	-	-	baseline	ns							-	-	-	44					
	Copper (essential)	ovary	-	-	-	baseline	ns								-	-	-	-	-	9.0							-	-	baseline	ns							-	-	ns							
		liver[b]	-	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-84	-	-	-	ns	ns	ns	264	ns	ns	ns	ns	-70	-	-	baseline	ns	ns	ns	ns	104	ns	ns	-	-	ns	ns	ns	ns	69	204	94	124
		kidney[b]	-	-	-	-	-	baseline	ns						-	-	-	-	-	12							-	-	-	baseline	ns							-	-	-	ns					
	Iron (essential)	liver[b]	-	-	-	baseline	ns								-	-	-	-	-	40							-	-	baseline	ns	ns	ns	ns	ns	ns	235	-	-	ns	ns	ns	ns	-44	ns	ns	139
		kidney[b]	-	-	-	-	-	baseline	ns						-	-	-	-	-	23							-	-	-	baseline	ns							-	-	-	ns					
	Selenium (essential)	muscle	baseline	268	316	173	271	267	257	224	211	174	110	144	-30	157	190	90	159	156	149	125	117	91	46	70	baseline	440	261	240	230	263	221	229	218	191	ns	389	227	208	198	229	190	198	188	163
		ovary[b]	-	-	baseline	201	ns	ns	ns	ns	ns	ns	ns	ns	-	-	121	564	146	133	180	93	121	70	67	80	-	baseline	-19	-16	-17	-24	-31	-37	-40	-32	-	197	140	148	146	126	103	88	77	102
		liver[b]	baseline	-	-	755	148	314	690	394	306	186	243	ns	ns	-	-	478	ns	180	434	234	174	93	132	ns	baseline	-	102	87	75	69	23	62	ns	34	17	-	135	118	104	97	43	88	26	56
		kidney[b]	-	-	-	-	-	baseline	ns						-	-	-	-	-	66							-	-	-	baseline	ns	ns	-23	ns	ns	-31	-	-	-	74	83	66	33	82	44	ns
Secondary Analytes	Barium	muscle	-	baseline	-	ns	-80	ns	ns	ns	ns	ns	ns	ns	-	ns	-	-53	-87	ns	-57	ns	ns	ns	-50	ns	-	-	baseline	ns	ns	ns	ns	ns	116	179	-	-	ns	ns	ns	ns	ns	ns	59	106
	Cadmium (non-essential)	kidney	-	-	-	-	-	baseline	ns						-	-	-	-	-	17							-	-	-	baseline	ns							-	-	-	-29					
	Calcium	muscle	-	baseline	-	ns									-	ns	-	ns									-	-	baseline	ns	ns	167	ns	ns	ns	192	-	-	ns	ns	ns	106	ns	ns	ns	126
		liver	-	-	-	baseline	ns								-	-	-	ns									-	-	baseline	ns	ns	ns	ns	-42	-35	ns	-	-	ns	ns	ns	-28	ns	-38	-30	46
	Cobalt	ovary	-	-	-	baseline	ns								-	-	-	30									-	-	baseline	ns	-32	-43	ns	ns	-32	ns	-	-	56	ns	ns	ns	ns	33	ns	64
		liver	-	-	-	baseline	ns								-	-	-	29									-	-	baseline	ns	ns	ns	ns	ns	ns	105	-	-	ns	ns	-26	-22	-24	ns	-25	100
		kidney	-	-	-	-	-	baseline	ns						-	-	-	-	-	149							-	-	-	baseline	ns	ns	ns	96	ns	131	-	-	-	ns	ns	ns	ns	49	ns	76

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold** = Data for either exposed or reference in the indicated year were entirely below the laboratory reporting limit (LRL), leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available for analysis (i.e., either data was not collected for the given analyte and time period or data were omitted from analysis because > 50% of data for a given analyte were <LRL in all time periods); "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis, "ns" = not significant. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Age, fork length, and body weight results are those that are associated with muscle tissue analyses.

[a] Statistical approaches included ANOVA, ANCOVA, and MLE and for each case depended on data suitability (see complete statistical results in Appendix Table E.6.1 to E.6.8). This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). If no significant change was detected in the exposed-reference difference among years (i.e., the Area x Year interaction was not significant), data from 2019 to 2024 were combined for the analyses.

[b] Organ in which the specific metal is known to accumulate (references in Appendix Table E.6.22).

[c] Magnitude of difference (MOD) calculated on back transformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[d] Magnitude of difference (MOD) calculated on back transformed least-squares means as (Exp-Ref)/Ref x 100%.

Table 5.12: Summary of Statistical Contrasts of Exposed - Reference Relative Differences of Fish Tissue Primary and Secondary Analyte Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024[a]

			Rainbow Trout: Two-way ANOVA																								Longnose Sucker: Two-way ANOVA															
			Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period[c] (%)												Magnitude of Difference for Polley Lake (Exposed) Mean Relative to Bootjack Lake (Reference)[d] (%)												Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period[c] (%)												Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake[d] (%)											
	Parameter	Tissue	Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period									Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period									Before Period	Post-Release Period	Post-Breach Period									Before Period	Post-Release Period	Post-Breach Period							
			1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024
Secondary Analytes	Manganese	muscle	-	baseline	-	ns	-58	ns	ns	-39	ns	ns	ns	ns	-	ns	-	ns	-63	-24	-33	-46	ns	ns	-38	-24	-	-	baseline	ns	ns	82	81	ns	ns	124	-	-	**ns**	ns	ns	ns	ns	ns	ns	71
		ovary	-	-	-	baseline	ns	-43	-46	-66	ns	-47	-43	-54	-	-	-	ns	ns	ns	ns	-52	ns	ns	ns	-35	-	-	baseline	ns	ns	ns	ns	ns	ns	60	-	-	ns	ns	ns	ns	ns	36	ns	57
	Mercury (ww) (non-essential)	muscle	baseline	-54	-	-42	ns	-35	-53	ns	98	ns	ns	ns	40	-36	-	ns	ns	ns	-34	ns	176	ns	38	33	baseline	-	ns	ns	ns	ns	ns	-37	ns	-35	ns	-	ns	30	-24	ns	ns	-39	ns	-37
	Molybdenum (essential)	muscle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**baseline**	<LRL	<LRL	ns	ns	ns	ns	ns	-	-	94	<LRL	<LRL	94				
		kidney	-	-	-	-	-	baseline	ns						-	-	-	-	-	ns							-	-	-	baseline	ns						-	-	-	58						
	Nickel	liver	baseline	-	-	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	ns	161	-	-	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		kidney	-	-	-	-	-	baseline	ns						-	-	-	-	-	37							-	-	-	baseline	ns	ns	ns	92	ns	ns	-	-	-	-37	-61	-44	ns	ns	-37	ns
	Phosphorus (essential)	muscle	-	-	-	baseline	22	ns	ns	ns	ns	ns	ns	20	-	-	-	-11	ns	ns	ns	-16	ns	ns	ns	ns	-	-	baseline	ns	ns	ns	ns	ns	26	ns	-	-	ns	ns	ns	ns	ns	ns	21	13
		ovary	-	-	-	baseline	19	ns	ns	-15	ns	ns	ns	ns	-	-	-	ns	17	ns	ns	-17	ns	ns	ns	ns	-	-	baseline	ns							-	-	5.0							
	Sodium	muscle	-	-	-	baseline	ns	ns	ns	-37	ns	-38	-42	ns	-	-	-	ns	ns	ns	ns	ns	ns	-23	-28	ns	-	-	baseline	ns	ns	ns	ns	ns	29	30	-	-	ns	ns	ns	ns	ns	21	24	
		liver	-	-	-	baseline	ns	ns	ns	-38	-45	-52	ns	-39	-	-	-	62	74	ns	ns	ns	ns	ns	ns	ns	-	-	baseline	-34	-31	-51	-41	-54	-41	ns	-	-	36	ns	ns	-34	-20	-38	-20	27
	Strontium	muscle	-	baseline	-	ns									-	ns	-	ns									-	-	baseline	ns	118	366	ns	ns	ns	422	-	-	-52	ns	ns	125	ns	-43	ns	152
		liver	-	-	-	baseline	ns	90	ns	ns	ns	ns	ns	ns	-	-	-	ns	ns	44	ns	-33	ns	ns	ns	ns	-	-	baseline	ns	ns	ns	ns	-64	ns	ns	-	-	ns	ns	ns	ns	-38	-60	-39	106
	Titanium	muscle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LRL	<LRL	baseline	727	936	-	-	-	-	-	<LRL	<LRL	ns	ns	201
		liver	-	-	-	-	-	-	-	<LRL	baseline	<LRL		ns	-	-	-	-	-	-	-	<LRL	ns	<LRL		ns	-	-	-	-	-	<LRL	baseline	<LRL	ns		-	-	-	-	-	<LRL	164	<LRL	164	
		kidney	-	-	-	-	-	-	-	baseline	ns				-	-	-	-	-	-	-	64					-	-	-	-	-	baseline	ns	<LRL	ns		-	-	-	-	-	ns	ns	<LRL	ns	
	Uranium	kidney	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	204	-	-	-	-	-	ns	ns	-50	ns	ns	ns	123	-	-	-	baseline	ns	ns	ns	ns	ns	ns	-	-	-	-70						
	Vanadium (essential)	liver	-	-	-	baseline	ns								-	-	-	168									-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	53							
		kidney	-	-	-	-	-	baseline	ns						-	-	-	-	-	123							-	-	-	baseline	ns	ns	ns	ns	ns	ns	-	-	-	76						
	Zinc (essential)	muscle	-	baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	ns	-	ns	-	ns	ns	ns	ns	-18	ns	ns	ns	ns	-	-	baseline	ns	-30	-33	ns	ns	-35	ns	-	-	119	81	55	48	104	118	44	136
		ovary	-	-	-	baseline	ns								-	-	-	ns									-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	8.2							
		liver	-	-	-	baseline	ns								-	-	-	10									-	-	baseline	-23	-20	ns	-22	ns	-25	ns	-	-	27	ns	ns	ns	ns	53	ns	43
		kidney	-	-	-	-	-	baseline	ns	ns	108	81	ns	ns	-	-	-	-	-	ns	ns	ns	63	ns	ns	ns	-	-	-	baseline	ns	ns	ns	ns	ns	ns	-	-	-	47						

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold** = Data for either exposed or reference in the indicated year were entirely below the laboratory reporting limit (LRL), leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available for analysis (i.e., either data was not collected for the given analyte and time period or data were omitted from analysis because > 50% of data for a given analyte were <LRL in all time periods); "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis, "ns" = not significant. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Age, fork length, and body weight results are those that are associated with muscle tissue analyses.

[a] Statistical approaches included ANOVA, ANCOVA, and MLE and for each case depended on data suitability (see complete statistical results in Appendix Table E.6.1 to E.6.8). This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). If no significant change was detected in the exposed-reference difference among years (i.e., the Area x Year interaction was not significant), data from 2019 to 2024 were combined for the analyses.

[b] Organ in which the specific metal is known to accumulate (references in Appendix Table E.6.22).

[c] Magnitude of difference (MOD) calculated on back transformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[d] Magnitude of difference (MOD) calculated on back transformed least-squares means as (Exp-Ref)/Ref x 100%.

Area×*Year* interaction was not significant[53]). Increasing analyte concentrations at the exposed area relative to reference area over time, or consistently elevated analyte concentrations at the exposed area relative to reference, were not detected for most analytes (Appendix Figures E.6.1 to E.6.7, Appendix Tables E.6.1 to E.6.8). The primary analytes arsenic, copper, iron, and selenium, and secondary analytes barium, cadmium, calcium, cobalt, manganese, mercury (ww), molybdenum, nickel, phosphorous, sodium, strontium, titanium, uranium, vanadium, and zinc met the criteria for inclusion in data interpretation outlined above (Figures 5.13 and 5.14, Table 5.12). The following discussion is focused on these four primary analytes and 15 secondary analytes.

Of the primary analytes identified, selenium had concentrations in exposed fish tissues that were the most elevated relative to reference and relative to baseline conditions. Significant *Area*×*Year* interactions were detected for selenium concentrations in most exposed tissues, except for rainbow trout kidney tissue. The significant *Area*×*Year* interaction indicates that the relative (exposed-reference) difference in selenium concentrations changed significantly among years (i.e., the geometric mean concentrations at the exposed area were not trending the same as the geometric mean concentrations at the reference area). The timing of the interactions indicated that selenium accumulation began between 1995 and 2009 in Polley Lake (i.e., may be associated with the 2006 to 2009 uncontrolled surface runoff to Polley Lake; Figure 5.13, Table 5.12; Appendix Tables E.6.1 to E.6.8). In general, selenium concentrations in exposed fish tissues did not continue to increase after the post-release period (2012), except for tissue selenium concentrations in rainbow trout ovary that were significantly higher, relative to reference, in 2015 compared to 2012 (Figure 5.13, Table 5.12; Appendix Table E.6.3)[54]. It is possible that the 2015 peak in exposed rainbow trout ovary selenium concentrations may reflect a short-term impact associated with the breach or possible laboratory error that cannot be separated from potential mine influence between 1995 and 2015.

Post-breach selenium concentrations in exposed rainbow trout muscle, ovary, liver, and kidney have been consistently higher than reference (46% to 564% across tissue types), except in liver tissue in 2017 and 2024. However, there is evidence of decreased selenium concentrations in exposed rainbow trout tissues over time. For instance, selenium concentrations in exposed rainbow trout liver tissue in 2024 were similar to reference and similar to baseline (i.e., 1995), representing a significant decrease compared to prior post-breach years (2015 to 2023) when selenium concentrations were significantly higher than reference (Figure 5.13, Table 5.12;

[53] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from all available years were combined for the analyses.

[54] It is considered likely that a subset of the selenium concentrations measured in exposed rainbow trout ovaries from 2015 were subject to laboratory error or contamination, resulting in reporting of increased selenium concentrations (Minnow 2017e).

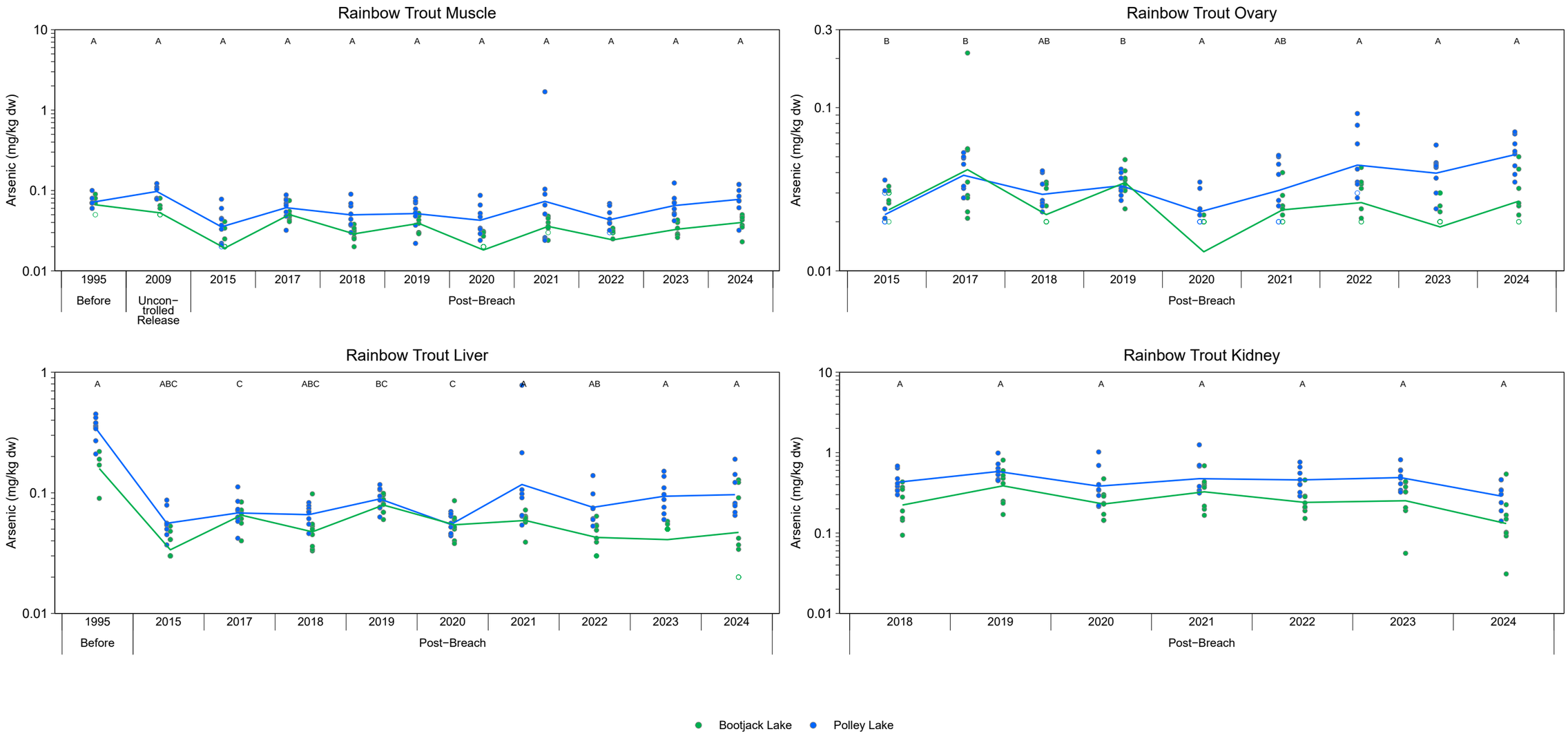
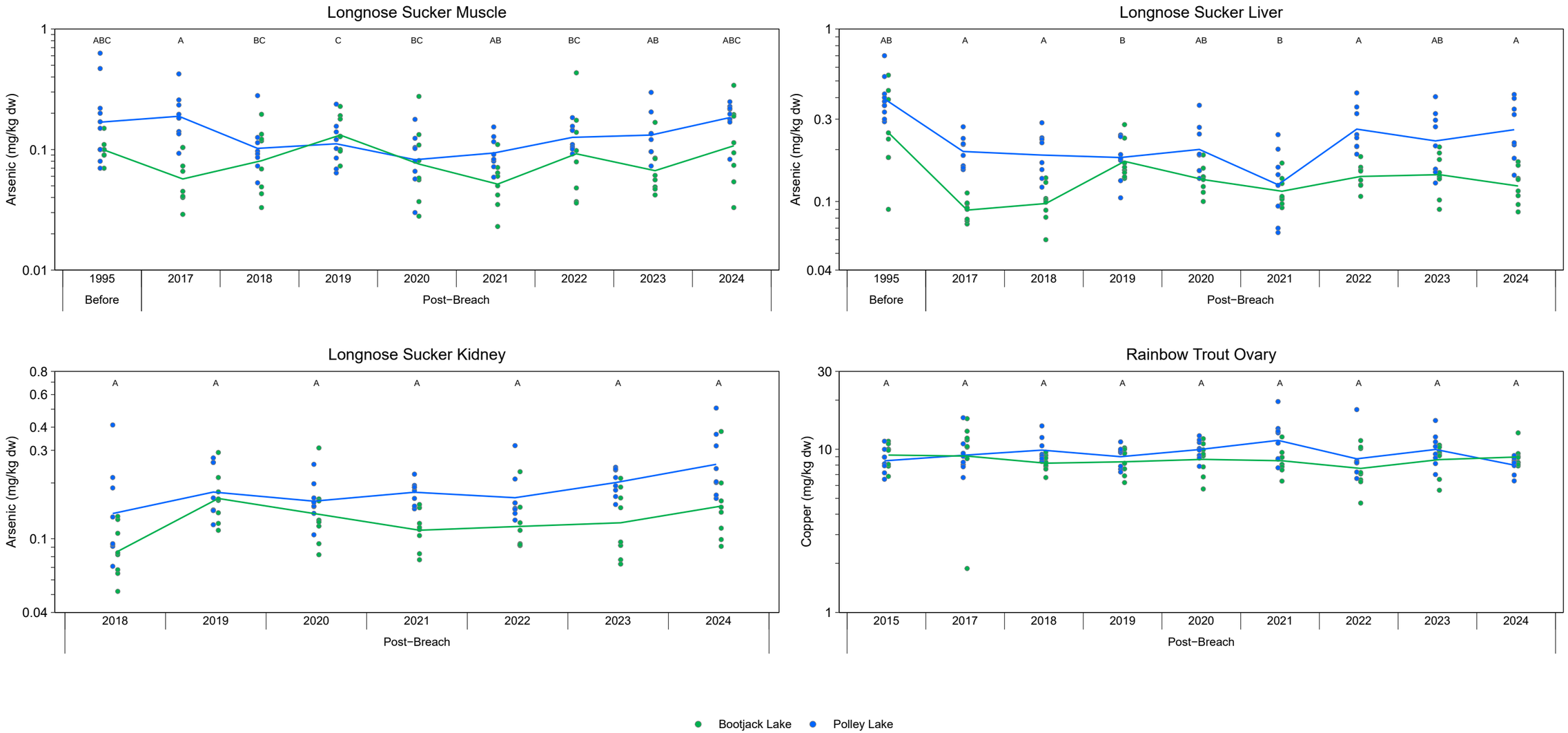


Figure 5.13: Fish Tissue Primary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: BCMOE = British Columbia Ministry of the Environment, GL = Guideline; dw = dry weight. Green represents reference areas and blue represents exposed areas.. Plots are only included for primary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two −way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.



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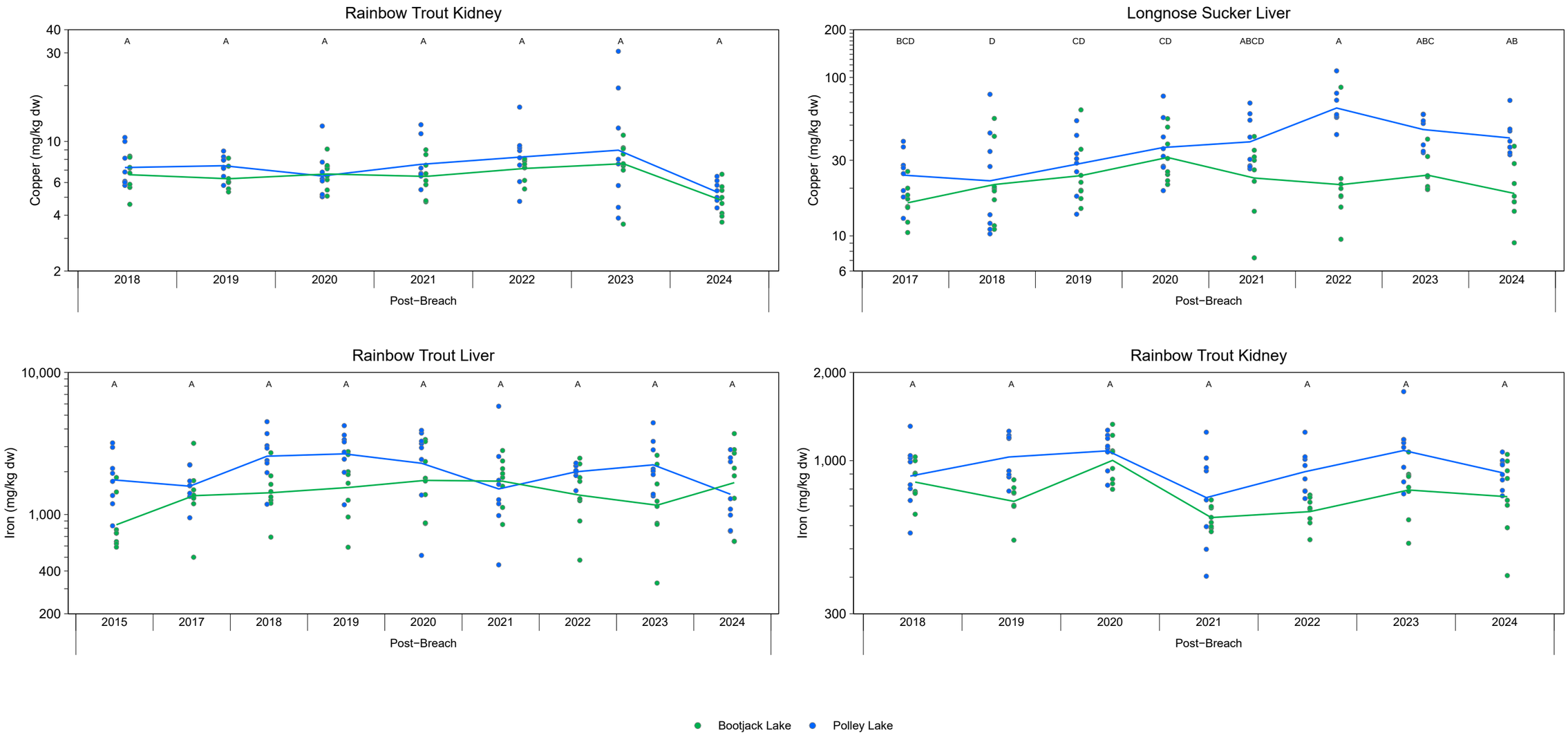

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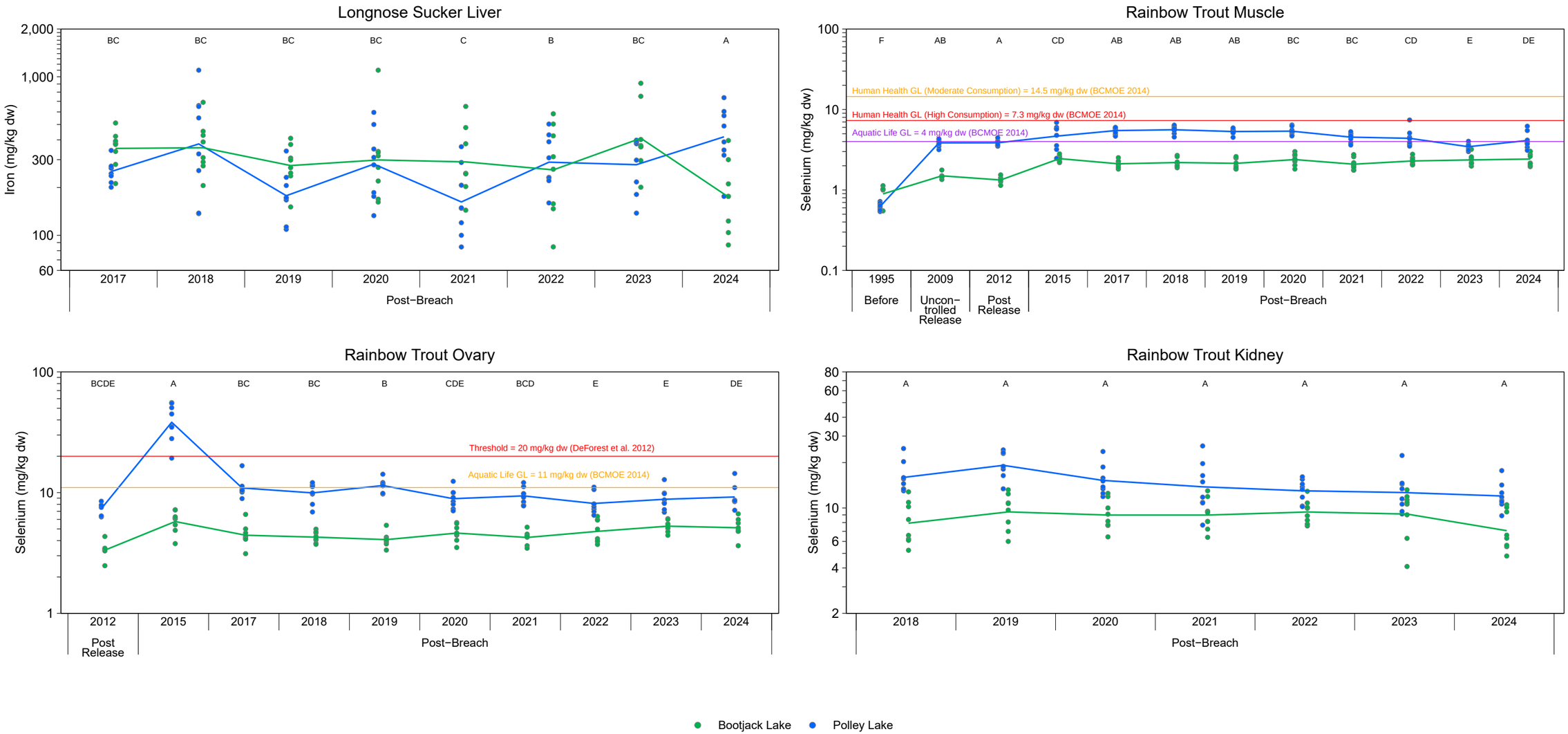

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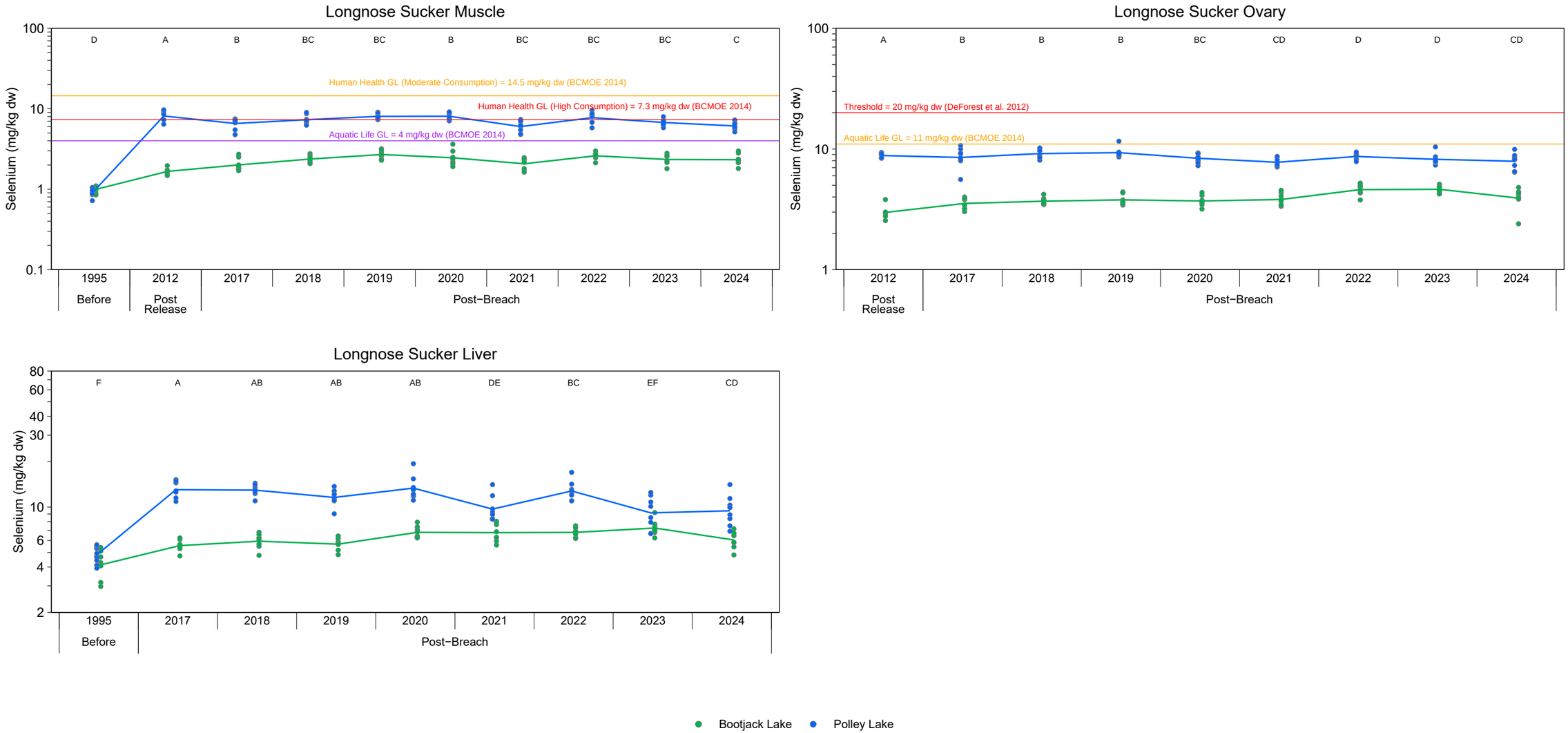

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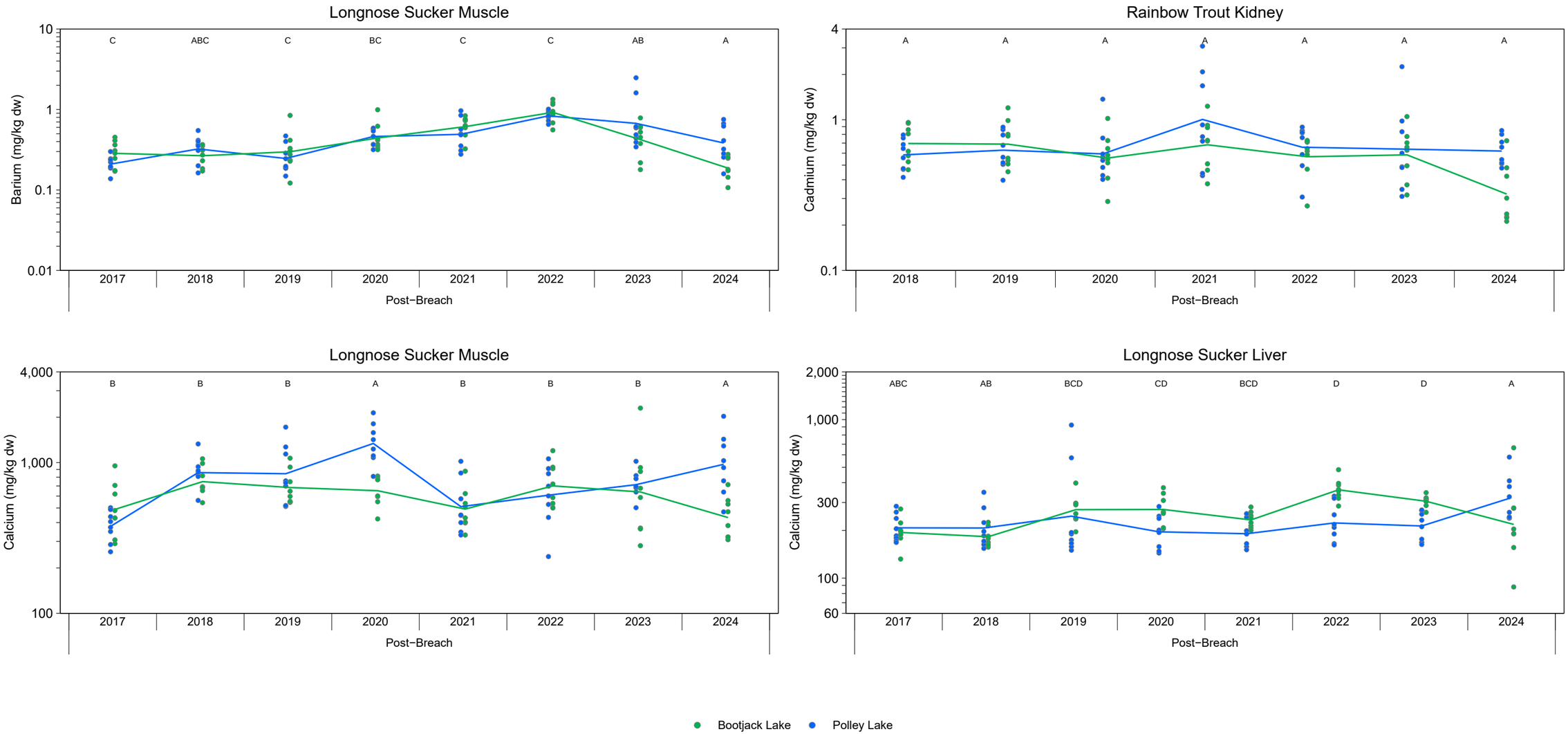
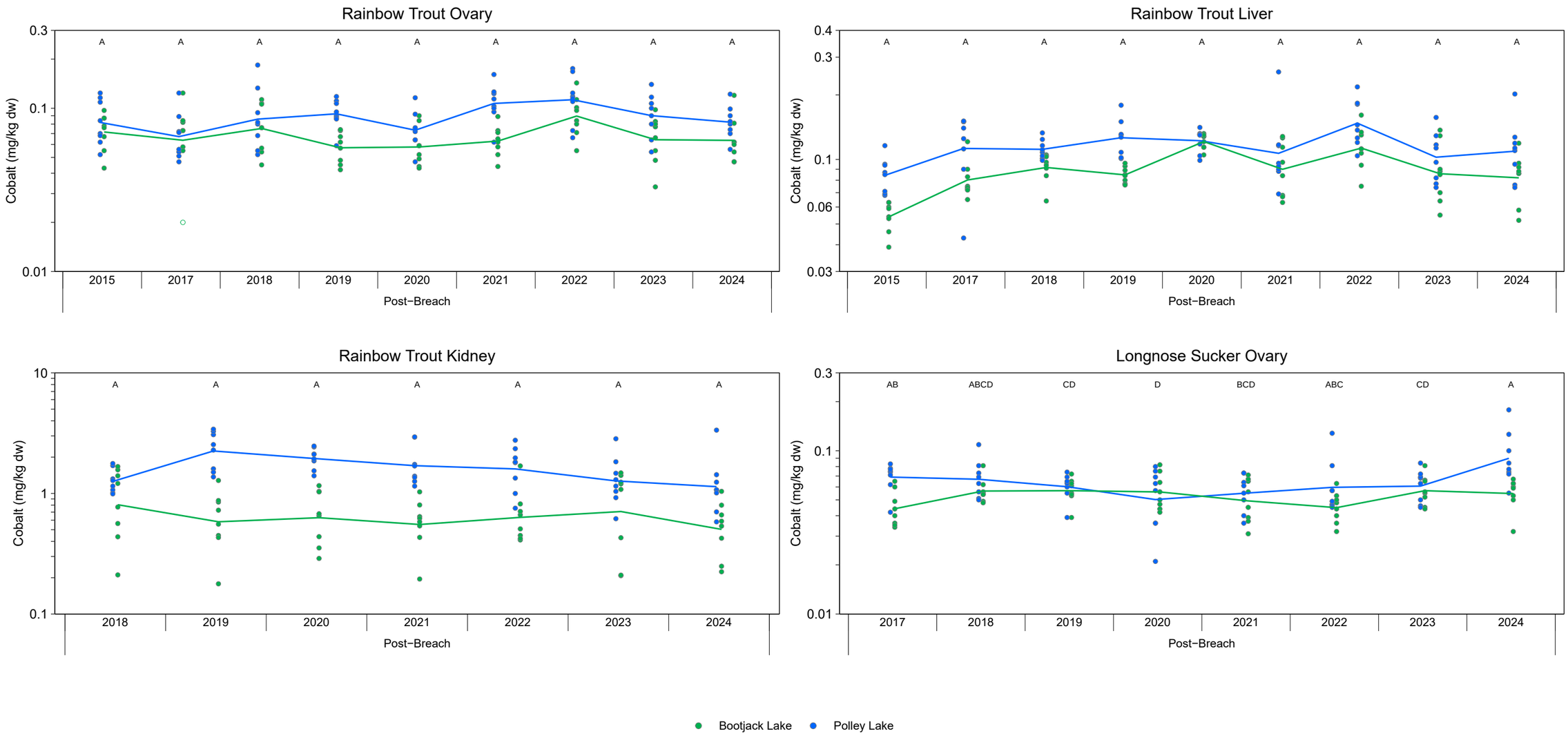


Figure 5.14: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: GL = guideline, mg/kg = milligrams per kilogram, ww = weight weight, dw = dry weight, CFIA = Canadian Food Inspection Agency. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant). Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors *Area* and *Year* . The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.



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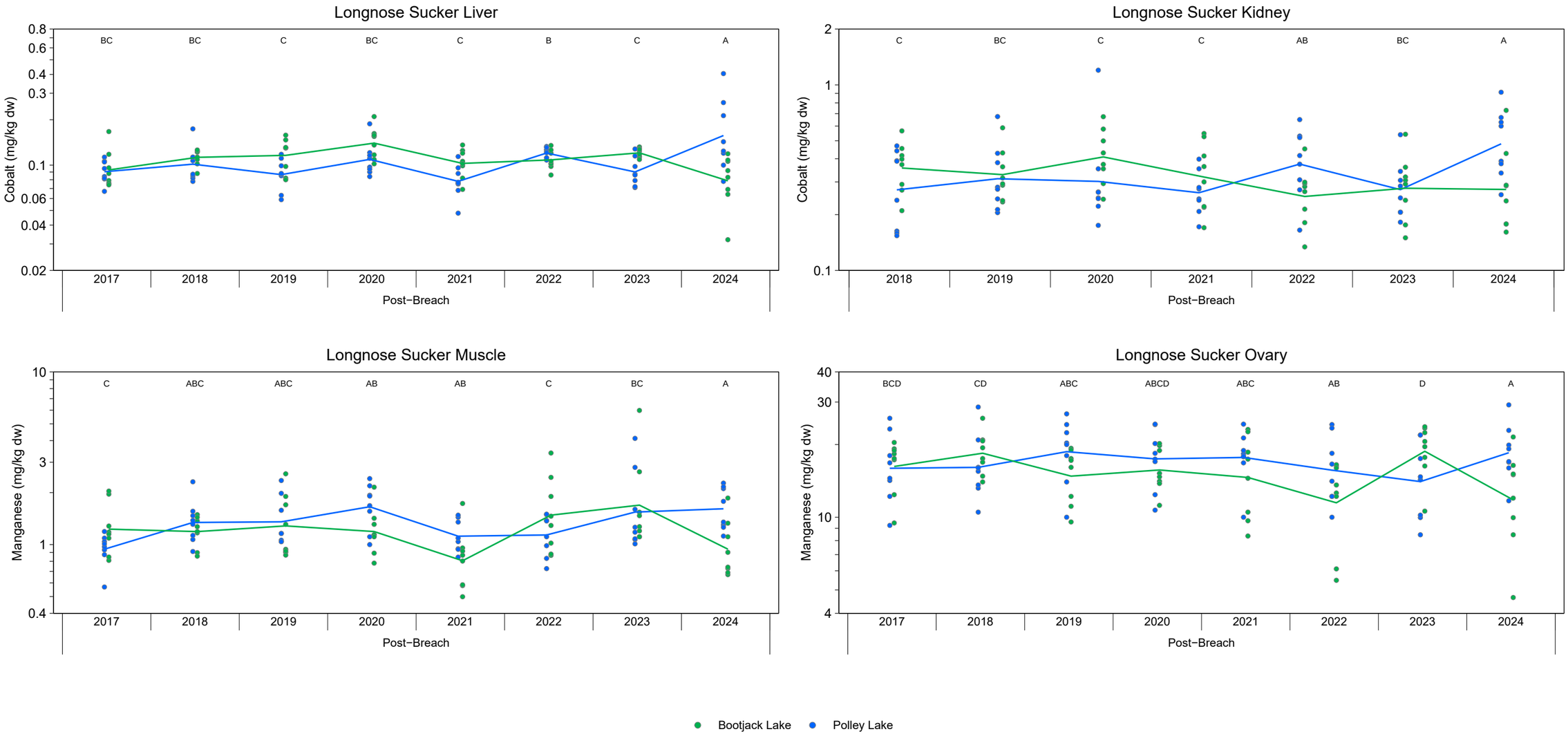

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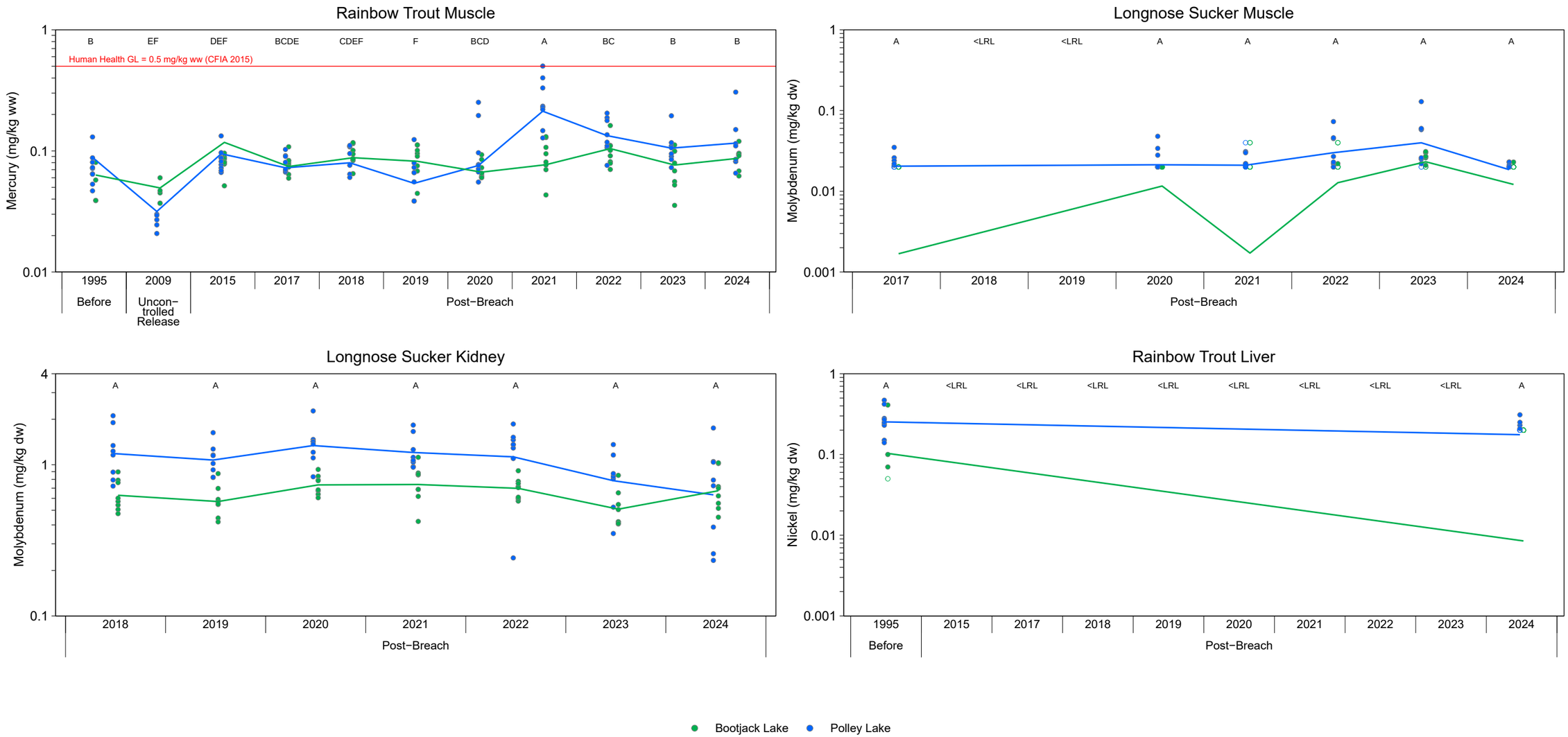

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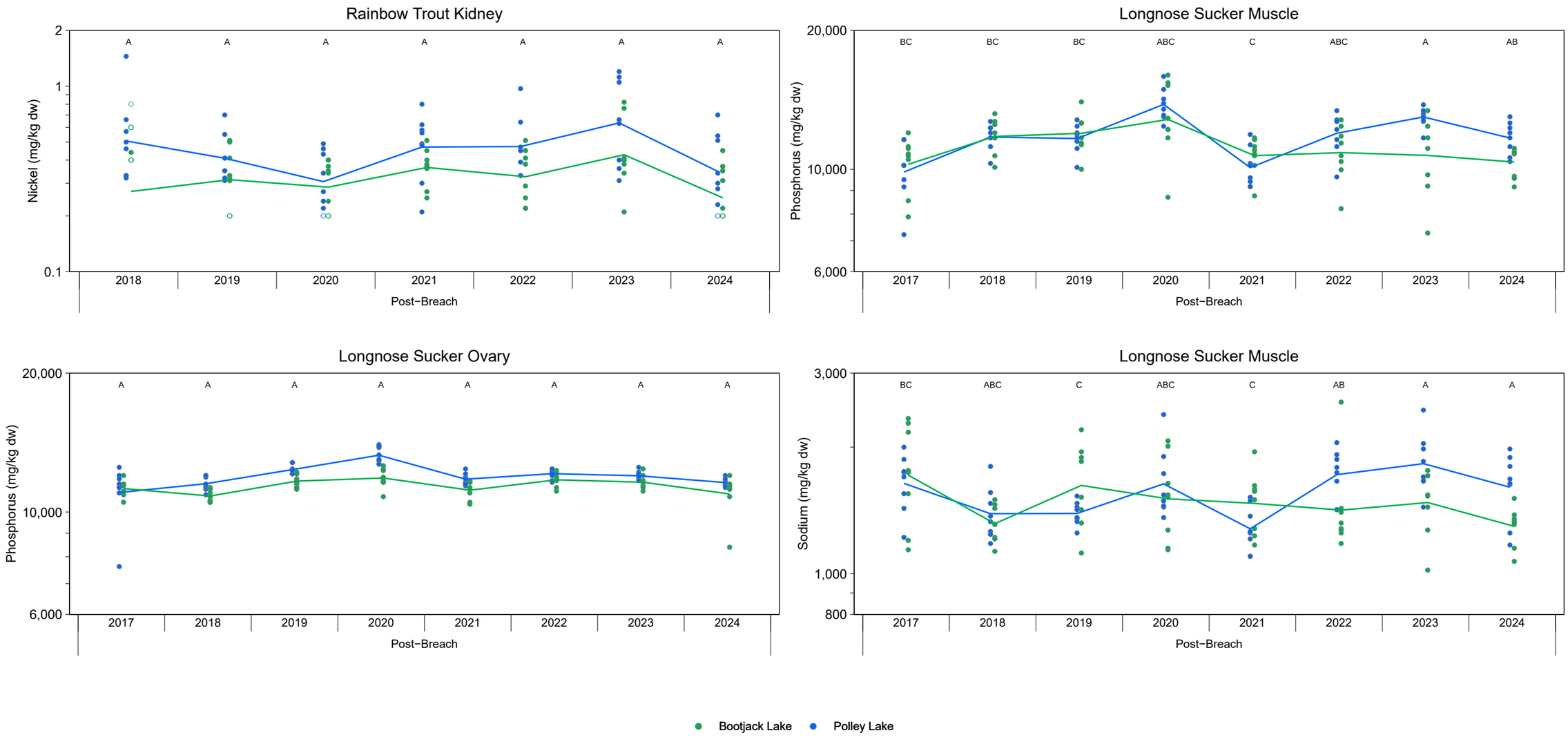

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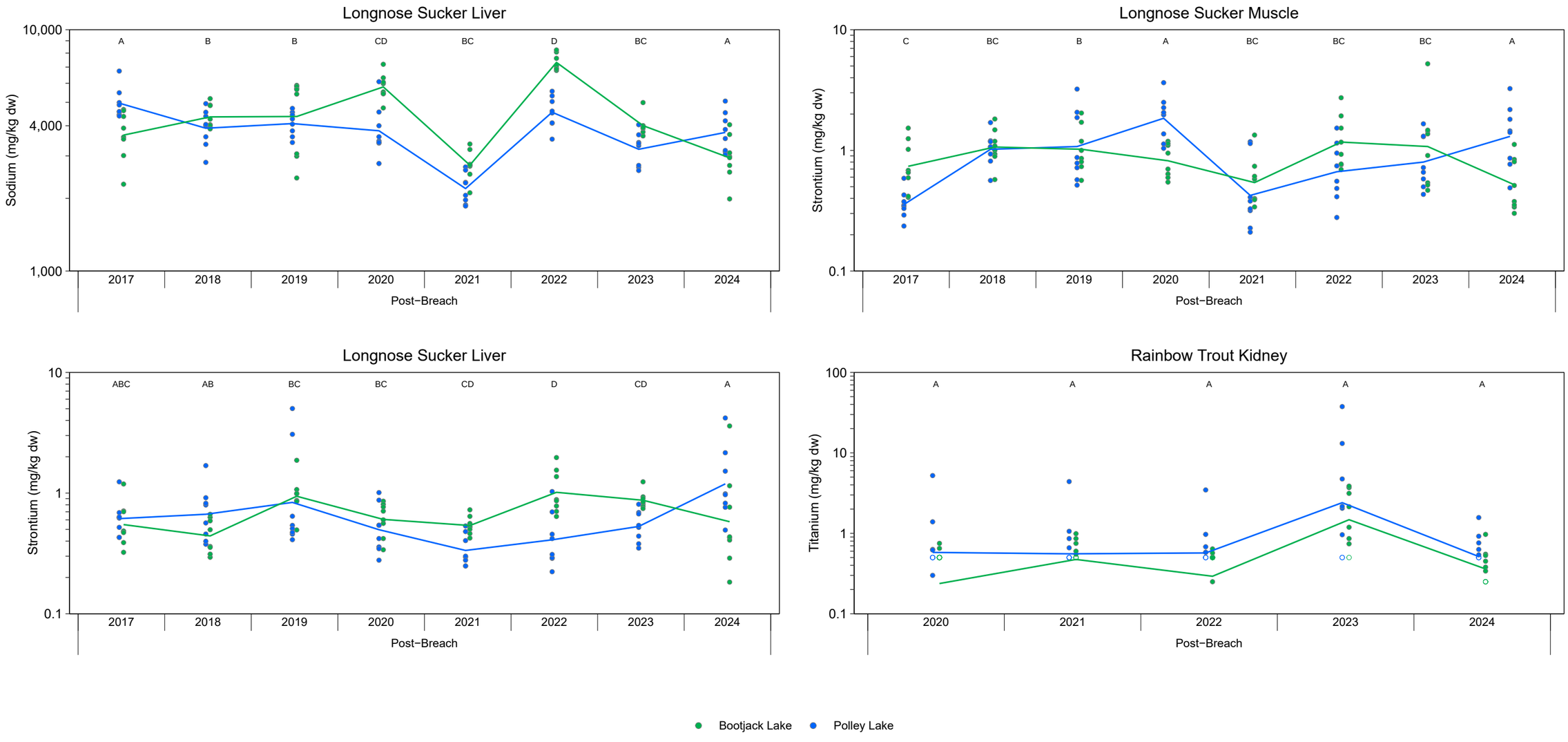

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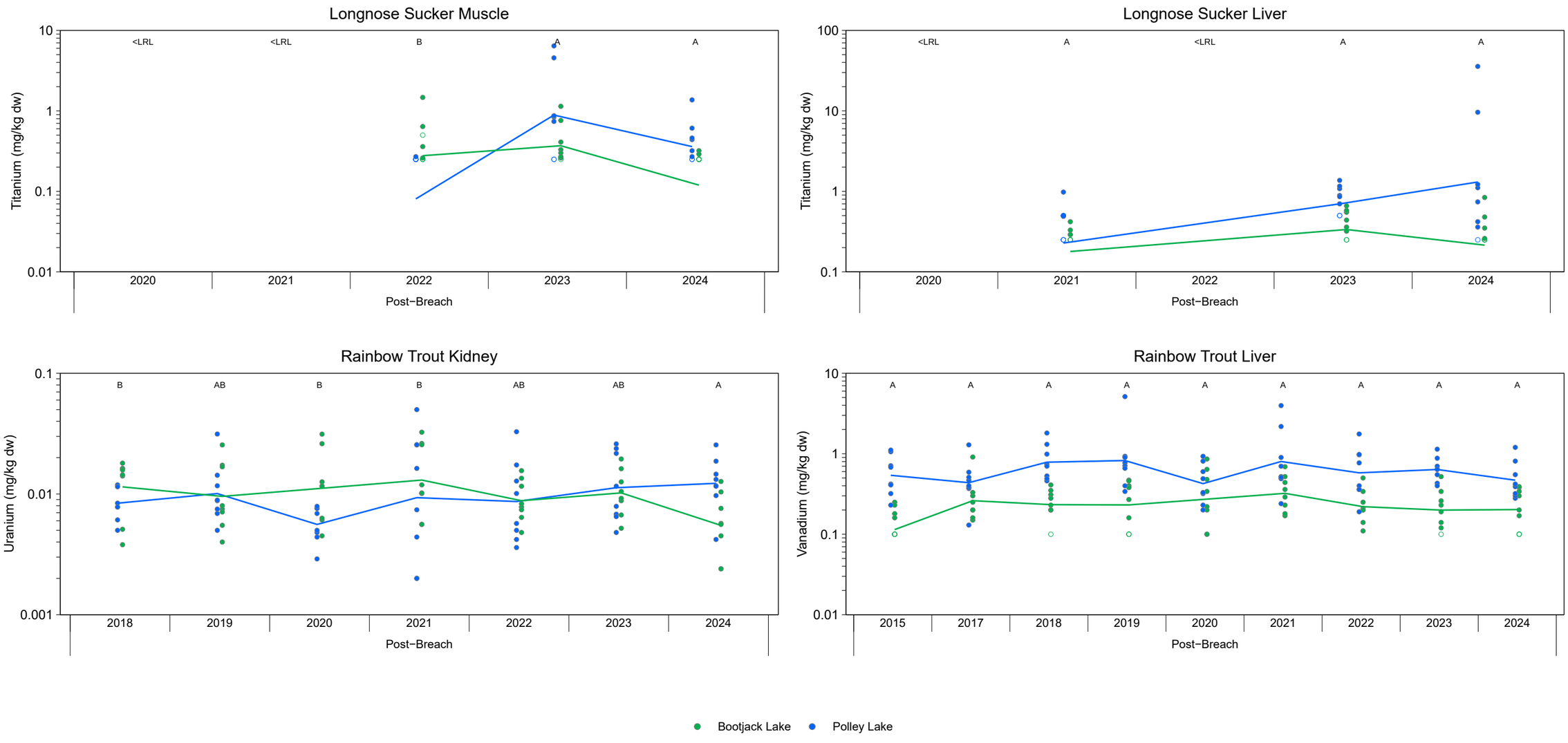

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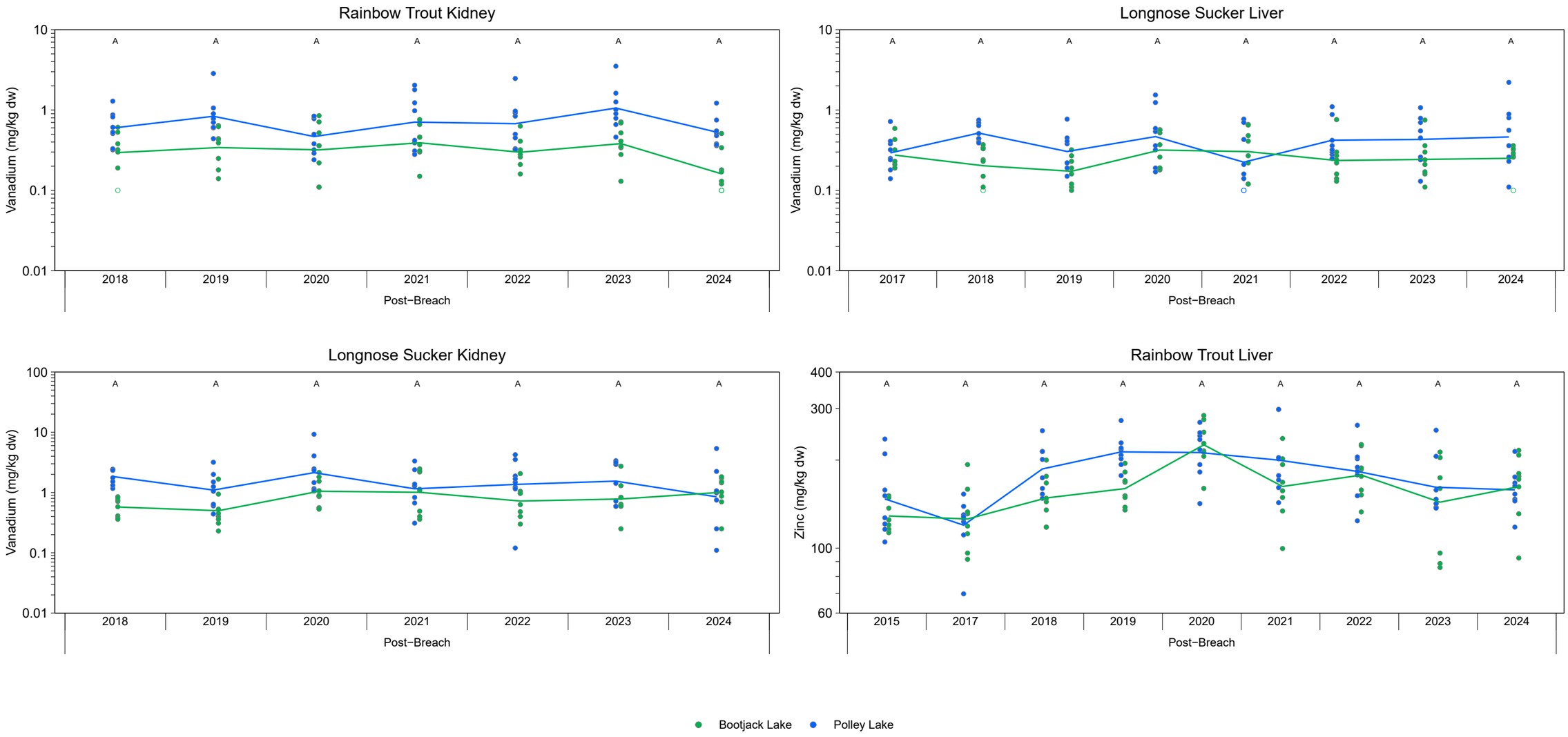

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Notes: GL = guideline, mg/kg = milligrams per kilogram, ww = weight weight, dw = dry weight, CFIA = Canadian Food Inspection Agency. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant). Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors *Area* and *Year* . The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

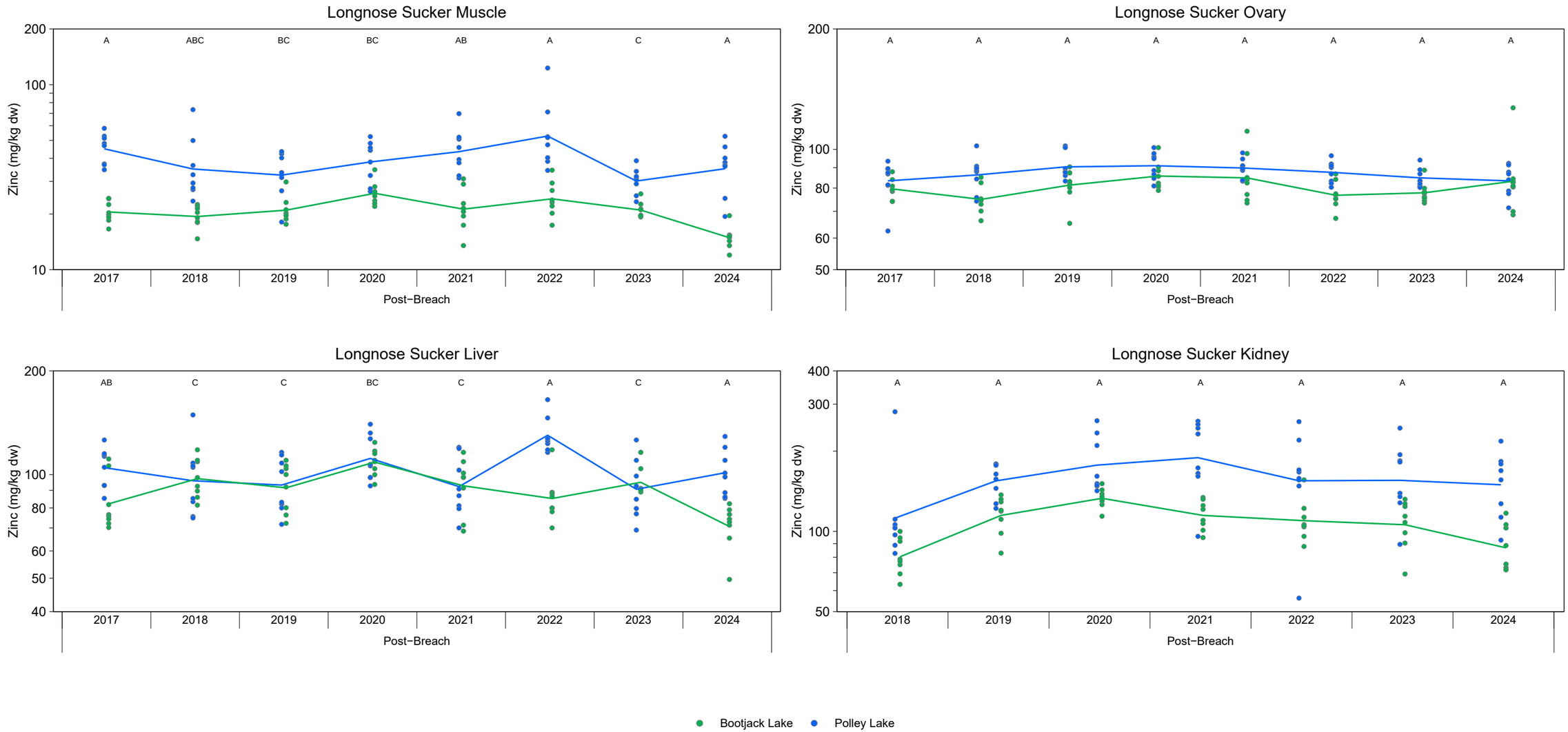

Figure 5.14: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: GL = guideline, mg/kg = milligrams per kilogram, ww = weight weight, dw = dry weight, CFIA = Canadian Food Inspection Agency. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant). Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors *Area* and *Year* . The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

Appendix Table E.6.4). For muscle and ovary tissues, the relative differences of selenium concentrations in 2024 were significantly lower than several consecutive prior years (2017 to 2021 for muscle, 2015 to 2019 for ovary) and were similar to the remaining post-breach years. Selenium concentrations in 2024 were similar to pre-breach (2012) results in the case of ovary tissue, and significantly lower than pre-breach (2012) results in the case of muscle tissue, relative to reference (Figure 5.13, Table 5.12; Appendix Tables E.6.1, E.6.3). The relative differences in selenium concentrations have remained unchanged (i.e., temporally stable) for rainbow trout kidney since 2018 (Figure 5.13, Table 5.12; Appendix Table E.6.8). Tissue selenium concentrations in exposed longnose sucker have been consistently higher than reference in each year since the breach (26% to 389% across tissue types), except for kidney tissue in 2024 (Table 5.12). Similar to the results for rainbow trout tissues, there is evidence of decreases in the relative differences of selenium concentrations in longnose sucker tissues over time. For instance, selenium concentrations in exposed longnose sucker kidney tissue in 2024 were similar to reference for the first time since monitoring began and were significantly lower than the majority of prior post-breach years (2018 to 2020 and 2022), relative to reference (Table 5.12; Appendix Table E.6.7). The relative difference of selenium concentrations in muscle, ovary, and liver tissues in 2024 were similar to or lower than in prior post-breach years, and significantly lower than the post-release period (2012, where data exist; Table 5.12, Appendix Tables E.6.2, E.6.5 to E.6.6). In the case of longnose sucker muscle tissue, the relative difference of selenium concentrations in 2024 was significantly higher than baseline (1995) only, and has been temporally stable for at least the last four years (2021 to 2024; Figure 5.13, Table 5.12; Appendix Table E.6.2).

Concentrations of the primary analytes arsenic, copper, and iron were significantly higher in most rainbow trout tissues (muscle, ovary, liver, and kidney) from Polley Lake compared to Bootjack Lake in 2024 (or in all monitoring years if the *Area×Year* interaction was not significant), with the exception of copper in muscle and liver, and iron in muscle and ovary tissues (Figure 5.13, Table 5.12; Appendix Tables E.6.1, E.6.3, E.6.4, E.6.8). These exceptions were excluded from further discussion. Of the exposed rainbow trout tissues with significantly higher arsenic, copper, and iron concentrations compared to reference, the relative differences for these have been unchanged since the initiation of monitoring (i.e., temporally stable) in most cases, with two exceptions: arsenic in ovary and liver tissues (Figure 5.13, Table 5.12; Appendix Tables E.6.1, E.6.3, E.6.4, E.6.8). Specifically, the relative difference of arsenic in ovary has been temporally stable from 2020 to 2024, and in liver has been temporally stable and similar to baseline (i.e., 1995) from 2021 to 2024 (Figure 5.13). As such, arsenic, copper, and iron concentrations in rainbow trout tissues from Polley Lake have not increased relative to reference since 2021 (i.e., over the last four years) at minimum.

In longnose sucker tissues, concentrations of arsenic in muscle, liver, and kidney, and concentrations of copper and iron in liver were the only analytes that were significantly higher in Polley Lake relative to Bootjack Lake in 2024 (or in all monitoring years if the *Area×Year* interaction was not significant; Figure 5.13, Table 5.12). Therefore, the discussion below is focused on the results for these five tissue-analyte combinations. The relative differences for arsenic concentrations in kidney tissue have been unchanged since initiation of monitoring in 2018 (i.e., temporally stable), and in liver and muscle tissue have been similar to baseline (i.e., 1995) throughout post-breach monitoring (2017 to 2024; Figure 5.13, Table 5.12; Appendix Tables E.6.2, E.6.5 to E.6.7). Similarly, the relative differences for copper concentrations in liver tissue have been similar to baseline (i.e., 1995) in most years, except 2022 which was significantly higher than baseline (Figure 5.13, Table 5.12; Appendix Table E.6.6). The relative differences for iron concentrations in longnose sucker liver were significantly higher in 2024 than all previous years, which may be attributable in part to a decrease at the reference area (Bootjack Lake) in 2024 (Figure 5.13, Table 5.12; Appendix Table E.6.6). Similar increases in iron concentrations in 2024 were not observed in other exposed longnose sucker tissues (muscle, ovary, kidney) nor in exposed rainbow trout tissues, relative to reference, and the increase is isolated to a single year (i.e., 2024 only; Figure 5.13, Table 5.12; Appendix Tables E.6.1 to E.6.8). As such, arsenic, and copper concentrations in exposed longnose sucker tissues, compared to reference, have not increased relative to the first year of monitoring, but there is limited evidence of a potential increase in iron concentrations in exposed liver tissues in 2024.

The concentrations of 15 secondary analytes (i.e., barium, cadmium, calcium, cobalt, manganese, mercury (ww), molybdenum, nickel, phosphorous, sodium, strontium, titanium, uranium, vanadium, and zinc) had significant *Area×Year* interaction terms for at least one tissue type in rainbow trout and/or longnose sucker and had analyte concentrations in Polley Lake fish that were significantly higher than in Bootjack Lake fish in 2024 (i.e., positive relative [exposed-reference] difference) or in all monitoring years (if the *Area×Year* interaction was not significant; Figure 5.14, Table 5.12; Appendix Tables E.6.1 to E.6.8). For most of the analyte-tissue combinations identified for these 15 secondary analytes, the relative differences were either temporally stable (i.e., the *Area×Year* interaction was not significant) or the exposed tissue analyte concentrations in 2024 were higher than reference in only one tissue type in within each species (i.e., barium, cadmium, mercury [ww], and uranium), indicating no sustained increase in secondary analyte concentrations in the exposed fish tissues over time. For simplicity, only those secondary analyte-tissue combinations with a significant positive relative difference in 2024 or in all years (if the *Area×Year* interaction was not significant) in more than one tissue type

within a species are discussed further (i.e., barium, cadmium, mercury [ww], and uranium were not discussed further).

Tissues of longnose sucker had secondary analyte concentrations that met the criteria for further discussion (i.e., having a significant positive relative difference in 2024 or in all years) most often (calcium, cobalt, manganese, molybdenum, phosphorus, sodium, strontium, titanium, vanadium, and zinc). Tissues of rainbow trout had concentrations of secondary analytes that met the criteria for further discussion less often (cobalt, nickel, titanium, vanadium, and zinc). Of these, concentrations of four secondary analytes (cobalt, titanium, vanadium, and zinc) met the criteria for further discussion in tissues of both longnose sucker and rainbow trout (Table 5.12). The discussion below is structured to focus on those secondary analytes in: 1) longnose sucker tissues only, 2) rainbow trout tissues only, and 3) both rainbow trout and longnose sucker tissues, that met the criteria for further discussion.

In longnose sucker tissues only, concentrations of six secondary analytes (calcium, manganese, molybdenum, phosphorus, sodium, and strontium) were significantly higher than reference in two or more tissues in 2024 (or all years; Table 5.12). For most of these secondary analyte-tissue combinations, the relative difference in analyte concentrations has either been stable since the initiation of monitoring or was similar in 2024 to the first year of monitoring (i.e., no consistent temporal increase) with few exceptions (Figure 5.14, Table 5.12; Appendix Tables E.6.2, E.6.5 to E.6.7). Those secondary analyte-tissue combinations that were exceptions are evaluated here in more detail. Specifically, calcium, manganese, sodium, and strontium concentrations in exposed longnose sucker muscle were significantly higher than reference in 2024, but the relative difference was the same as in 2018 (for manganese and sodium) or the same as in 2020 (for calcium and strontium). Similarly, manganese concentrations in exposed ovary tissue from longnose sucker were significantly higher than reference in 2024, but the difference was the same as in 2019 (Figure 5.14, Table 5.12; Appendix Tables E.6.2, E.6.5 to E.6.7). Combined, these results indicate concentrations of these six secondary analytes evaluated in longnose sucker tissues (calcium, manganese, molybdenum, phosphorus, sodium, and strontium) have been either temporally stable or have not increased consistently over at least the last five years (i.e., since at least 2020).

In rainbow trout tissues only, nickel was the only secondary analyte with concentrations in exposed tissues (liver and kidney) that were significantly higher than reference in 2024 (for liver) or in all years (for kidney). The relative difference of nickel concentrations in these two rainbow trout tissues has been stable since the initiation of monitoring (where detectable; Figure 5.14, Table 5.12; Appendix Tables E.6.6 and E.6.7).

In both rainbow trout and longnose sucker tissues, concentrations of four secondary analytes (cobalt, titanium, vanadium, and zinc) were significantly higher than reference in two or more tissues in 2024 (or all years; Table 5.12). For most of these secondary analyte-tissue combinations, the relative difference in analyte concentrations has been stable since the initiation of monitoring except for six analyte-tissue combinations, as detailed below (Figure 5.14, Table 5.12; Appendix Tables E.6.2, E.6.5 to E.6.7). In exposed longnose sucker, cobalt concentrations in ovary and zinc concentrations in muscle and liver were significantly higher than reference, but the relative difference was the same as in the first year of monitoring (Figure 5.14, Table 5.12). The relative difference of titanium concentrations in longnose sucker muscle was significantly higher in 2023 and 2024 compared to prior years, but this was related (at least in part) to a decrease in titanium concentrations in reference tissues (Figure 5.14, Table 5.12). Finally, cobalt concentrations in exposed longnose sucker liver and kidney tissues in 2024 were significantly higher than in all prior years, relative to reference, increasing from similar to or significantly lower than reference in most prior years to significantly higher than reference in 2024 (Figure 5.14, Table 5.12). Combined, these results indicate that of the four secondary analytes evaluated in both rainbow trout and longnose sucker tissues (cobalt, titanium, vanadium, and zinc), only cobalt in longnose sucker liver and kidney was significantly higher in 2024 relative to all prior years.

5.2 Quesnel Lake

5.2.1 Sediment Quality

Sediment quality monitoring in 2024 was completed at two deep exposed areas (QUL-PNF and QUL-PFF1) and one shallow exposed area (QUL-LNF1) exposed area of Quesnel Lake. An unimpacted deep area (QUL-PREF1) served as a reference for the deep exposed areas while an unimpacted shallow area (QUL-LREF1) served as reference for the corresponding shallow exposed area (Figure 3.2, Table 3.2). Prior sediment quality monitoring within the 2022 to 2024 period included annual monitoring of the deep near-field (QUL-PNF) and shallow near-field (QUL-LNF1) and reference (QUL-LREF1) areas (Figure 3.2, Table 3.2).

Sediments were also collected at three deep monitoring areas in Quesnel Lake in 2024 as part of EEM (Phase 4) under the MDMER of the federal *Fisheries Act*. The EEM program included one exposed (QUL-EEMEXP) and two reference areas (QUL-EEMREF1 [non-breach-influenced], and QUL-EEMREF2 [breach-influenced]), with five monitoring stations per area (Figure 3.2; Table 3.2). Results for the Phase 4 EEM are due in a separate report in October 2025 and are therefore not included in the present report. Sediment quality monitoring in support of the Phase 3 of EEM monitoring was previously completed in 2021 (Table 3.2).

A review of the 2024 sediment quality results (Appendix B) indicated that the data met the established DQOs and can be used with a high level of confidence for interpretation (see Section 5.1.1 for details). A review of 2024 supporting water data quality indicated these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

5.2.1.1 Deep Areas

Sediments collected in 2024 from the exposed deep near-field area (QUL-PNF) of Quesnel Lake were composed primarily of silt and clay particles (mean = 48.6% and 46.5%, respectively; Table 5.13; Appendix Table C.2.8). This texture was similar to the predominantly fine-grained texture of sediments from this area in previous years (2014 to 2023), except for 2022 when sediments had the highest sand content (mean = 10.2%) among years (Table 5.13). The sediment collected from the deep far-field area of Quesnel Lake (QUL-PFF1) was also composed primarily of silt and clay in 2024 (mean = 50.0% and 49.7%, respectively), although the clay content in 2024 was higher than most previous years and only lower than 2021 (62.6%; Table 5.13; Appendix Table C.2.8). As observed in previous monitoring years, sediments from the deep reference station (QUL-PREF1) in 2024 were composed primarily of silt and sand (mean of 69.4% and 19.1%, respectively) and had considerably higher sand content than the exposed QUL-PNF and QUL-PFF1 sediments (mean = 4.90% and <1.0%, respectively; Table 5.13; Appendix Tables C.2.7 and C.2.8).

Despite a steady increase in the TOC content of QUL-PNF and QUL-PFF1 sediments (mean = 0.635% and 0.425%, respectively), the TOC content in 2024 of these sediments remained significantly lower than reference in 2024 (mean = 1.75%; Table 5.13; Appendix Tables C.2.7 and C.2.8, Appendix Table E.1.7). Temporally, the relative (exposed-reference) difference of TOC in 2024 was significantly higher than most prior years but was similar to 2019 at QUL-PFF1 and similar to 2014 at QUL-PNF (Figure 5.15; Appendix Table E.1.6). When considered separately from reference results, the TOC content of sediments from QUL-PFF1 has not changed significantly since 2014 (i.e., temporally stable from 2014 to 2024), and the TOC content of QUL-PNF sediments was significantly higher in 2024 than 2014 (and similar to other prior years; Appendix Table E.1.7). This indicates variability in the TOC content of reference sediments is partly driving the observed temporal relative differences in sediment TOC content. Combined, the TOC results indicate a steady increase in the TOC content of exposed sediments, that is statistically significant at QUL-PNF, but not significant at QUL-PFF1, relative to immediate post-breach conditions (i.e., 2014). Total nitrogen content of sediments from QUL-PNF and QUL-PFF1 in 2024 (mean = 0.0850% and 0.0646%, respectively) were higher than most previous years, except for 2023 at QUL-PNF, but remained lower than those reported

Table 5.13: **Summary of Sediment Quality Data for Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024**

Analyte	Units	BC Working Sediment Quality Guidelines [a]		Reference 95th Percentile[b]	Reference QUL-PREF1													
					2014		2015		2016		2018		2019		2021		2024	
		Lower	Upper	QUL-PREF1 (2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																		
Moisture	%	-	-	62.2	51.8	2.56	53.4	0.802	55.0	0.828	58.6	4.72	56.1	1.39	53.7	1.45	54.6	1.29
pH (1:2 soil:water)	pH	-	-	6.35	6.90	0.0744	7.02	0.335	6.52	0.0251	6.78	0.0661	6.48	0.0251	6.50	0.0917	6.38	0.0619
Particle Size																		
% Gravel (>2 mm)	%	-	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	23.5	7.23	19.5	5.54	19.8	6.90	15.1	1.67	13.4	3.82	20.1	1.77	19.1	3.19
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	67.4	7.24	69.8	4.79	69.3	6.17	75.7	1.39	77.5	3.59	68.7	1.87	69.4	3.23
% Clay (<4 µm)	%	-	-	12.1	9.08	1.17	10.7	1.11	10.9	1.44	9.14	0.434	9.06	0.297	11.2	0.647	11.5	0.432
Organic / Inorganic Carbon (<63 µm)																		
Total Organic Carbon	%	-	-	2.22	1.68	0.0449	1.82	0.144	1.92	0.153	2.12	0.134	1.80	0.191	2.10	0.0546	1.75	0.0472
Nutrients (Bulk sediment)																		
Total Nitrogen by LECO	%	-	-	0.182	0.140	0.00829	0.170	0.0120	0.158	0.0110	0.177	0.0105	0.161	0.0129	0.154	0.0143	0.170	0.00631
Metals, Metalloids, and Non-Metals (<63 µm)																		
Aluminum	mg/kg dw	-	-	19,000	14,780	760	16,567	945	16,060	871	14,880	687	15,900	453	16,480	722	18,660	1,106
Antimony	mg/kg dw	-	-	0.470	0.416	0.0182	0.437	0.0306	0.436	0.0219	0.394	0.00894	0.406	0.00894	0.446	0.0134	0.424	0.0207
Arsenic	mg/kg dw	5.9	17	9.89	7.75	0.690	8.88	0.209	9.58	0.982	7.96	0.514	7.90	0.475	9.02	0.713	9.08	0.597
Barium	mg/kg dw	-	-	172	144	6.50	147	4.00	163	12.0	145	7.89	159	3.35	157	8.53	169	5.50
Beryllium	mg/kg dw	-	-	0.540	0.412	0.0228	0.490	0.0361	0.456	0.0195	0.452	0.00837	0.466	0.0114	0.456	0.0329	0.520	0.0274
Bismuth	mg/kg dw	-	-	0.170	0.140	0.00707	0.157	0.0115	0.154	0.00548	0.142	0.00447	0.144	0.00548	0.128	0.00837	0.160	0.00707
Boron	mg/kg dw	-	-	<5	<10	-	<10	-	<10	-	<10	-	<10	-	<5	-	<5	-
Cadmium	mg/kg dw	0.6	3.5	0.475	0.384	0.0289	0.420	0.0555	0.445	0.0374	0.420	0.0203	0.414	0.0253	0.402	0.0219	0.416	0.0149
Calcium	mg/kg dw	-	-	9,480	7,742	296	8,747	114	7,900	251	7,800	176	7,370	141	8,014	342	9,140	412
Chromium	mg/kg dw	37.3	90	61.9	52.0	3.21	57.7	3.59	56.7	3.83	53.7	1.53	54.3	1.55	56.3	1.19	60.4	1.92
Cobalt	mg/kg dw	-	-	15.2	13.3	0.658	14.5	0.987	14.6	0.901	13.4	0.297	13.7	0.283	14.0	0.427	14.7	0.430
Copper	mg/kg dw	35.7	197	59.4	42.2	3.34	55.1	4.74	56.1	5.24	46.2	2.10	49.0	1.28	45.3	2.98	47.1	1.62
Iron	mg/kg dw	21,200	43,766	34,100	28,580	1,341	31,300	2,088	30,420	1,244	28,700	612	30,040	871	30,460	537	33,640	981
Lead	mg/kg dw	35	91.3	8.06	7.00	0.235	7.65	0.357	7.65	0.423	6.63	0.228	7.09	0.191	6.58	0.161	7.75	0.194
Lithium	mg/kg dw	-	-	16.1	13.1	0.518	14.4	1.59	13.5	0.598	13.4	0.268	14.4	0.329	14.3	0.783	15.7	0.667
Magnesium	mg/kg dw	-	-	9,030	7,666	382	8,150	678	8,082	454	7,402	205	7,972	229	8,172	234	8,956	245
Manganese	mg/kg dw	460	1,100	572	470	31.8	491	22.0	470	17.7	418	20.1	413	18.6	471	61.8	510	44.1
Mercury	mg/kg dw	0.17	0.486	0.0627	0.0486	0.00240	0.0579	0.00576	0.0551	0.00239	0.0546	0.00235	0.0472	0.00130	0.0578	0.0224	0.0528	0.00580
Molybdenum	mg/kg dw	25	23,000	1.11	0.910	0.0458	1.08	0.107	1.01	0.0636	0.916	0.0780	0.964	0.0723	1.02	0.0522	1.01	0.0808
Nickel	mg/kg dw	16	75	42.0	35.6	2.07	39.1	2.68	39.4	2.76	35.8	0.934	37.1	1.11	38.1	0.940	40.4	1.20
Phosphorus	mg/kg dw	-	-	1,400	1,094	32.9	1,180	26.5	1,314	76.7	1,236	62.7	1,274	55.9	1,356	65.0	1,318	46.0
Potassium	mg/kg dw	-	-	1,710	1,312	70.9	1,517	75.7	1,492	87.0	1,282	23.9	1,270	20.0	1,390	79.7	1,642	116
Selenium	mg/kg dw	2	-	1.34	0.860	0.0731	0.970	0.115	0.968	0.0572	0.946	0.0924	0.940	0.0381	1.25	0.132	1.28	0.0482
Silver	mg/kg dw	0.5	-	0.238	0.188	0.0136	0.214	0.0245	0.223	0.0136	0.195	0.00950	0.214	0.00557	0.204	0.0157	0.207	0.0120
Sodium	mg/kg dw	-	-	541	396	23.0	497	25.2	436	27.0	370	19.6	384	8.92	442	31.3	517	36.6
Strontium	mg/kg dw	-	-	90.0	74.6	3.17	85.1	3.49	79.3	2.87	74.1	0.630	76.8	2.36	84.6	3.82	86.8	4.21
Sulphur[c]	mg/kg dw	-	-	1,400	-	-	1,167	321	1,180	192	1,040	152	1,280	148	866	79.6	1,170	104
Thallium	mg/kg dw	-	-	0.187	0.157	0.00860	0.174	0.0182	0.166	0.00635	0.146	0.00207	0.152	0.00444	0.148	0.00684	0.178	0.0104
Tin	mg/kg dw	-	-	0.510	0.408	0.0536	0.453	0.0404	0.466	0.111	0.402	0.0642	0.390	0.0141	0.468	0.0259	0.338	0.0239
Titanium	mg/kg dw	-	-	1,190	1,036	47.0	1,130	79.4	1,049	56.4	925	62.8	956	38.0	989	67.8	1,126	96.9
Uranium	mg/kg dw	-	-	1.60	1.30	0.0510	1.46	0.0945	1.44	0.0630	1.28	0.0365	1.39	0.0152	1.29	0.0483	1.58	0.0828
Vanadium	mg/kg dw	-	-	73.0	62.2	3.56	70.1	4.49	67.9	3.74	61.5	1.59	63.0	1.37	65.1	2.20	70.9	2.72
Zinc	mg/kg dw	123	315	85.1	73.7	2.95	79.8	7.18	80.4	7.30	74.3	2.37	80.5	3.60	80.1	3.23	80.4	2.35
Zirconium	mg/kg dw	-	-	4.80	-	-	-	-	-	-	-	-	-	-	3.90	0.224	4.58	0.179

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates exposed value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th and 5th percentile values see Appendix Table C.2.6.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 5.13: Summary of Sediment Quality Data for Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	Exposed QUL-PNF																	
					2014		2015		2016		2018		2019		2020		2021		2022		2023		2024	
		Lower	Upper	QUL-PREF1 (2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																								
Moisture	%	-	-	62.2	37.7	7.38	49.2	16.7	61	2.31	58.5	5.00	59.9	7.86	57.5	4.73	57.7	2.73	58.9	5.44	61.6	3.74	59.5	4.26
pH (1:2 soil:water)	pH	-	-	6.35	8.51	0.0900	8.45	0.123	8.43	0.0471	8.25	0.141	8.46	0.0730	8.10	0.0688	8.11	0.186	8.10	0.0913	8.32	0.111	8.05	0.103
Particle Size																								
% Gravel (>2 mm)	%	-	-	<0.1	0.102	-	<0.1	-	<0.1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	7.75	12.6	7.00	11.9	1.75	1.39	7.28	9.72	3.44	2.71	4.66	3.41	5.36	2.48	10.2	8.04	5.60	2.95	4.90	2.68
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	69.6	10.8	57.5	14.6	47.1	4.02	52.5	5.09	50.9	3.65	54.8	10.3	51.8	4.31	46.0	3.12	48.9	3.44	48.6	1.69
% Clay (<4 µm)	%	-	-	12.1	***22.6***	11.9	***35.5***	19.4	***51.1***	4.89	***40.4***	13.0	***45.7***	5.60	***40.6***	10.3	***42.9***	4.95	***43.8***	6.46	***45.5***	4.38	***46.5***	2.10
Organic / Inorganic Carbon (<63 µm)																								
Total Organic Carbon	%	-	-	2.22	0.166	0.0619	0.294	0.158	0.346	0.0844	0.568	0.495	0.518	0.120	0.507	0.0836	0.567	0.186	0.614	0.111	0.743	0.142	0.635	0.162
Nutrients (Bulk sediment)																								
Total Nitrogen by LECO	%	-	-	0.182	0.0228	0.00566	0.0434	0.0163	0.0388	0.00606	0.0630	0.0345	0.0470	0.00927	0.0742	0.0106	0.0580	0.0215	0.0786	0.0174	0.114	0.0151	0.0850	0.0192
Metals, Metalloids, and Non-Metals (<63 µm)																								
Aluminum	mg/kg dw	-	-	19,000	***20,800***	3,949	***26,520***	8,065	***35,340***	1,341	***31,060***	3,112	***32,680***	4,954	***27,020***	2,500	***28,700***	2,482	***30,560***	2,315	***29,600***	2,024	***31,020***	1,188
Antimony	mg/kg dw	-	-	0.470	***0.516***	0.0688	***0.554***	0.0907	***0.628***	0.0179	***0.542***	0.0402	***0.650***	0.0735	***0.560***	0.0579	***0.642***	0.0363	***0.506***	0.0134	***0.516***	0.0182	***0.536***	0.0365
Arsenic	mg/kg dw	5.9	17	9.89	***15.4***	2.01	***15.4***	1.53	***18.5***	0.652	***15.4***	1.45	***16.5***	1.17	***14.9***	0.526	***15.7***	0.887	***15.6***	0.469	***15.1***	1.16	***15.4***	0.207
Barium	mg/kg dw	-	-	172	***225***	35.8	***255***	58.0	***361***	12.9	***296***	44.3	***357***	35.5	***294***	22.8	***274***	24.7	***271***	16.8	***293***	11.7	***290***	7.77
Beryllium	mg/kg dw	-	-	0.540	***0.790***	0.161	***0.960***	0.253	***1.12***	0.0492	***0.990***	0.110	***1.11***	0.134	***0.936***	0.104	***0.946***	0.0594	***1.00***	0.0802	***0.860***	0.0652	***1.01***	0.0432
Bismuth	mg/kg dw	-	-	0.170	0.104	-	0.134	0.0155	0.158	0.00837	0.150	0.0158	0.156	0.0207	***0.174***	0.0313	0.146	0.0182	0.158	0.00837	0.156	0.00894	***0.186***	0.0134
Boron	mg/kg dw	-	-	<5	10.6	0.566	11.4	0.490	11.8	0.447	11.0	0.462	11.8	1.30	10.4	0.577	10.3	0.541	10.3	0.873	9.48	0.672	10.7	0.550
Cadmium	mg/kg dw	0.6	3.5	0.475	0.164	0.0271	0.197	0.0446	0.263	0.0141	0.238	0.0186	0.259	0.0349	0.221	0.0203	0.226	0.0274	0.246	0.00453	0.245	0.00988	0.250	0.0190
Calcium	mg/kg dw	-	-	9,480	***33,340***	4,053	***31,160***	2,792	***31,840***	1,036	***24,360***	5,178	***28,360***	2,405	***20,400***	3,310	***23,220***	3,869	***22,040***	2,318	***19,020***	2,404	***20,520***	2,415
Chromium	mg/kg dw	37.3	90	61.9	14.3	3.02	20.9	4.27	23.9	1.42	30.6	6.70	26.3	3.61	28.0	5.08	27.9	4.59	29.4	1.87	28.9	2.15	32.5	2.83
Cobalt	mg/kg dw	-	-	15.2	***19.4***	2.90	***25.5***	8.57	***34.6***	1.69	***26.8***	3.26	***30.1***	5.79	***22.3***	2.14	***23.8***	2.95	***25.8***	1.86	***23.4***	1.96	***25.3***	1.47
Copper	mg/kg dw	35.7	197	59.4	***714***	111	***859***	304	***1,210***	54.3	***846***	185	***1,059***	201	***784***	81.9	***806***	113	***835***	80.2	***774***	86.1	***814***	71.7
Iron	mg/kg dw	21,200	43,766	34,100	***37,240***	17,475	***40,620***	5,418	***38,620***	1,117	***40,860***	3,004	***41,220***	2,678	***39,260***	6,523	***38,780***	4,713	***45,100***	3,421	***42,060***	3,606	***42,820***	1,062
Lead	mg/kg dw	35	91.3	8.06	7.09	1.46	***9.90***	2.98	***12.6***	0.436	***11.3***	1.48	***12.1***	1.56	***12.3***	2.20	***11.1***	1.45	***12.0***	0.548	***11.2***	0.594	***13.5***	0.929
Lithium	mg/kg dw	-	-	16.1	***20.5***	4.21	***29.8***	10.9	***36.6***	2.59	***30.0***	3.76	***35.5***	6.70	***27.9***	2.95	***29.5***	3.96	***30.1***	2.44	***28.2***	2.64	***31.7***	1.93
Magnesium	mg/kg dw	-	-	9,030	***12,958***	2,560	***17,320***	6,916	***24,740***	1,488	***18,920***	2,943	***21,580***	4,593	***15,300***	1,744	***16,920***	2,756	***18,180***	1,933	***18,040***	2,179	***17,360***	1,379
Manganese	mg/kg dw	460	1,100	572	***797***	119	***1,033***	265	***1,348***	71.6	***1,290***	179	***1,358***	195	***1,344***	165	***1,398***	283	***1,292***	82.3	***1,392***	123	***1,414***	144
Mercury	mg/kg dw	0.17	0.486	0.0627	***0.0697***	0.00747	***0.0954***	0.0192	***0.101***	0.00610	-	-	***0.0983***	0.0107	***0.0896***	0.00735	***0.0909***	0.0117	***0.0990***	0.00402	***0.0907***	0.00554	***0.104***	0.00750
Molybdenum	mg/kg dw	25	23,000	1.11	***3.76***	0.270	***4.05***	0.718	***4.44***	0.154	***3.60***	0.681	***4.38***	0.559	***3.48***	0.216	***3.56***	0.307	***3.41***	0.214	***3.17***	0.412	***3.50***	0.166
Nickel	mg/kg dw	16	75	42.0	12.9	2.26	20.2	5.51	25.7	1.62	26.8	3.77	25.5	3.78	25.9	4.29	25.1	3.98	27.3	1.64	26.5	1.67	30.1	2.58
Phosphorus	mg/kg dw	-	-	1,400	***1,706***	125	1,352	240	1,400	105	1,198	121	1,292	137	1,224	173	1,296	219	1,260	66.7	1,150	107	1,190	47.4
Potassium	mg/kg dw	-	-	1,710	***1,942***	353	***2,640***	713	***4,140***	259	***2,922***	327	***3,198***	397	***2,450***	334	***2,500***	217	***2,736***	219	***2,356***	200	***2,950***	220
Selenium	mg/kg dw	2	-	1.34	1.07	0.177	1.23	0.368	***1.53***	0.0870	1.21	0.0952	***1.46***	0.282	1.02	0.0847	1.18	0.161	1.13	0.0917	1.07	0.223	1.07	0.0823
Silver	mg/kg dw	0.5	-	0.238	***0.332***	0.0399	***0.369***	0.0857	***0.446***	0.0151	***0.354***	0.0503	***0.423***	0.0645	***0.354***	0.0255	***0.349***	0.0231	***0.353***	0.0152	***0.325***	0.0203	***0.368***	0.0168
Sodium	mg/kg dw	-	-	541	***1,118***	206	***1,396***	331	***2,018***	165	***1,400***	174	***1,502***	143	***1,093***	82	***1,124***	137	***1,142***	76.9	***954***	47.7	***1,180***	52.4
Strontium	mg/kg dw	-	-	90.0	***188***	29.4	***212***	36.4	***238***	6.11	***205***	31.0	***239***	25.5	***223***	10.3	***229***	20.6	***213***	13.3	***201***	10.5	***220***	11.8
Sulphur[c]	mg/kg dw	-	-	1,400	-	-	***1,560***	182	1,360	54.8	-	-	960	89.4	790	87.5	694	168	940	141	856	197	732	173
Thallium	mg/kg dw	-	-	0.187	<0.05	-	0.0596	0.000980	0.0688	0.00295	0.0764	0.0203	0.0722	0.00792	0.0786	0.0155	0.0750	0.0123	0.0836	0.00802	0.0816	0.00953	0.100	0.0131
Tin	mg/kg dw	-	-	0.510	***2.05***	0.390	***1.99***	0.425	***2.32***	0.105	***1.83***	0.314	***2.19***	0.304	***1.66***	0.0936	***1.88***	0.123	***1.74***	0.118	***1.50***	0.182	***1.57***	0.0804
Titanium	mg/kg dw	-	-	1,190	***1,946***	277	***1,996***	410	***2,380***	82.8	***1,984***	239	***2,192***	290	***1,758***	108	***1,832***	128	***1,786***	133	***1,682***	166	***1,772***	114
Uranium	mg/kg dw	-	-	1.60	1.43	0.285	1.39	0.191	***1.62***	0.0434	1.45	0.161	1.52	0.168	1.49	0.0999	1.37	0.0800	1.48	0.104	1.37	0.105	***1.70***	0.130
Vanadium	mg/kg dw	-	-	73.0	***145***	68.1	***142***	26.3	***140***	5.10	***129***	14.5	***134***	6.83	***125***	23.1	***123***	10.3	***140***	15.9	***124***	14.3	***127***	10.4
Zinc	mg/kg dw	123	315	85.1	69	11.1	***96.0***	33.2	***129***	6.94	***101***	9.11	***119***	21.9	***87***	10.4	***95.5***	10.7	***101***	6.69	***94.8***	6.73	***104***	6.08
Zirconium	mg/kg dw	-	-	4.80	-	-	-	-	-	-	-	-	-	-	***6.52***	0.487	***6.94***	1.05	***5.18***	0.409	***5.38***	0.792	***5.36***	0.956

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates exposed value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th and 5th percentile values see Appendix Table C.2.6.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 5.13: **Summary of Sediment Quality Data for Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024**

Analyte	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	Exposed QUL-PFF1									
					2014		2016		2018		2021		2024	
		Lower	Upper	QUL-PREF1 (2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests														
Moisture	%	-	-	62.2	41.9	10.8	48.3	10.3	49.6	11.9	58.7	3.53	57.3	2.81
pH (1:2 soil:water)	pH	-	-	6.35	8.32	0.198	8.41	0.120	8.40	0.114	8.08	0.148	8.13	0.125
Particle Size														
% Gravel (>2 mm)	%	-	-	<0.1	<0.1	-	<0.1	-	<1	-	<1	-	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	0.374	0.349	0.392	0.388	1.38	-	1.70	1.98	<1	-
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	***84.1***	9.87	67.0	20.3	67.7	12.9	36.0	8.03	50.0	6.31
% Clay (<4 µm)	%	-	-	12.1	***15.5***	10.0	***32.6***	20.3	***31.6***	13.6	***62.6***	9.44	***49.7***	6.33
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	2.22	0.438	0.460	0.147	0.0190	0.143	0.0301	0.316	0.157	0.425	0.205
Nutrients (Bulk sediment)														
Total Nitrogen by LECO	%	-	-	0.182	0.0428	0.0435	0.0242	0.00849	0.0296	0.00808	0.0370	0.00663	0.0646	0.0164
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	19,000	***19,540***	3,961	***23,620***	5,168	***19,040***	3,798	***30,680***	2,740	***27,740***	1,484
Antimony	mg/kg dw	-	-	0.470	0.462	0.108	0.466	0.0958	0.468	0.0709	***0.628***	0.0335	***0.550***	0.0245
Arsenic	mg/kg dw	5.9	17	9.89	***13.2***	1.65	***13.2***	1.05	***11.9***	1.86	***14.8***	1.13	***15.2***	1.77
Barium	mg/kg dw	-	-	172	***204***	32.2	***287***	75.9	***231***	42.4	***326***	34.3	***289***	20.1
Beryllium	mg/kg dw	-	-	0.540	***0.686***	0.131	***0.758***	0.135	***0.768***	0.125	***1.00***	0.0835	***0.982***	0.0691
Bismuth	mg/kg dw	-	-	0.170	0.118	0.0441	0.112	0.0113	0.108	-	0.154	0.0297	0.152	0.0217
Boron	mg/kg dw	-	-	<5	<10	-	10.0	-	10.4	-	10.9	0.502	11.3	0.867
Cadmium	mg/kg dw	0.6	3.5	0.475	0.181	0.0805	0.147	0.0363	0.131	0.0238	0.205	0.0406	0.204	0.0297
Calcium	mg/kg dw	-	-	9,480	***27,900***	880	***23,220***	2,369	***21,160***	2,173	***23,140***	1,527	***23,560***	1,683
Chromium	mg/kg dw	37.3	90	61.9	18.8	7.92	16.5	3.97	15.9	2.68	25.2	3.94	22.5	3.18
Cobalt	mg/kg dw	-	-	15.2	***16.1***	4.30	***16.8***	3.70	14.7	2.87	***21.4***	2.68	***19.5***	1.61
Copper	mg/kg dw	35.7	197	59.4	***481***	97	***567***	153	***506***	116	***833***	107	***686***	60.6
Iron	mg/kg dw	21,200	43,766	34,100	27,680	5,531	23,840	3,347	23,120	3,741	30,800	3,093	29,500	3,160
Lead	mg/kg dw	35	91.3	8.06	6.97	2.64	7.63	2.68	7.38	1.99	***12.2***	2.12	***10.9***	1.32
Lithium	mg/kg dw	-	-	16.1	***20.3***	5.24	***19.0***	3.22	***18.7***	3.56	***26.1***	2.82	***25.1***	1.97
Magnesium	mg/kg dw	-	-	9,030	***10,938***	2,541	***11,758***	2,217	***10,344***	2,057	***15,980***	1,879	***13,700***	872
Manganese	mg/kg dw	460	1,100	572	***725***	241	***767***	204	***823***	226	***1,338***	257	***1,173***	243
Mercury	mg/kg dw	0.17	0.486	0.0627	***0.0763***	0.0175	***0.0683***	0.0100	***0.0767***	0.0101	***0.0903***	0.0130	***0.0847***	0.0102
Molybdenum	mg/kg dw	25	23,000	1.11	***2.89***	0.283	***2.76***	0.246	***2.49***	0.367	***2.82***	0.311	***2.81***	0.248
Nickel	mg/kg dw	16	75	42.0	16.9	7.45	15.8	4.37	13.9	2.61	22.7	3.96	21.4	2.99
Phosphorus	mg/kg dw	-	-	1,400	***1,506***	183	1,299	331	1,089	293	916	189	1,151	102
Potassium	mg/kg dw	-	-	1,710	***1,842***	436	***3,724***	1,503	***2,386***	494	***3,056***	335	***2,778***	241
Selenium	mg/kg dw	2	-	1.34	0.942	0.348	0.720	0.198	0.698	0.149	0.832	0.186	0.888	0.231
Silver	mg/kg dw	0.5	-	0.238	***0.261***	0.0676	***0.239***	0.0392	0.225	0.0380	***0.315***	0.0316	***0.295***	0.0347
Sodium	mg/kg dw	-	-	541	***936***	86.2	***1,986***	746	***1,332***	245	***1,636***	192	***1,340***	139
Strontium	mg/kg dw	-	-	90.0	***183***	12.1	***237***	42.4	***242***	41.4	***297***	17.0	***256***	10.4
Sulphur[c]	mg/kg dw	-	-	1,400	-	-	720	44.7	720	44.7	<500	-	672	147
Thallium	mg/kg dw	-	-	0.187	0.0664	0.0340	0.0612	0.0140	0.0532	-	0.0730	0.0112	0.0782	0.0112
Tin	mg/kg dw	-	-	0.510	***1.52***	0.200	***1.63***	0.200	***1.56***	0.185	***1.96***	0.0628	***1.73***	0.127
Titanium	mg/kg dw	-	-	1,190	***1,464***	229	***1,606***	217	***1,592***	196	***1,872***	47.6	***1,858***	120
Uranium	mg/kg dw	-	-	1.60	1.34	0.282	1.18	0.134	1.20	0.144	1.35	0.122	1.54	0.124
Vanadium	mg/kg dw	-	-	73.0	***90.8***	10.1	***86.3***	8.46	***79.8***	11.9	***99.5***	4.54	***93.6***	4.70
Zinc	mg/kg dw	123	315	85.1	63.2	18.5	66.2	14.9	57.2	10.9	***87.0***	12.0	78.8	6.56
Zirconium	mg/kg dw	-	-	4.80	-	-	-	-	-	-	***7.78***	0.415	***6.54***	0.767

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates exposed value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th and 5th percentile values see Appendix Table C.2.6.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

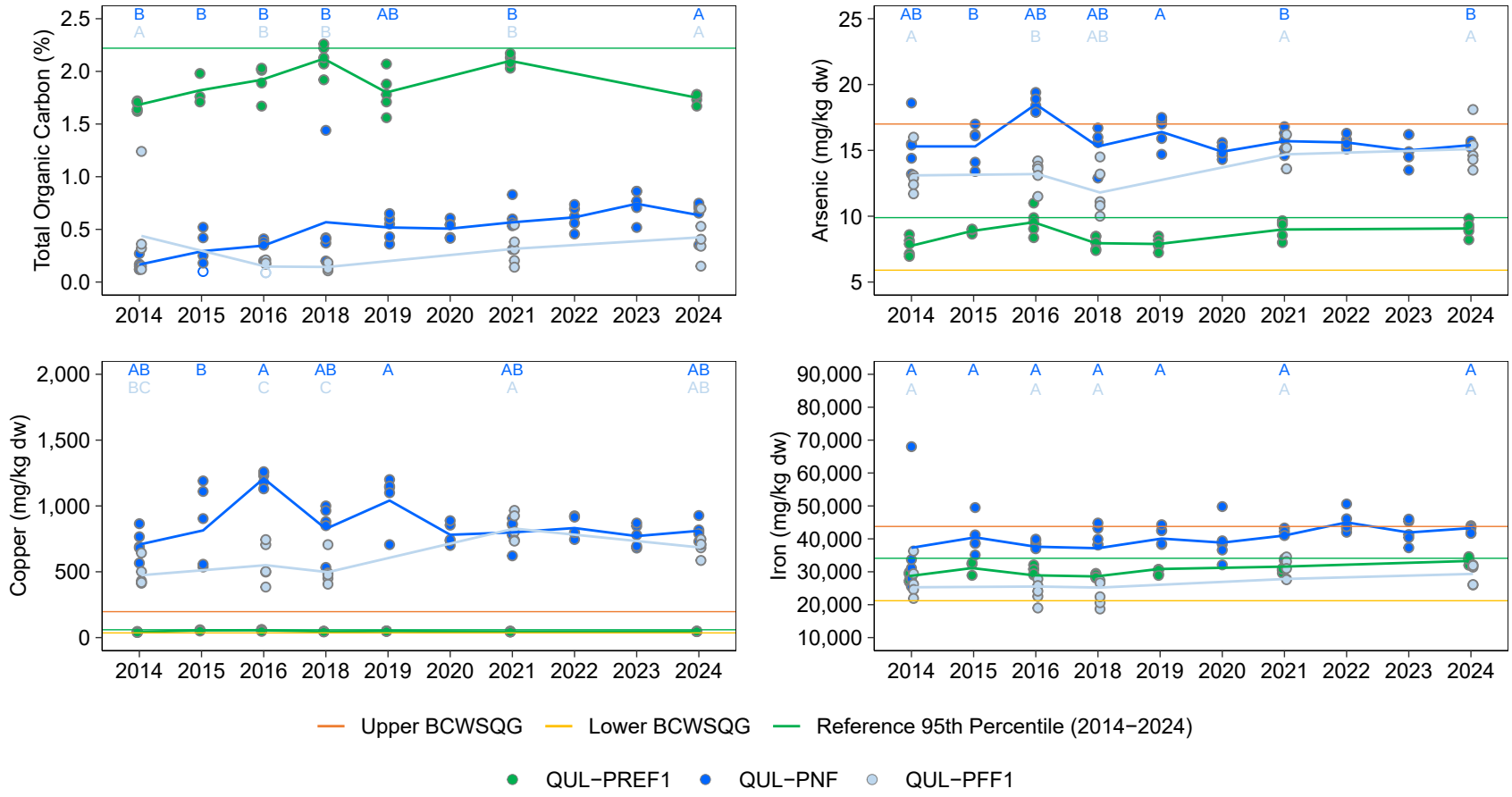

Figure 5.15: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 20245). Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

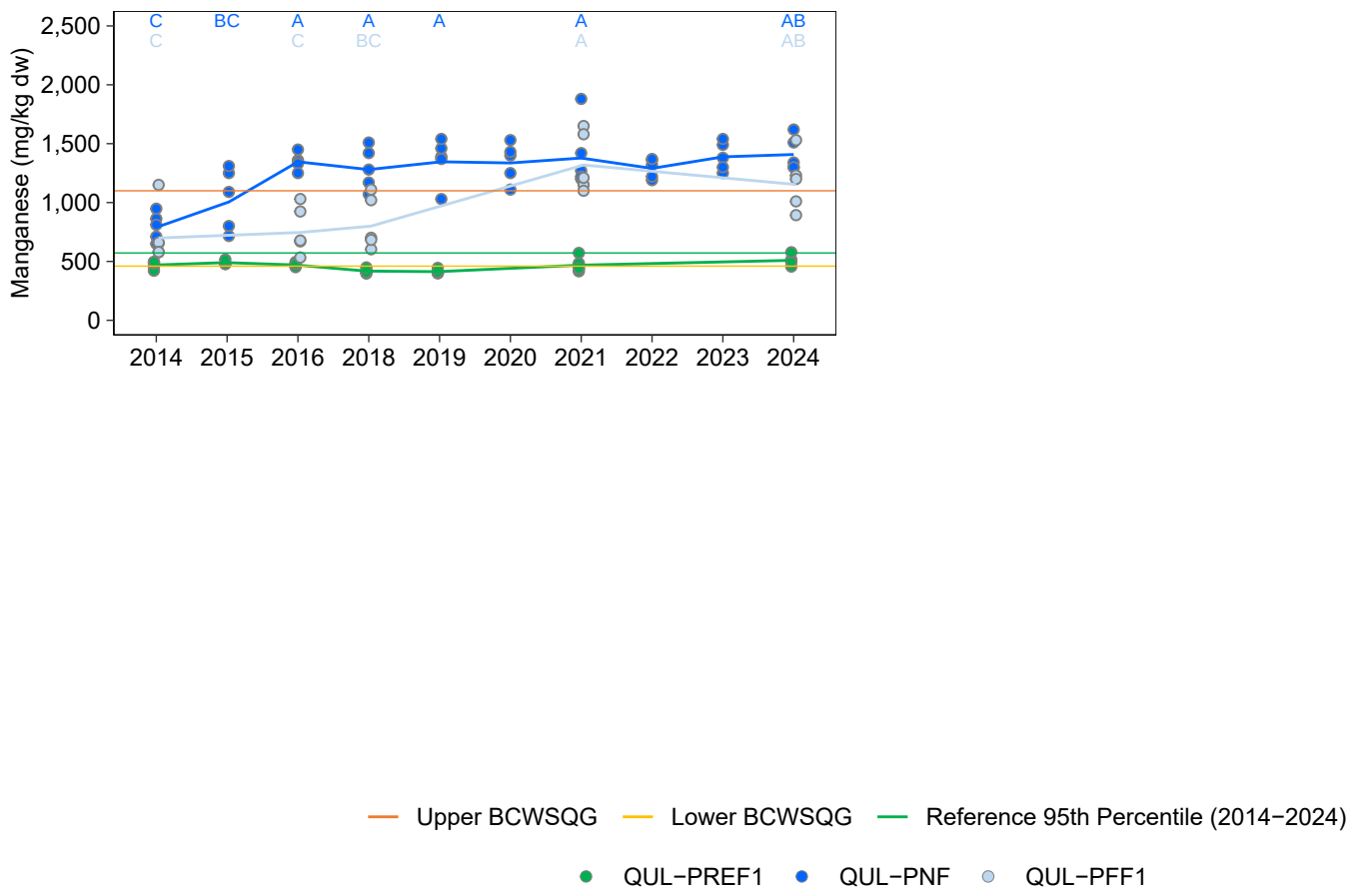

Figure 5.15: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

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for the corresponding reference area in 2024 (0.170%; Table 5.13; Appendix Tables C.2.7 and C.2.8).

Mean analyte concentrations in the sediments (<63 µm fraction) collected from QUL-PNF and QUL-PFF1 in 2024 exceeded the reference 95th percentile values for 26 and 22 analytes, respectively (Table 5.13; Appendix Tables C.2.7 and C.2.8). Among these analytes, four (arsenic, copper, iron, and manganese) at QUL-PNF, and three (arsenic, copper, and manganese) at QUL-PFF1 had mean concentrations in 2024 which also exceeded BCWSQG (Table 5.13; Appendix Table C.2.8). Specifically, mean arsenic concentrations in QUL-PNF and QUL-PFF1 sediments in 2024 were both approximately 2.6-times the lower BCWSQG, and the mean iron concentration at QUL-PNF in 2024 was approximately 2.0-times the lower BCWSQG (Figure 5.15, Table 5.13; Appendix Table C.2.8). The mean copper concentrations of QUL-PNF and QUL-PFF1 sediments in 2024 were approximately 4.1- and 3.5-times the upper BCWSQG, respectively, and mean manganese concentrations were 1.3- and 1.1-times the upper BCWSQG, respectively (Figure 5.15, Table 5.13). Mean arsenic, copper, iron, and manganese concentrations at the deep reference area (QUL-PREF1) were naturally elevated above the lower BCWSQG in all monitoring years (Figure 5.15, Table 5.13; Appendix Table C.2.7), demonstrating that these analytes are somewhat naturally elevated in parts of Quesnel Lake.

The relative (exposed-reference) differences of mean arsenic, copper, iron, and manganese concentrations for QUL-PNF sediments in 2024 were similar to those in prior years (2014 to 2023) with two exceptions (Figure 5.15; Appendix Table E.1.6). The two exceptions are that the relative differences in 2024 were significantly lower than in 2019 for arsenic, and significantly higher than in 2014 for manganese (Figure 5.15; Appendix Table E.1.6). When considered separately from reference results (which were not available for all years), mean concentrations of arsenic, copper, iron, and manganese concentrations in sediments from QUL-PNF have not changed significantly since at least 2018 (Appendix Table E.1.7). Combined, these results indicate that sediment concentrations of these four analytes have been stable since at least 2019 (when considered relative to or independent from reference), and that concentrations observed in 2024 were similar to or lower than those from all most prior years (at least 2015 to 2023).

In QUL-PFF1 sediments, the relative differences in Analyte of Interest concentrations have been temporally stable (i.e., have not changed significantly) since 2018 for arsenic, and since 2021 for copper and manganese. The relative difference for arsenic concentrations in 2024 was the same as the first year of monitoring (i.e., 2014). However, for copper and manganese the relative difference in concentrations increased significantly between 2018 and 2021, to a result higher than all prior years, and has not changed since then (Figure 5.15; Appendix Table E.1.6). This increase in copper and manganese concentrations in 2021 and 2024 corresponds with, and

was likely driven by, changes in the physical characteristics of the QUL-PFF1 sediments. There were no significant temporal changes in manganese and copper concentrations of reference sediments over this period (Appendix Table E.1.7). The mean clay composition of the QUL-PFF1 sediments in 2021 and 2024 was 2.0- and 1.6-times higher than in 2018, respectively (Table 5.13). Arsenic, copper, and manganese concentrations were positively correlated with clay content of fine exposed sediments (see below), therefore the concurrent increase in the clay content and copper and manganese concentrations of QUL-PFF1 sediments in 2021 and 2024 may be indicative of the mobilization of breach-related fines from QUL-PNF towards QUL-PFF1 in deep areas of Quesnel Lake.

When considering the fine exposed sediments from deep Quesnel Lake (QUL-PNF and QUL-PFF1), arsenic and copper were positively correlated with TOC, % clay, total nitrogen, and total sulphur content. Iron was positively correlated with TOC, total nitrogen, and total sulphur content and manganese was positively correlated with TOC, % clay, and total nitrogen (Appendix Figure E.1.3, Appendix Table E.1.8). The positive correlation of analytes measured in fine exposed sediments with higher clay content (% clay) is consistent with the input of fine tailings-influenced sediments with elevated analyte concentrations to the deep area of Quesnel Lake. Correlations of sediment characteristics that considered both exposed (QUL-PNF and QUL-PFF1) and reference (QUL-PREF1) areas were highly leveraged results, therefore were excluded from detailed interpretation (Appendix Figure E.1.3).

The results of a PCA of sediment quality data from QUL-PNF, QUL-PFF1, and QUL-PREF1 between 2014 and 2024 (Appendix Figure E.1.4, Appendix Tables E.1.9 and E.1.10) were included in correlations with benthic invertebrate community endpoints from these areas and sampling years (see Section 5.2.5).

Overall, the 2024 monitoring results indicate that physical and chemical characteristics of the deep exposed near-field sediments appear stable, with no difference in analyte (arsenic, copper, iron, or manganese) concentrations compared to within one year following the breach (2015), and no temporal changes since at least 2019. This is consistent with the low sediment deposition rate observed at this deep exposed area, with approximately 1 cm of fresh sediment deposition after 7 to 10 years (Minnow 2019a). In contrast, copper and manganese concentrations in the far-field sediments were significantly higher in 2021 and 2024, relative to reference. This increase was likely driven by the higher clay content of the sampled sediments and may be indicative of the mobilization of breach-related fines from QUL-PNF towards QUL-PFF1 in deep areas of Quesnel Lake.

5.2.1.2 Shallow Areas

Sediments collected from the shallow near-field exposed area of Quesnel Lake (QUL-LNF1) in 2024 were predominantly sand with some silt (mean = 96.8% and 3.20%, respectively), which was consistent with the sediments collected from this area in most previous post-breach years (2015 to 2023; Table 5.14; Appendix Table C.2.11). The high sand content of sediments from QUL-LNF1 was visually evident during sample collection and was likely a result of continued washing of fine particles from these shallow sampling locations towards deeper areas of the lake. Sediments from QUL-LNF1 in 2024 were higher in sand content and lower in silt content than the corresponding reference sediments (QUL-LREF1; mean = 70.9% sand, 22.1% silt), which also exhibited the highest sand content observed relative to prior years (range = 52.8 to 68.6% sand in 2014 to 2023; Table 5.14; Appendix Tables C.2.11 and C.2.12). Mean TOC and total nitrogen content at the exposed area in 2024 (mean TOC = 0.421%, mean total nitrogen = 0.0222%) were lower than at the corresponding reference area (mean TOC = 1.15% TOC, mean total nitrogen = 0.0622%), significantly so for TOC, which was consistent with previous post-breach years (Table 5.14; Appendix Table E.1.11). The relative (exposed-reference) difference in mean TOC of QUL-LNF1 sediments has been temporally stable (i.e., has not changed significantly) since the initiation of sampling in 2014 (Figure 5.16; Appendix Tables E.1.11 and E.1.12).

Mean analyte concentrations in the sediments (<63 µm fraction) collected from QUL-LNF1 in 2024 exceeded both reference and pre-breach 95th percentile values for 26 analytes (Table 5.14; Appendix Tables C.2.10 to C.2.12). Among these, five analytes (arsenic, copper, iron, manganese, and silver) also had mean concentrations that exceeded BCWSQG. Specifically, mean manganese and silver concentrations were approximately 2.2- and 1.6-times the lower BCWSQG, respectively, and mean arsenic, copper, and iron concentrations were approximately 1.1-, 8.7-, and 2.8-times the upper BCWSQG, respectively (Figure 5.16, Table 5.14; Appendix Table C.2.12). Of these analytes, iron concentrations exceeded the lower BCWSQG guidelines in the corresponding shallow reference sediments in each year (2014 to 2024; Figure 5.16, Table 5.14; Appendix Tables C.2.10 and C.2.11), demonstrating that iron is naturally elevated in parts of Quesnel Lake.

The mean concentrations of arsenic, copper, iron, manganese, and silver in QUL-LNF1 sediments have been significantly higher than reference concentrations since monitoring began in 2014 (Figure 5.16, Table 5.14; Appendix Table E.1.11). The relative (exposed-reference) difference in arsenic and iron concentrations observed in 2024 were not significantly different than those observed in previous years (2014 to 2023; Figure 5.16; Appendix Table E.1.12). Similarly, the relative difference in manganese concentrations in 2024 was not significantly different from most

Table 5.14: Summary of Sediment Quality Data for Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2007 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines [a]		Reference 95th Percentile [b]		Reference															
						QUL-LREF1															
						2014		2015		2016		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Pre-Breach (QUL-LNF1; 2007)	Reference (QUL-LREF1; 2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																					
Moisture	%	-	-	-	44.8	40.7	2.73	40.8	3.76	33.4	3.73	43.2	3.41	41.4	1.23	36.3	5.17	30.5	2.97	38.9	4.80	30.7	1.87
pH (1:2 soil:water)	pH	-	-	-	6.96	***6.56***	0.160	6.97	0.235	***6.14***	0.320	***6.50***	0.386	***6.43***	0.196	***6.30***	0.300	***6.12***	0.165	***6.35***	0.130	***6.13***	0.449
Particle Size																					
% Gravel (>2 mm)	%	-	-	7.00	5.40	1.02	0.647	1.49	0.782	1.81	1.23	2.38	1.07	5.40	11.5	2.42	1.41	2.50	0.969	3.08	1.65	5.06	2.89
% Sand (2.0 mm - 0.063 mm)	%	-	-	58.0	76.8	***59.7***	6.37	***60.0***	4.65	***64.0***	17.3	52.8	9.32	***66.3***	10.3	***60.1***	2.63	***61.4***	8.90	***68.6***	12.6	***70.9***	9.29
% Silt (0.063 mm - 4 µm)	%	-	-	53.0	44.9	35.1	6.48	33.9	3.73	30.8	16.4	42.1	10.1	26.2	6.86	34.5	4.33	32.5	8.17	25.6	11.4	22.1	11.1
% Clay (<4 µm)	%	-	-	9.00	4.99	4.17	0.590	4.64	1.66	3.39	1.62	3.10	1.11	2.46	0.305	3.40	0.485	3.72	0.691	2.94	0.996	2.18	0.492
Organic / Inorganic Carbon (<63 µm)[c]																					
Total Organic Carbon	%	-	-	2.45	1.86	1.12	0.186	1.47	0.214	1.19	0.137	1.27	0.331	1.52	0.316	1.43	0.406	1.40	0.354	1.32	0.295	1.15	0.357
Nutrients (Bulk sediment)																					
Total Nitrogen by LECO	%	-	-	-	0.101	0.0658	0.00497	0.104	0.00945	0.0534	0.0114	0.0792	0.0128	0.0766	0.00351	0.0570	0.0119	0.0780	0.0134	0.0870	0.0219	0.0622	0.00482
Metals, Metalloids, and Non-Metals (<63 µm)[c]																					
Aluminum	mg/kg dw	-	-	12,500	17,100	***13,260***	1,383	***13,133***	723	11,294	1,726	12,440	1,050	***14,160***	1,260	***13,840***	2,297	***15,800***	1,355	***15,120***	1,232	***15,180***	2,224
Antimony	mg/kg dw	-	-	<10.0	0.350	0.296	0.0513	0.310	0.0173	0.256	0.0219	0.264	0.0270	0.304	0.0313	0.292	0.0402	0.288	0.0356	0.270	0.0346	0.276	0.0559
Arsenic	mg/kg dw	5.9	17	7.50	5.71	4.08	0.774	4.54	0.781	3.95	0.643	3.56	0.388	4.74	0.700	4.56	1.07	4.72	0.709	4.71	0.954	4.47	1.35
Barium	mg/kg dw	-	-	91.4	144	***124***	7.76	***115***	7.64	***109***	9.48	***114***	23.7	***129***	14.4	***128***	10.5	***126***	11.1	***137***	3.85	***120***	11.9
Beryllium	mg/kg dw	-	-	<0.50	0.450	0.350	0.0354	0.367	0.0351	0.324	0.0336	0.324	0.0261	0.386	0.0451	0.348	0.0476	0.412	0.0286	0.338	0.0342	0.380	0.0579
Bismuth	mg/kg dw	-	-	<20.0	0.130	0.112	0.0113	0.110	0.00667	0.100	-	<0.1	-	0.116	0.0188	0.106	0.00566	0.108	0.0143	0.102	0.00490	0.110	0.00600
Boron	mg/kg dw	-	-	-	<5	<10	-	<10	-	<10	-	<10	-	<5	-	<5	-	<5	-	<5	-	<5	-
Cadmium	mg/kg dw	0.6	3.5	<0.50	0.368	0.313	0.0341	0.330	0.0378	0.296	0.0280	0.279	0.0275	0.329	0.0575	0.307	0.0488	0.326	0.0490	0.319	0.0458	0.307	0.0522
Calcium	mg/kg dw	-	-	5,660	8,740	***7,136***	533	***7,483***	603	***6,420***	555	***6,746***	238	***7,446***	519	***7,872***	1,107	***8,070***	399	***7,560***	295	***8,296***	650
Chromium	mg/kg dw	37.3	90	32.3	60.3	***49.5***	4.11	***49.7***	3.66	***47.8***	5.91	***49.1***	2.26	***54.7***	3.99	***54.3***	4.53	***55.8***	2.69	***54.2***	3.17	***57.4***	3.51
Cobalt	mg/kg dw	-	-	9.60	12.9	***10.3***	1.41	***10.8***	0.927	9.60	0.972	***9.85***	0.814	***11.2***	1.42	***11.1***	2.09	***11.5***	1.17	***10.6***	1.96	***10.7***	1.85
Copper	mg/kg dw	35.7	197	29.6	35.8	***30.3***	3.69	***31.6***	3.20	27.8	2.68	26.6	3.52	***33.3***	2.39	***30.2***	4.80	***32.1***	3.80	***30.2***	3.88	***30.9***	6.36
Iron	mg/kg dw	21,200	43,766	23,100	28,000	***23,680***	2,187	***23,200***	1,709	22,240	1,817	22,060	611	***24,720***	1,711	***24,400***	2,913	***26,040***	1,762	***25,300***	2,537	***24,640***	3,340
Lead	mg/kg dw	35	91.3	<30.0	6.47	5.27	0.613	5.78	0.658	5.06	0.394	4.53	0.480	5.74	0.698	5.17	0.756	5.63	0.637	5.15	0.637	5.52	1.03
Lithium	mg/kg dw	-	-	13.2	13.7	11.5	1.43	11.0	0.850	11.1	1.49	10.2	1.27	12.1	1.29	10.7	1.74	11.9	1.45	11.5	1.45	11.9	2.40
Magnesium	mg/kg dw	-	-	5,770	8,310	***6,360***	501	***6,420***	495	***5,892***	640	***6,122***	478	***7,004***	473	***7,384***	876	***7,536***	560	***7,688***	597	***6,982***	904
Manganese	mg/kg dw	460	1,100	514	433	309	53.2	322	41.3	254	22.4	281	38.6	353	69.7	347	99.2	363	53.9	346	89.9	314	62.3
Mercury	mg/kg dw	0.17	0.486	0.0729	0.0471	0.0377	0.00611	0.0438	0.00660	0.0357	0.00698	0.0289	0.00269	0.0334	0.00312	0.0310	0.00611	0.0354	0.00576	0.0303	0.00519	0.0346	0.00957
Molybdenum	mg/kg dw	25	23,000	<4.0	1.02	0.782	0.0817	0.833	0.150	0.796	0.121	0.748	0.113	0.950	0.135	0.838	0.188	0.776	0.151	0.740	0.125	0.790	0.212
Nickel	mg/kg dw	16	75	21.1	34.4	***29.3***	3.40	***30.7***	2.74	***28.2***	2.63	***26.7***	2.28	***31.1***	2.89	***29.2***	4.12	***31.5***	2.62	***28.8***	3.44	***30.3***	4.53
Phosphorus	mg/kg dw	-	-	-	1,280	1,136	88.5	1,143	41.6	1,055	58.9	1,130	103	1,184	56.8	1,148	89.3	1,138	47.6	1,166	75.4	1,238	42.7
Potassium	mg/kg dw	-	-	890	1,470	***1,120***	170	***1,213***	125	***992***	104	***1,026***	75.7	***1,166***	118	***1,216***	202	***1,390***	186	***1,110***	160	***1,218***	243
Selenium	mg/kg dw	2	-	<2.0	0.880	0.584	0.107	0.637	0.0945	0.562	0.0507	0.506	0.121	0.826	0.123	0.664	0.165	0.678	0.139	0.638	0.147	0.628	0.205
Silver	mg/kg dw	0.5	-	<2.0	0.172	0.144	0.0194	0.148	0.0119	0.138	0.00986	0.127	0.0221	0.152	0.0188	0.150	0.0380	0.144	0.0181	0.144	0.0209	0.133	0.0317
Sodium	mg/kg dw	-	-	240	538	***386***	16.7	***460***	20.0	***348***	21.7	***380***	20.2	***413***	19.7	***446***	53.2	***516***	38.9	***415***	25.3	***466***	48.6
Strontium	mg/kg dw	-	-	58.5	82.0	***63.3***	6.58	***68.9***	6.30	55.7	5.97	***62.5***	4.66	***71.8***	5.47	***71.2***	11.3	***75.5***	5.29	***70.7***	4.36	***72.4***	8.81
Sulphur[d]	mg/kg dw	-	-	-	720	-	-	<500	-	680	179	560	98	594	83.5	<500	-	508	11.3	566	65.9	<500	-
Thallium	mg/kg dw	-	-	<1.0	0.138	0.123	0.0198	0.120	0.0146	0.103	0.00868	0.0980	0.00957	0.116	0.0158	0.108	0.0175	0.125	0.0165	0.106	0.0137	0.114	0.0165
Tin	mg/kg dw	-	-	<5.0	0.550	0.354	0.0467	0.380	0.0100	0.352	0.113	0.350	0.0265	0.384	0.0619	0.464	0.0835	0.502	0.0438	0.398	0.0476	0.316	0.0764
Titanium	mg/kg dw	-	-	607	1,220	***990***	85.9	***936***	34.9	***864***	114	***965***	54.8	***1,065***	76.3	***1,071***	116	***1,076***	53.7	***1,078***	29.5	***1,198***	124
Uranium	mg/kg dw	-	-	-	1.41	0.988	0.142	1.14	0.137	1.04	0.0771	0.958	0.0675	1.25	0.147	1.07	0.181	1.23	0.124	1.08	0.0963	1.30	0.185
Vanadium	mg/kg dw	-	-	54.9	69.9	***56.9***	4.08	***57.0***	3.76	53.4	5.28	***55.5***	2.61	***61.9***	4.16	***62.2***	5.62	***64.4***	2.64	***62.2***	3.11	***66***	5.49
Zinc	mg/kg dw	123	315	46.7	70.4	***60.8***	6.45	***62.3***	4.42	***54.3***	4.80	***57.3***	5.41	***61.4***	6.10	***62.6***	8.37	***63.8***	5.36	***61.1***	6.36	***62.8***	9.11
Zirconium	mg/kg dw	-	-	-	4.90	-	-	-	-	-	-	-	-	3.82	0.327	4.12	0.130	3.34	0.241	3.74	0.439	4.34	0.666

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics:*** Exposed value is > both reference and pre-breach 95th percentile values (<5th percentile for pH); reference value is > reference 95th percentile value (<5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table C.2.9).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th percentile values see Appendix Table C.2.10 and for calculation of pre-breach 95th percentile values see Appendix Table C.2.9.

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 5.14: Summary of Sediment Quality Data for Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2007 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines [a]		Reference 95th Percentile [b]		Exposed																	
						QUL-LNF1																	
						2007		2014		2015		2016		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Pre-Breach (QUL-LNF1; 2007)	Reference (QUL-LREF1; 2014 to 2024)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																							
Moisture	%	-	-	-	44.8	-	-	32.6	4.82	25.4	6.19	22.8	5.02	26.1	4.31	29.3	3.74	23.5	3.50	23.9	1.41	29.7	1.65	24.4	1.80
pH (1:2 soil:water)	pH	-	-	-	5.89	-	-	8.48	0.207	7.95	0.703	8.54	0.0554	8.68	0.136	8.31	0.722	8.51	0.224	8.35	0.218	8.77	0.0923	8.65	0.0669
Particle Size																							
% Gravel (>2 mm)	%	-	-	7.00	5.40	3.40	2.51	1.15	-	2.02	3.04	3.54	4.54	2.12	-	1.84	-	3.54	-	1.04	-	1.60	1.58	<1	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	58.0	76.8	44.4	11.7	49.2	2.14	***82.4***	17.7	***89.2***	4.52	***95.1***	3.01	***91.2***	11.4	***90.7***	6.13	***92.8***	2.79	***95.1***	1.53	***96.8***	1.18
% Silt (0.063 mm - 4 µm)	%	-	-	53.0	44.9	44.6	8.08	41.7	2.01	14.8	14.7	6.67	3.55	3.34	1.65	7.46	9.26	6.26	1.64	6.02	2.93	3.86	0.904	3.20	1.21
% Clay (<4 µm)	%	-	-	9.00	4.99	7.20	2.05	8.07	1.82	0.786	0.405	0.628	0.129	<1	-	<1	-	1.12	-	1.12	0.147	<1	-	<1	-
Organic / Inorganic Carbon (<63 µm)[c]																							
Total Organic Carbon	%	-	-	2.45	1.86	1.89	0.432	0.214	0.0370	0.350	0.198	0.122	0.0790	0.708	0.329	0.805	0.228	0.528	0.158	0.826	0.349	0.294	0.0785	0.421	0.0848
Nutrients (Bulk sediment)																							
Total Nitrogen by LECO	%	-	-	-	0.101	-	-	<0.02	-	0.0316	0.00598	<0.02	-	<0.02	-	0.0250	0.0105	<0.02	-	0.0236	0.00453	0.0284	0.00362	0.0222	0.00283
Metals, Metalloids, and Non-Metals (<63 µm)[c]																							
Aluminum	mg/kg dw	-	-	12,500	17,100	10,744	1,376	***17,920***	887	12,314	2,265	10,632	2,246	14,960	1,780	14,860	2,321	13,564	2,787	13,980	2,848	15,060	1,436	16,640	1,734
Antimony	mg/kg dw	-	-	<10.0	0.350	***<10***	-	***0.426***	0.0230	***0.430***	0.0464	***0.364***	0.0550	***0.552***	0.0736	***0.544***	0.123	***0.524***	0.0764	***0.478***	0.0497	***0.504***	0.0321	***0.538***	0.0319
Arsenic	mg/kg dw	5.9	17	7.50	5.71	6.00	0.773	***13.0***	0.493	***15.0***	1.34	***14.6***	1.51	***18.7***	0.986	***15.5***	3.84	***16.4***	1.37	***15.4***	2.83	***16.4***	1.32	***18.0***	1.23
Barium	mg/kg dw	-	-	91.4	144	79.0	9.99	***195***	12.7	105	20.6	97.2	34.1	***156***	30.4	***155***	45.6	123	25.7	111	29.2	***155***	40.3	***156***	24.2
Beryllium	mg/kg dw	-	-	<0.50	0.450	***<0.5***	-	***0.676***	0.0477	***0.518***	0.0626	***0.488***	0.0698	***0.594***	0.0483	***0.530***	0.110	***0.514***	0.0669	***0.496***	0.0706	***0.518***	0.0205	***0.608***	0.0471
Bismuth	mg/kg dw	-	-	<20.0	0.130	***<20***	-	<0.1	-	0.102	0.00490	0.110	0.0170	***0.150***	0.0212	***0.148***	0.0135	0.122	0.0179	0.130	0.0200	***0.132***	0.0164	***0.150***	0.0158
Boron	mg/kg dw	-	-	-	<5	-	-	<10	-	<10	-	<10	-	<10	-	7.84	1.06	7.54	1.24	7.30	1.00	8.16	0.932	8.70	0.828
Cadmium	mg/kg dw	0.6	3.5	<0.50	0.368	***<0.5***	-	0.133	0.0135	0.218	0.0464	0.168	0.0314	0.346	0.0782	0.285	0.0667	0.281	0.0465	0.343	0.128	0.285	0.0189	0.305	0.0474
Calcium	mg/kg dw	-	-	5,660	8,740	5,110	394	***28,300***	1,701	***20,300***	1,198	***20,920***	1,994	***22,740***	2,950	***19,220***	5,893	***20,860***	1,968	***16,780***	2,083	***22,940***	2,329	***26,460***	2,562
Chromium	mg/kg dw	37.3	90	32.3	60.3	27.7	3.63	15.5	1.58	34.7	7.84	35.9	10.3	52.5	13.8	58.9	21.6	54.5	18.4	51.4	11.8	46.7	11.6	43.5	11.1
Cobalt	mg/kg dw	-	-	9.60	12.9	8.02	1.12	***20.3***	0.850	***23.5***	6.05	***25.2***	6.19	***28.1***	7.21	***23.3***	6.94	***30.4***	9.31	***28.0***	9.49	***25.8***	5.66	***26.1***	6.79
Copper	mg/kg dw	35.7	197	29.6	35.8	23.0	3.99	***652***	52.6	***648***	140	***659***	212	***1,644***	433	***1,328***	676	***1,077***	208	***1,122***	510	***1,390***	164	***1,708***	294
Iron	mg/kg dw	21,200	43,766	23,100	28,000	19,580	2,879	***62,740***	7,313	***119,880***	54,185	***142,020***	48,744	***129,940***	64,269	***105,920***	45,297	***162,340***	83,211	***152,520***	98,091	***127,560***	46,504	***120,960***	60,660
Lead	mg/kg dw	35	91.3	<30.0	6.47	***<30***	-	5.76	0.203	6.40	0.660	5.92	1.01	***8.96***	1.03	***9.17***	2.22	***7.50***	0.831	***8.15***	1.68	***8.48***	1.32	***8.52***	0.655
Lithium	mg/kg dw	-	-	13.2	13.7	11.3	1.70	***18.2***	1.22	13.2	1.55	12.3	1.78	***16.4***	1.73	***15.7***	2.55	13.4	1.59	***13.9***	1.86	***13.9***	0.808	***16.6***	1.23
Magnesium	mg/kg dw	-	-	5,770	8,310	4,956	762	***11,320***	694	6,924	1,117	6,210	1,085	***9,400***	1,179	***8,652***	1,496	***8,774***	1,282	7,804	1,583	***9,386***	639	***9,730***	853
Manganese	mg/kg dw	460	1,100	514	433	359	92.4	***695***	38.4	***750***	100	***630***	96.2	***1,006***	97.3	***984***	250	***1,140***	184	***1,146***	266	***964***	48.2	***1,018***	103
Mercury	mg/kg dw	0.17	0.486	0.0729	0.0471	0.0517	0.0125	***0.0773***	0.00371	***0.101***	0.0151	***0.100***	0.0261	***0.127***	0.0240	***0.103***	0.0243	***0.116***	0.0214	***0.129***	0.0375	***0.113***	0.0105	***0.123***	0.0212
Molybdenum	mg/kg dw	25	23,000	<4.0	1.02	***<4***	-	***3.75***	0.201	***3.38***	0.415	***3.17***	0.544	***5.44***	1.07	***5.44***	2.72	***4.02***	1.15	***2.68***	0.647	***4.42***	0.785	***5.66***	0.802
Nickel	mg/kg dw	16	75	21.1	34.4	17.5	2.60	12.2	0.456	18.8	2.51	17.6	3.96	27.5	3.94	31.1	7.54	24.7	3.60	25.6	2.54	22.1	2.27	23.0	1.49
Phosphorus	mg/kg dw	-	-	-	1,280	-	-	***1,660***	142	***1,946***	285	***2,024***	259	***1,766***	30.5	***1,572***	186	***1,758***	167	***1,542***	138	***1,574***	78.9	***1,832***	92.6
Potassium	mg/kg dw	-	-	890	1,470	736	131	***1,786***	87.9	920	231	736	213	992	144	1,028	132	978	214	990	245	902	98.8	1,086	162
Selenium	mg/kg dw	2	-	<2.0	0.880	***<2***	-	***1.02***	0.0324	***1.16***	0.166	***1.07***	0.264	***1.99***	0.416	***1.57***	0.556	***1.61***	0.302	***1.41***	0.416	***1.60***	0.231	***1.75***	0.251
Silver	mg/kg dw	0.5	-	<2.0	0.172	***<2***	-	***0.325***	0.0242	***0.368***	0.0330	***0.414***	0.0987	***0.778***	0.179	***0.612***	0.251	***0.515***	0.101	***0.521***	0.217	***0.617***	0.143	***0.780***	0.122
Sodium	mg/kg dw	-	-	240	538	210	19.0	***1,160***	46.4	526	121	444	106	522	88.0	502	120	507	111	468	84.1	514	84.9	***580***	105
Strontium	mg/kg dw	-	-	58.5	82.0	53.2	4.78	***193***	11.5	***106***	21.1	***91.5***	21.2	***110***	15.7	***114***	22.1	***111***	27.5	***100***	18.2	***118***	17.0	***129***	19.9
Sulphur[d]	mg/kg dw	-	-	-	720	-	-	-	-	***1,220***	259	520	-	***740***	207	***726***	58.6	***850***	80.3	***748***	50.2	***1,106***	147	***924***	106
Thallium	mg/kg dw	-	-	<1.0	0.138	***<1***	-	<0.05	-	0.0500	-	0.0514	-	0.0562	0.00170	0.0562	0.00523	0.0522	0.00240	0.0620	0.00765	0.0512	0	0.0530	0.000980
Tin	mg/kg dw	-	-	<5.0	0.550	***<5***	-	***1.63***	0.0992	***1.31***	0.0918	***1.07***	0.157	***1.31***	0.272	***1.26***	0.353	***1.57***	0.220	***1.44***	0.275	***1.45***	0.178	***1.19***	0.182
Titanium	mg/kg dw	-	-	607	1,220	557	34.2	***1,690***	75.8	***1,326***	132	1,074	231	***1,488***	231	***1,512***	429	***1,622***	343	***1,470***	274	***1,446***	177	***1,478***	174
Uranium	mg/kg dw	-	-	-	1.41	-	-	1.21	0.105	1.08	0.0782	1.02	0.184	1.02	0.0979	1.14	0.158	1.02	0.0791	1.14	0.188	1.00	0.0556	1.25	0.0964
Vanadium	mg/kg dw	-	-	54.9	69.9	49.5	4.27	***235***	25.7	***461***	220	***561***	202	***501***	270	***422***	197	***673***	355	***575***	397	***523***	197	***477***	249
Zinc	mg/kg dw	123	315	46.7	70.4	39.2	7.10	63.1	4.35	***70.8***	9.41	67	11.2	***98.2***	18.8	***79.8***	17.4	***87.2***	15.3	***81.5***	11.2	***85.6***	10.6	***92.8***	11.7
Zirconium	mg/kg dw	-	-	-	4.90	-	-	-	-	-	-	-	-	-	-	***5.94***	1.49	***6.42***	1.04	***4.92***	0.589	***5.80***	0.515	***6.14***	1.18

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics:*** Exposed value is > both reference and pre-breach 95th percentile values (<5th percentile for pH); reference value is > reference 95th percentile value (<5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table C.2.9).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th percentile values see Appendix Table C.2.10 and for calculation of pre-breach 95th percentile values see Appendix Table C.2.9.

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

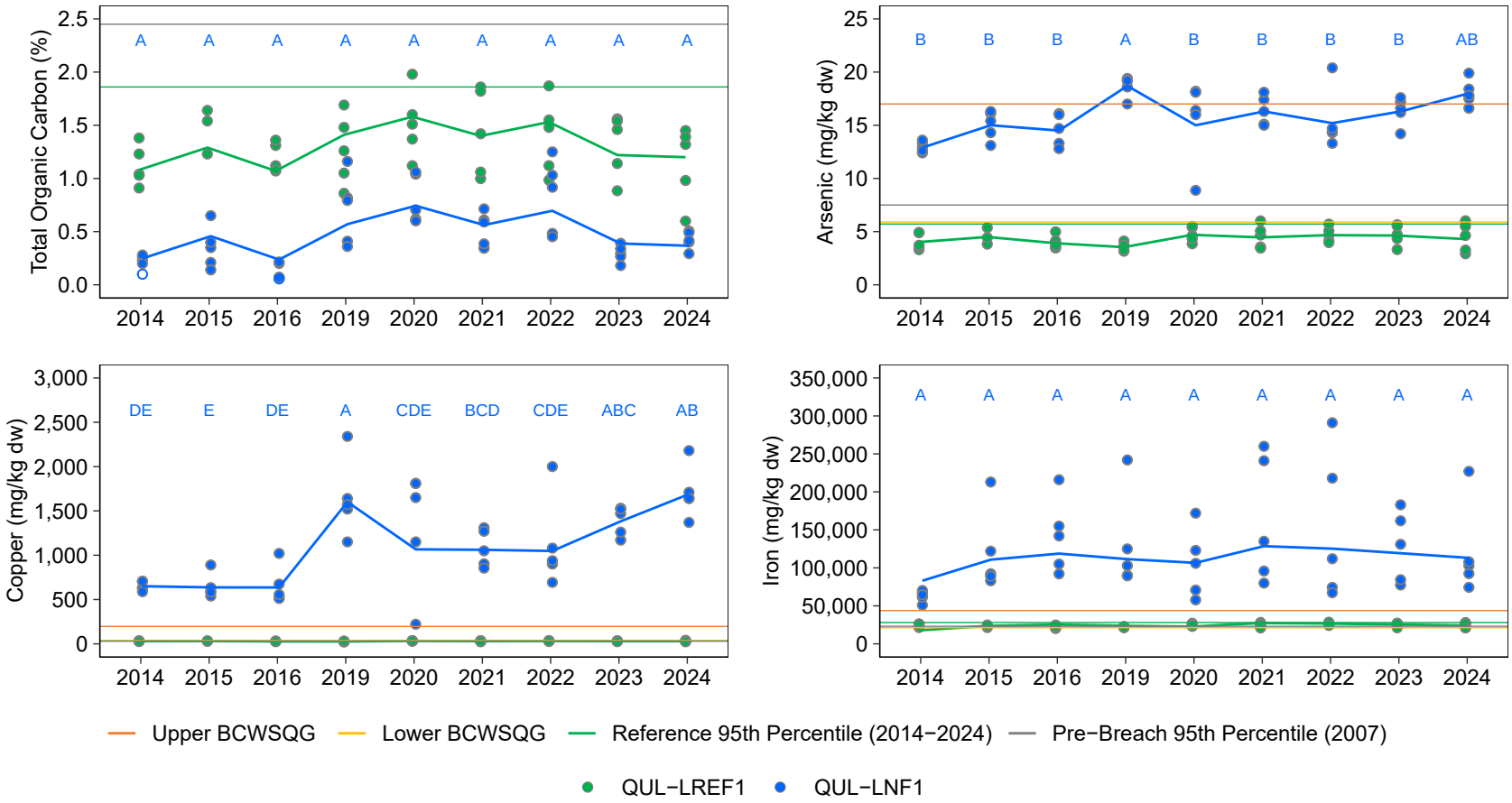

Figure 5.16: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

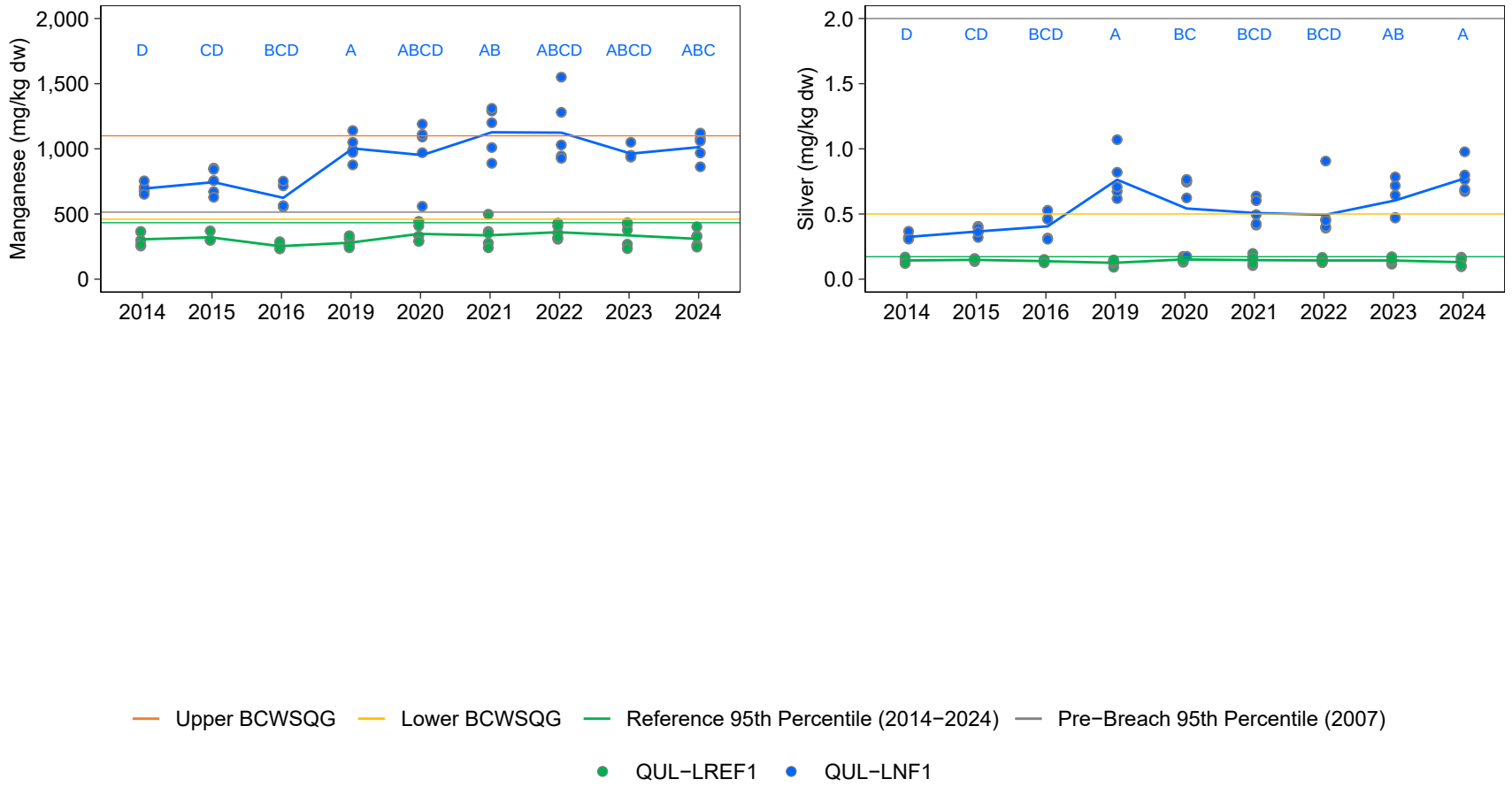

Figure 5.16: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

prior years (2015 to 2023), and has been temporally stable (i.e., has not changed significantly) from 2019 to 2024 (Figure 5.16; Appendix Table E.1.12). For both copper and silver concentrations, the relative difference in 2024 was similar to 2023, and to 2019, but was significantly higher than most (for copper) or all (for silver) remaining prior years. In 2019, most Analyte of Interest concentrations (except iron) were significantly higher than in prior years, which was likely associated with the relocation of QUL-LNF1 in 2019 (Figure 5.16; Appendix Table E.1.12).[55] Temporal changes in the relative differences of copper and silver concentrations were consistent with those shown by the temporal evaluation of exposed sediments only (i.e., not compared to reference; Appendix Table E.1.11). Overall, these results indicate that the relative difference in arsenic, manganese, and iron concentrations at the shallow exposed area in 2024 were similar to those shortly following the breach (i.e., 2014 or 2015) and have been stable since at least 2019. Copper and silver concentrations in 2024 were similar to 2023 and 2019, relative to reference, but were significantly higher than most (copper) or all (silver) remaining prior years, indicating that sediment concentrations copper and silver have not increased to concentrations significantly greater than those observed in 2019 when sampling station relocation occurred.

In the exposed sediments from QUL-LNF1, arsenic, copper, manganese, and silver concentrations were positively associated with % clay content, and copper, manganese, and silver were also positively associated with TOC (Appendix Figure E.1.5, Appendix Table E.1.13). The significant correlations in exposed sediments infer that the tailings-influenced sediments at the shallow sampling areas of Quesnel Lake with higher clay and TOC content tend to have higher concentrations of Analytes of Interest (e.g., arsenic, copper, manganese, and silver). Correlations of sediment characteristics that considered both exposed (QUL-LNF1) and reference (QUL-LREF1) areas were highly leveraged results, therefore were excluded from detailed interpretation (Appendix Figure E.1.5).

5.2.2 Sediment Toxicity

Sediment toxicity testing in Quesnel Lake was completed in 2024 using *C. dilutus* (10-day standard test using static methods) to test deep near-field (QUL-PNF) and reference (QUL-PREF1) sediments, and was completed using *H. azteca* (14-day standard test using static methods) to test shallow near-field (QUL-LNF1) and reference (QUL-LREF1) sediments (Figure 3.2, Table 3.3). Prior sediment toxicity monitoring within the 2022 to 2024

[55] The shallow near-field area of Quesnel Lake (QUL-LNF1) was moved in 2019 from its previous location due to variable water levels in the lake. Specifically, QUL-LNF1 stations that were originally sampled in 2015 to 2016 were either dry in 2019 or only very shallow (<0.5 m depth). As such, the QUL-LNF1 monitoring locations were moved in 2019 to adjacent locations that were deeper and continually submerged (see Minnow 2020a for details). These sediment stations established in 2019 were resampled in 2020 to 2024.

period included annual testing of *H. azteca* using sediments from the shallow near-field (QUL-LNF1) and reference (QUL-LREF1) areas (Figure 3.2, Table 3.3).

A review of the 2024 sediment toxicity results (Appendix B) indicated that the data met the established DQOs and can be used with a high level of confidence for interpretation (see Section 5.1.2 for details). A review of 2024 supporting water data quality associated with toxicity testing indicated that DOC was detected in one of three method blanks at a concentration of 0.51 mg/L, which surpassed the limit of reporting (LOR) of 0.5 mg/L (see Appendix B for more details). However, the DOC content of samples collected in 2024 was at least an order of magnitude greater than the LOR and, therefore, data are considered acceptable for interpretation. The exceedance for DOC does not affect the interpretation of sediment toxicity data but could influence the BCWQG calculated for dissolved copper since DOC is used in this guideline calculation.

5.2.2.1 Deep Areas

Survival of *C. dilutus* exposed to QUL-PNF sediments in 2024 showed a moderate response relative to the lab control and a low response relative to the reference sediments (23 to 46% mortality; Table 5.15). Although the control-normalized survival of *C. dilutus* in 2024 was lower than all prior years (Figure 5.17; i.e., greater mortality), the response classification relative to the lab control was similar to 2018 results (moderate response; Minnow 2019a). When compared to reference sediments, the survival of *C. dilutus* in 2024 had a lower response (i.e., lower mortality) than in 2018 (i.e., moderate response), but a higher response (i.e., greater mortality) than remaining prior years (Figure 5.17). The growth of *C. dilutus* exposed to QUL-PNF sediments showed no unacceptable response relative to laboratory control, but growth showed a low response relative to reference (QUL-PREF1; 25% reduction; Table 5.15). In contrast to the survival rate of *C. dilutus* in 2024, which was the lowest control-normalized survival rate observed across all studied years, control-normalized growth of *C. dilutus* in 2024 was the highest growth (lowest response) observed to date (Figure 5.17).

Evaluation of regression relationships indicated that control-normalized *C. dilutus* survival were positively related to TOC and negatively related to copper concentrations, however, correlation coefficients of these significant relationships were both weak after removal of outliers (r^2 values of 0.152 and 0.0724, respectively; Figure 5.18, Table 5.16). The regression relationships of control-normalized growth with TOC and copper concentrations after removal of outliers were significant and had stronger r^2 values of 0.400 and 0.548, respectively, which are consistent with moderate descriptive power (Milton and Arnold 2002).

The observed impact on growth and survival of *C. dilutus* exposed to deep near-field sediments is consistent with a breach-related effect that occurs due to a combination of low TOC and high

Table 5.15: Summary of *Chironomus dilutus* 10-day Survival and Growth Responses for Sediment Toxicity Testing of Quesnel Lake (QUL-PNF; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2024

Results and Classification	Profundal Near Field (QUL-PNF)	
	Survival	Growth[a]
	%	mg
Raw Area Result	54 ± 30.5	2.44 ± 1.11
Raw Laboratory Control Result	100 ± 0	1.66 ± 0.12
Raw Reference Result (QUL-PREF1)	70 ± 18.7	3.25 ± 0.29
Control Normalized Response[c]	54%	147%
Reference Normalized Response[c]	77%	75%
Statistical Difference from Control	Y	N
Statistical Difference from Reference	N	N
CLASSIFICATION[b]	**MR / LR**	**NR / LR**

No unacceptable response (<20% reduction) - **NR**.
Low response (20-50% reduction) and not significantly different than control and reference - **LR**.
Moderate response (20-50% reduction) and significantly different than control and reference - **MR**.
High response (>50% reduction) - **HR**.

Notes: Y = Yes. N = No.

[a] Growth = dry weight per surviving organism (mg).

[b] Where comparisons to mean laboratory control result and the mean field reference result did not fall into the same response classification, the result was discussed relative to both the control and the field reference.

[c] Response for survival differed significantly from the laboratory control but not the reference. The result was classified as moderate/low response. Since comparisons of survival to mean laboratory control result and the mean field reference result did not fall into the same response classification, the result was discussed relative to both the control and the field reference.

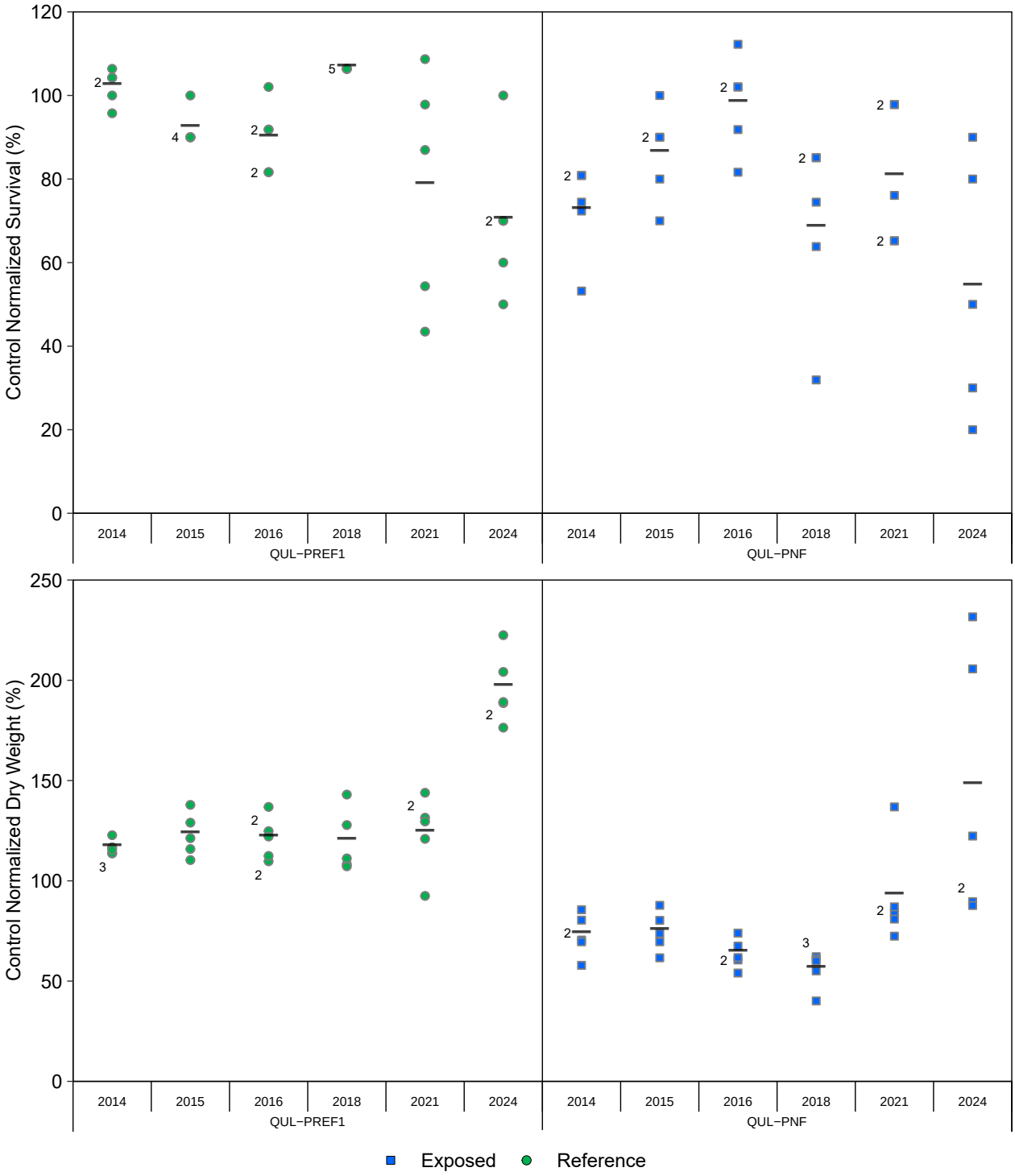

Figure 5.17: *Chironomus dilutus* Survival and Growth Responses (10−day) for Sediment Toxicity Testing at the Quesnel Lake (QUL−PNF; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: Green represents reference areas and blue represents exposed areas. Survival and growth data were normalized as a percentage of control performance for the same test batch. Numbers beside points on the plot indicate the number of overlapping results plotted.

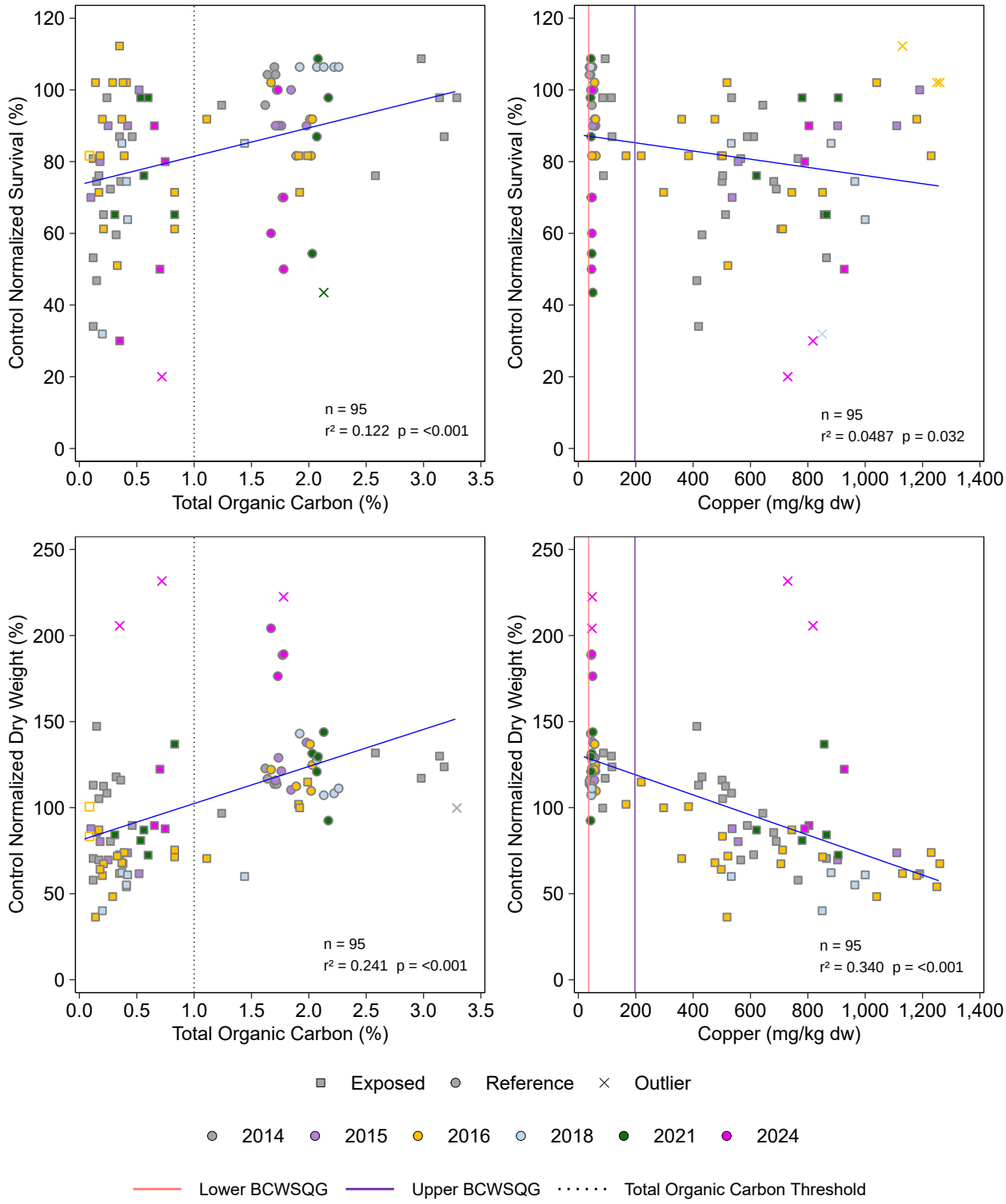

Figure 5.18: Simple Linear Regression Models of Control Normalized *Chironomus dilutus* Survival and Growth (10-day) Responses Relative to Sediment Characteristics at the Quesnel Lake (QUL−PNF; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024). Total Organic Carbon Threshold = the Total Organic Carbon concentration below which *C. dilutus* have been shown to be intolerant (Suedel et al. 1993). Control normalized survival and growth data were normalized as a percentage of control performance for the same test batch. Censored values are shown as open symbols. Statistical comparison shown (n, p, r^2) are based on linear regression before the removal of outliers. Outliers are noted with a ×. Regression model includes data from the following deep areas of Quesnel Lake (2014 to 2024): QUl-PNF, QUL-PFF1, QUL-PFF2, QUL-PFFF, QUL-I, QUL-PREF1, and QUL-PREF2.

Table 5.16: Simple Linear Regression Models of Control Normalized *Chironomus dilutus* 10-day Survival and Growth Responses Relative to Sediment Characteristics of Quesnel Lake Deep Monitoring Areas, 2014 to 2024

Response	Predictor	Data Set	n	Slope	Intercept	P-value	r^2
Control Normalized Survival (%)	Sediment TOC (%)	All Data	95	7.92	73.6	<0.001	0.122
		Outliers excluded[a]	93	8.25	74.3	<0.001	0.152
	Sediment Copper (mg/kg dw)	All Data	95	-0.0114	87.5	0.032	0.0487
		Outliers excluded[a]	89	-0.0128	88.7	0.011	0.0724
Control Normalized Dry Weight (%)	Sediment TOC (%)	All Data	95	21.5	80.9	<0.001	0.241
		Outliers excluded[a]	91	24.3	74.4	<0.001	0.400
	Sediment Copper (mg/kg dw)	All Data	95	-0.0582	131	<0.001	0.340
		Outliers excluded[a]	91	-0.0598	127	<0.001	0.548

P-value < 0.05

Notes: mg/kg dw = milligrams per kilogram dry weight, TOC = total organic carbon. Total organic carbon and copper concentrations measured in the <63 µm sediment fraction. Regression model includes data from the following deep areas of Quesnel Lake (2014 to 2024): QUL-PNF, QUL-PFF1, QUL-PFF2, QUL-PFFF, QUL-I, QUL-PREF1, and QUL-PREF2.

[a] Outliers were removed from the regression based a Cook's Distance > 6/n.

concentrations of copper and the suite of breach-related analytes that correlate positively with copper (see Section 5.2.1). It is notable that Suedel et al. (1993) reported the intolerance of *Chironomus tentans* (the commonly used former name of *C. dilutus*) to sediments with organic content less than 1% and Suedel and Rodgers (1994) reported poor survival of *C. tentans* at organic content of 0.5% or lower. More specifically, Suedel and Rodgers (1994) documented a minimum organic matter requirement between 0.76% and 0.91% even when *C. tentans* were fed daily during 10-day exposures. For comparison, the mean TOC content in sediments collected from the Quesnel Lake deep near-field area (QUL-PNF) in 2024 was 0.635 ± 0.162% and ranged from 0.351% to 0.748% (Appendix Table C.2.8), which is similar to TOC content in previous years for this area (Table 5.13). The upper BCWSQG for copper is 197 mg/kg and is considered to represent a concentration that, if exceeded, will likely cause severe effects on aquatic life (BCMOWLRS 2024). Despite substantial evidence that bioavailability of copper in breach-influenced sediments may be limited (SRK 2015a,b; Minnow 2015a, 2018f, 2019a, 2020a; Golder 2017c), it is plausible that mean concentrations 3.5-times the upper BCWSQG, which were observed in 2024, would also have an influence on the growth of *C. dilutus*.

Overall, the survival of *C. dilutus* exposed to deep near-field sediments in 2024 showed a low to moderate response, and growth showed either no response or a low response. The survival response in 2024 was similar to 2018, but showed lower survival than other prior years, while growth in 2024 was higher than in prior years. It is apparent that low TOC and high sediment copper concentrations in deep near-field sediments of Quesnel Lake continue to be effective descriptors of growth responses in sediment toxicity tests of *C. dilutus*. This does not indicate that elevated copper and/or low TOC (both of which are indicative of the influence of the breach) are the sole causes of the observed responses, only that they predict the responses at concentrations that make mechanistic sense and are indicative of an influence of both physical and chemical conditions on the observed organism responses.

5.2.2.2 Shallow Areas

Survival of *H. azteca* exposed to QUL-LNF1 sediments in 2024 showed a moderate response (31 to 38% mortality; Table 5.17), which was consistent with most prior years (i.e., 2016, 2020, 2021, 2022) but represented lower mortality than in 2019 and 2023 when survival responses were high (Figure 5.19). Growth of *H. azteca* exposed to QUL-LNF1 sediments showed a moderate to high response (48 to 63% reduction in growth; Table 5.17), which was consistent with the growth response in 2020, and a lower response (i.e., higher growth) than most prior years (i.e., 2016, 201, 2021, 2022, 2023) which had high growth responses (for similar 14-day standard static tests Figure 5.19).

Table 5.17: Summary of *Hyalella azteca* 14-day Survival and Growth Responses for Sediment Toxicity Testing of Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2024

Results and Classification	Littoral Near Field (QUL-LNF)	
	Survival	Growth[a]
	%	mg
Raw Area Result	62.0 ± 20.5	0.12 ± 0.02
Raw Laboratory Control Result	100.0 ± 0.00	0.23 ± 0.05
Raw Reference Result (QUL-LREF1)	90.0 ± 12.30	0.32 ± 0.04
Control Normalized Response	62%	52%
Reference Normalized Response	69%	38%
Statistically Significant Reduction from Control	Y	Y
Statistically Significant Reduction from Reference	Y	Y
CLASSIFICATION [b]	**MR**	**MR** / **HR**

No unacceptable response (<20% reduction) - **NR**.
Low response (20-50% reduction) and not significantly different than control and reference - **LR**.
Moderate response (20-50% reduction) and significantly different than control and reference - **MR**.
High response (>50% reduction) - **HR**.

Notes: Y = Yes. N = No.

[a] Growth = dry weight per surviving organism (mg).

[b] Where comparisons to mean laboratory control result and the mean field reference result did not fall into the same response classification, the result was discussed relative to both the control and the field reference.

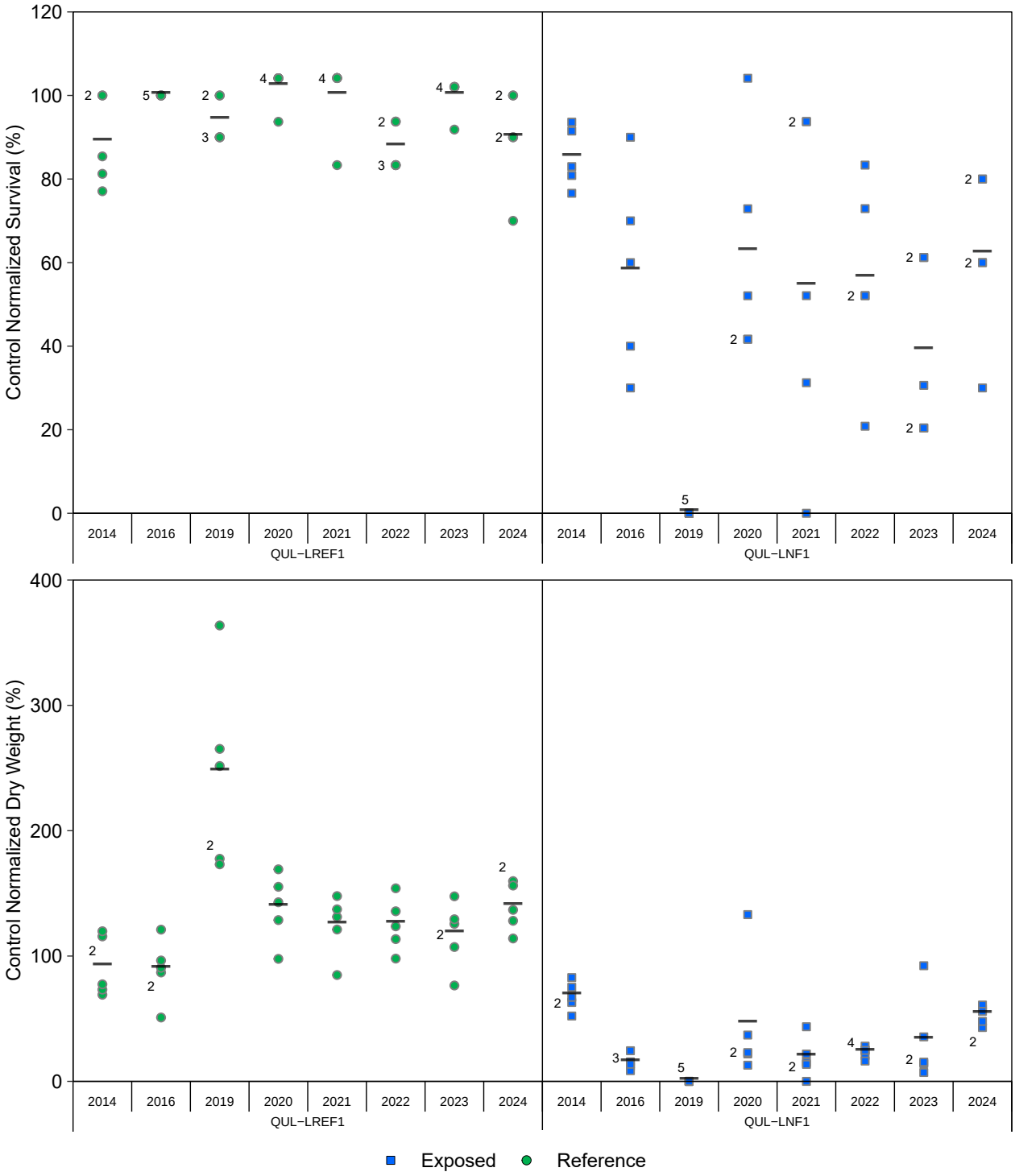

Figure 5.19: *Hyalella azteca* Survival and Growth Responses (14−day) for Sediment Toxicity Testing at the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: Green represents reference areas and blue represents exposed areas. Survival and growth data were normalized as a percentage of control performance for the same test batch. Numbers beside points on the plot indicate the number of overlapping results plotted.

Mean sediment copper concentrations at QUL-LNF1 in 2024 were 1,708 ± 294 mg/kg (Appendix Table C.2.12), which was greater than a laboratory determined copper 10-day LC_{50} (lethal concentration to 50% of test organisms) of 1,078 mg/kg for *H. azteca* (Cairns et al. 1984). The corresponding dissolved aqueous copper LC_{50} concentration from the Cairns et al. (1984) study was 39 µg/L. The mean dissolved copper concentrations observed in overlying water of QUL-LNF1 toxicity testing vessels on day 14 of the test in 2024 (84.2 ± 10 µg/L; Appendix G) was approximately 2.2-times higher than the LC_{50} reported by Cairns et al. (1984) and approximately 3.4-times higher than the BLM-based acute BCWQG (24.9 µg/L; Figure 5.20). Dissolved copper concentrations in the overlying water of toxicity test vessels were notably higher for exposed (QUL-LNF1; mean of 84.2 µg/L ± 10 µg/L) than for reference sediments (QUL-LREF1; mean of 3.27 ± 0.84 µg/L; Figure 5.20; Appendix G). The mean dissolved copper concentrations of laboratory-collected overlying water for both exposed and reference treatments were also notably higher than field-collected (*in situ*) overlying water samples (QUL-LNF1 mean = 0.502 µg/L; QUL-LREF1 mean = 0.580 µg/L; Appendix Table C.1.3), which remained below the BLM-based chronic BCWQG (1.0 µg/L; Figure 5.20). Specifically, the ratio of mean dissolved copper concentrations in toxicity testing overlying waters compared to *in situ* field-collected waters was 168-times for QUL-LNF1 sediments in 2024 (Appendix G; Appendix Table C.1.3). This ratio was similar to the ratio observed in 2019 (175-times), and higher than the ratio observed in 2020 (74-times), 2021 (114-times), 2022 (97-times), and 2023 (78-times; Figure 5.20; Minnow 2020a, 2021a, 2022a, 2023a, 2024a). Combined, these results suggest copper mobilization occurred in the test setup that has either not occurred in the field or has attenuated over time.

In 2021, the 14-day *H. azteca* testing was conducted using static and static-renewal methods (i.e., renewing the testing waters during the test) to better understand the evolution of dissolved copper to overlying test waters and associated implications to toxicity test results (Minnow 2022a). While the dissolved copper concentrations in overlying water of bioassay vessels were decreased by using static-renewal methods, the test methods were not representative of *in situ* conditions, with dissolved copper concentrations in overlying water remaining 56-times higher than *in situ* (Minnow 2022a). Except for the use of both static and static-renewal methods in 2021, 14-day *H. azteca* toxicity testing has been completed solely using static test methods in other monitoring years.

Evaluation of regression relationships indicated that control-normalized survival and growth of *H. azteca* were significantly positively related to sediment TOC and significantly negatively related to sediment copper concentrations and to aqueous dissolved copper concentrations in the overlying water of bioassay vessels. No significant relationships existed between control-normalized survival and growth and dissolved aqueous copper in water overlying

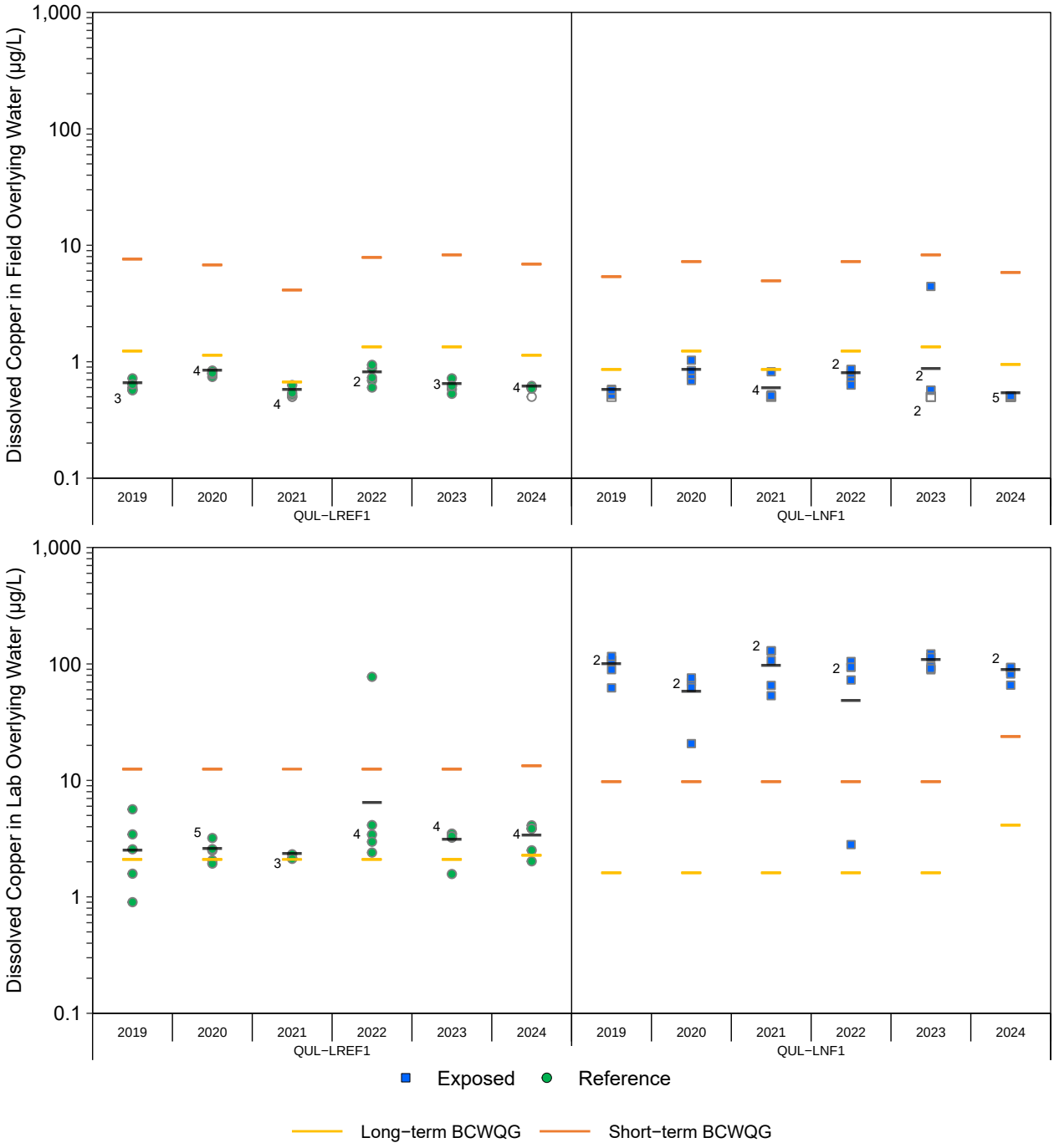

Figure 5.20: Dissolved Copper Concentrations in Laboratory and Field Overlying Water Associated with *Hyalella azteca* Survival and Growth (14−day) Sediment Toxicity Testing at the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2019 to 2024

Notes: BCWQG = British Columbia Water Quality Guidelines (BCMOWLRS 2024, 2025). Green represents reference areas and blue represents exposed areas. Numbers beside dots on the plot indicate the number of overlapping points. Copper guidelines were calculated based on the Biotic Ligand Model (BLM) Look−up Table using temperature, pH, dissolved organic carbon, and hardness (BCMOWLRS 2025). Copper WQG shown on plots are the most conservative (lowest) guidelines for replicate sets at for a given area and year. Data for estimating the copper guideline using the BLM were not available for before 2023 for overlying lab water; therefore, the 2023 guideline is shown for all years up to and including 2023.

sediment *in situ* (Figure 5.21, Table 5.18). The relationships with copper concentrations in sediment and test overlying waters (dissolved copper) had strong r^2 values ranging from 0.612 to 0.709 after removal of outliers, which are r^2 values consistent with strong descriptive power (Milton and Arnold 2002). These relationships infer lower *H. azteca* growth and survival at higher dissolved copper concentrations in the overlying water, which is consistent with the fact that *H. azteca* have been documented to derive little nutrition from sediment and to respond primarily to contaminants in overlying water (Wang et al. 2004). As indicated above, dissolved copper concentrations in overlying water of the exposed (QUL-LNF1) test vessels were approximately 3.4-times higher than the BLM-based acute BCWQG, which is consistent with the moderate to high mortality rate observed in this test in 2024. Mean dissolved copper concentrations in the overlying test waters for reference sediments (QUL-LREF1; mean = 3.27 µg/L) were lower than the acute BLM-based acute BCWQG (11.4 µg/L) but higher than the chronic BCWQG (1.9 µg/L; Figure 5.20).

Overall, temporal trends of *H. azteca* toxicity test results suggest a residual breach-related influence on *H. azteca* toxicity for both growth and survival within the small shallow near-field area near the mouth of Hazeltine Creek. However, the substantial difference in overlying water quality between laboratory and field conditions (as noted earlier) indicates the toxicity test results from this area cannot be reliably extrapolated to field (*in situ*) exposure but suggests potential for copper mobilization in this area with disturbance.

5.2.3 Plankton Community and Productivity

Plankton community and productivity monitoring was completed annually between 2022 and 2024 with three sampling events per year (June, July, and August) in exposed (QUL-ZOO-1) and reference (QUL-ZOO-7) areas of Quesnel Lake (Figure 3.3, Tables 3.4 and 3.5). Single phytoplankton and zooplankton samples were collected in June and August, whereas replicate samples were collected in July of each year (n = 5 per area; see Section 3.3.1 for details).

A review of the 2024 plankton community and productivity results and supporting water quality results (Appendix B) indicated that these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

5.2.3.1 Phytoplankton

5.2.3.1.1 Community

Qualitative evaluation of seasonal data from 2024 indicated that phytoplankton total densities at QUL-ZOO-1 (exposed) and QUL-ZOO-7 (reference) were highest in June and July and decreased in August, while taxon richness at both QUL-ZOO-1 and QUL-ZOO-7 was lower in June and July relative to August 2024 (Appendix Figure E.2.7, Appendix Table C.3.5).

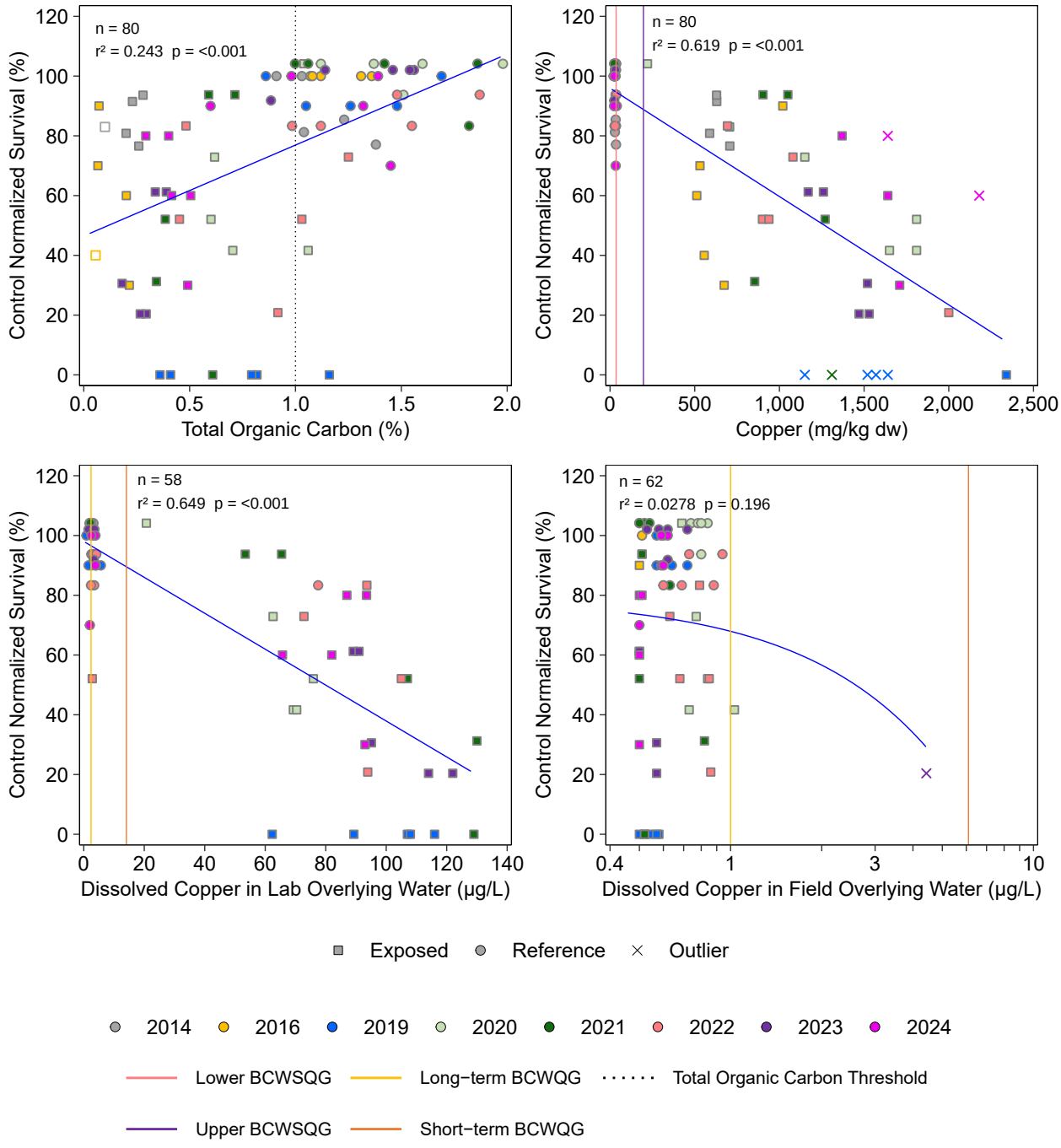

Figure 5.21: Simple Linear Regression Models of Control−Normalized *Hyalella azteca* Survival and Growth (14−day) Responses Relative to Sediment and Overlying Water Characteristics at the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024). BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Total Organic Carbon Threshold = the Total Organic Carbon concentration below which *C. dilutus* have been shown to be intolerant (Suedel et al. 1993). Displayed BCWQG for dissolved copper are the most conservative values for QUL−LNF for 2024 calculated using the Biotic Ligand Model Look−up Table (BCMOWLRS 2025). Field and lab overlying water dissolved copper data are only available from 2019 to 2024. Censored values are shown as open symbols. Outliers are noted with a ×. Statistical comparison shown (n, p, r²) are based on linear regression before the removal of outliers. For plots showing dissolved copper concentrations in water measured in the field, the x−axis has been log10 −transformed to better display the data.

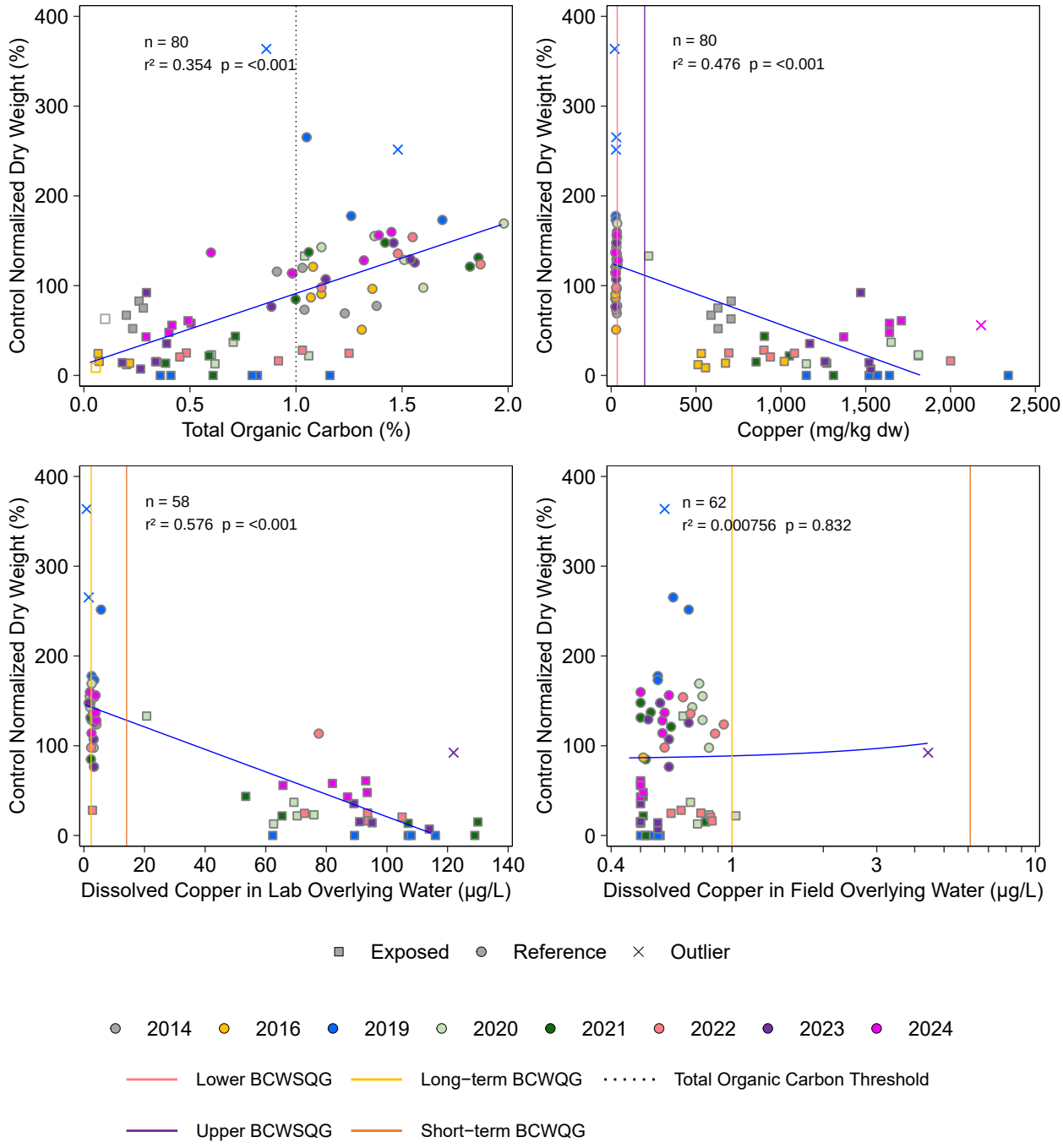

Figure 5.21: Simple Linear Regression Models of Control−Normalized *Hyalella azteca* Survival and Growth (14−day) Responses Relative to Sediment and Overlying Water Characteristics at the Quesnel Lake (QUL−LNF1; Exposed and QUL−LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024). BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Total Organic Carbon Threshold = the Total Organic Carbon concentration below which *C. dilutus* have been shown to be intolerant (Suedel et al. 1993). Displayed BCWQG for dissolved copper are the most conservative values for QUL−LNF for 2024 calculated using the Biotic Ligand Model Look−up Table (BCMOWLRS 2025). Field and lab overlying water dissolved copper data are only available from 2019 to 2024. Censored values are shown as open symbols. Outliers are noted with a ×. Statistical comparison shown (n, p, r^2) are based on linear regression before the removal of outliers. For plots showing dissolved copper concentrations in water measured in the field, the x−axis has been log10 −transformed to better display the data.

Table 5.18: Simple Linear Regression Models of Control Normalized *Hyalella azteca* 14-day Survival and Growth Responses Relative to Sediment and Overlying Water Characteristics of Quesnel Lake (QUL-LNF; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Response	Predictor	Data Set	n	Slope	Intercept	P-value	r^2
Control Normalized Survival (%)	Sediment TOC (%)	All Data	80	30.4	46.5	<0.001	0.243
	Sediment Copper (mg/kg dw)	All Data	80	-0.0363	95.9	<0.001	0.619
		Outliers excluded[a]	73	-0.0337	96.4	<0.001	0.676
	Dissolved Copper in Lab Overlying Water (µg/L)	All Data	58	-0.601	98.0	<0.001	0.649
	Dissolved Copper in Field Overlying Water (µg/L)	All Data	62	-11.3	79.3	0.196	0.0278
		Outliers excluded[a]	61	19.3	60.0	0.555	0.00594
Control Normalized Dry Weight (%)	Sediment TOC (%)	All Data	80	79.1	12.2	<0.001	0.354
		Outliers excluded[a]	78	75.9	9.86	<0.001	0.457
	Sediment Copper (mg/kg dw)	All Data	80	-0.0685	125	<0.001	0.476
		Outliers excluded[a]	76	-0.0633	114	<0.001	0.612
	Dissolved Copper in Lab Overlying Water (µg/L)	All Data	58	-1.25	146	<0.001	0.576
		Outliers excluded[a]	55	-1.18	135	<0.001	0.709
	Dissolved Copper in Field Overlying Water (µg/L)	All Data	62	4.11	84.6	0.832	0.000756
		Outliers excluded[a]	60	50.0	51.1	0.441	0.0103

P-value < 0.05.

Notes: mg/kg dw = milligrams per kilogram dry weight, TOC = total organic carbon, µg/L = micrograms per liter. TOC content and copper concentrations measured in the <63 µm sediment fraction.

[a] Outliers were removed from the regression based a Cook's Distance > 6/n.

Statistical analyses of replicated data (from July sampling events) indicated that mean phytoplankton density, taxon richness, Simpson's Diversity, and Simpson's Evenness were all similar between the exposed (QUL-ZOO-1) and reference (QUL-ZOO-7) areas of Quesnel Lake in 2024 (Figure 5.22, Table 5.19; Appendix Tables C.3.5 and C.3.6).

Temporal analyses showed similar patterns of phytoplankton density, richness, and Simpson's Evenness and Diversity between the exposed and reference areas of Quesnel Lake from 2019 to 2024. At both QUL-ZOO-1 and QUL-ZOO-7, mean phytoplankton densities increased significantly year-over-year from 2021 to 2023, then decreased significantly in 2024 but remained significantly higher than in 2019 to 2022 (Figure 5.22, Table 5.19). The similarity in temporal changes in total density between the areas over time suggests that these temporal patterns were related to variability in local environmental factors (e.g., light exposure and water temperature). The higher total densities of phytoplankton observed in 2023 and 2024 relative to previous years were driven by significantly higher Diatom densities at both the exposed and reference areas (Appendix Figures E.2.8 and E.2.9, Appendix Tables C.3.5 and E.2.3). Diatom densities at QUL-ZOO-1 have been similar to the reference area over time, except in 2020 when Diatom density was higher at the exposed area (Appendix Figure E.2.8, Appendix Table E.2.3).

At both QUL-ZOO-1 and QUL-ZOO-7, mean taxon richness was significantly higher in 2024 relative to 2023, but was significantly lower than prior post-breach years (i.e., 2019 to 2021 for QUL-ZOO-1; 2020 to 2022 for QUL-ZOO-7; Figure 5.22, Table 5.19). The significantly lower taxon richness in 2023 and 2024 at both the exposed and reference areas compared to prior years coincided with significantly higher total densities and dominance of Diatoms (Figures 5.22 and 5.23; Appendix Figure E.2.8, Appendix Table E.2.3). Taxon richness at QUL-ZOO-1 has been similar to the QUL-ZOO-7 reference area in most years, except for being significantly lower than reference in 2022 and 2023 (Figure 5.22, Table 5.19). Mean Simpson's Diversity and Evenness followed a similar temporal pattern as taxon richness with significantly lower Simpson's Diversity and Evenness at both QUL-ZOO-1 and QUL-ZOO-7 in 2022 to 2024 compared to all prior years (except for Simpson's Diversity at QUL-ZOO-7 in 2020; Figure 5.22, Table 5.19). Simpson's Diversity at QUL-ZOO-1 has consistently been similar to or significantly higher than at the reference area (QUL-ZOO-7), except for in 2022, which was likely associated with a significant increase in the relative density (%) of Chrysophytes. Simpson's Evenness at QUL-ZOO-1 has consistently been similar to QUL-ZOO-7 since 2021 (Figure 5.22, Table 5.19).

Qualitative evaluation of seasonal data from 2024 indicated that Diatoms and Chrysophytes were dominant at both the exposed and reference areas in June and July Figure 5.23, Appendix Table C.3.,). In August, the density and dominance of Diatoms decreased substantially in both areas and the relative densities (%) of Cryptomonads and Cyanobacteria increased

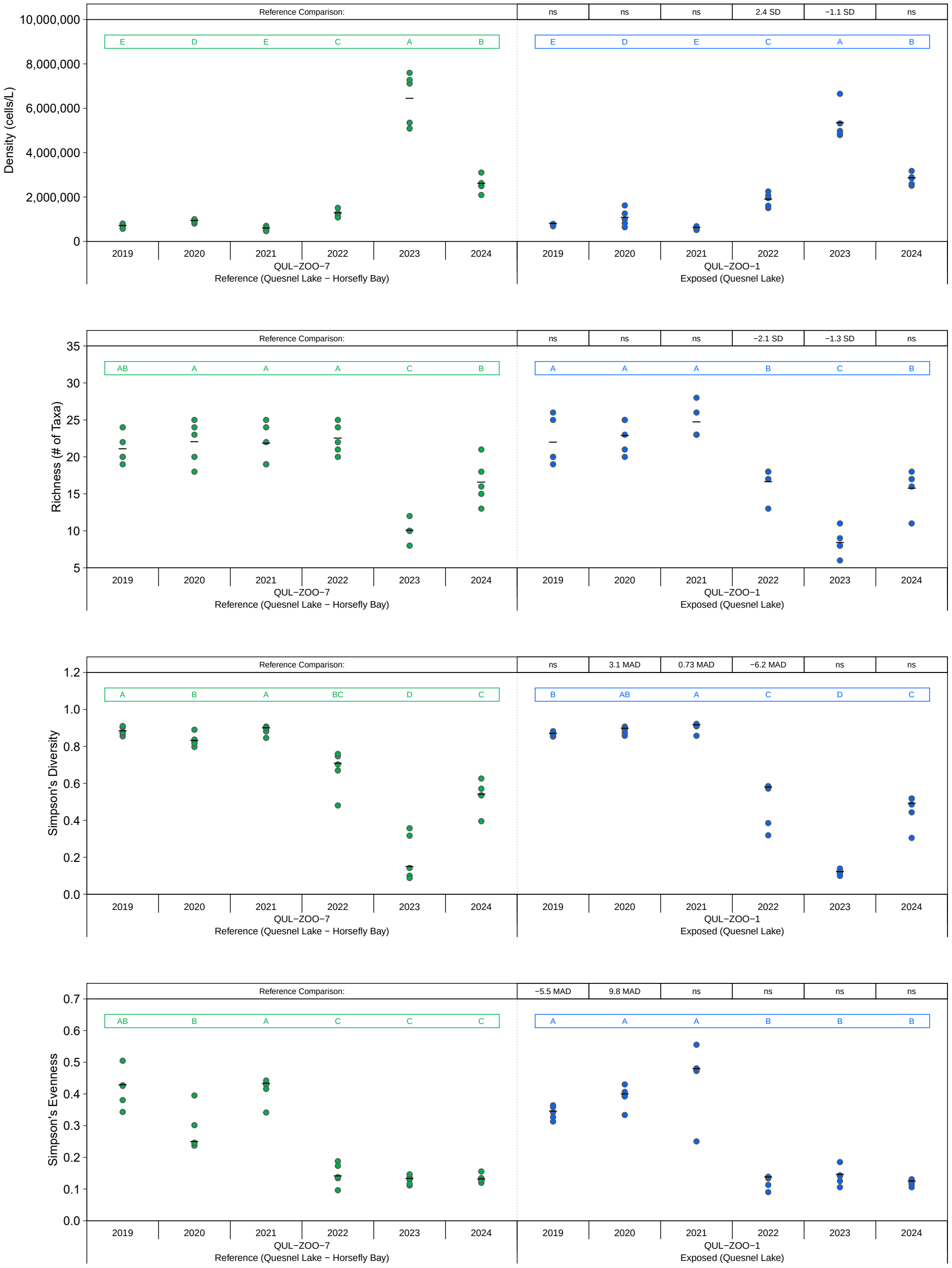

Figure 5.22: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non-significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5.

Table 5.19: Statistical Comparisons of Phytoplankton Community Metrics for Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
										Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year						2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Density (cells/L)	log10	-	-	0.011	Reference	QUL-ZOO-7	2019	651,204	645,498	E	D	E	C	A	B	Baseline	1.9	ns	3.9	14	8.2	ns
							2020	889,702	887,084													ns
							2021	550,375	543,568													ns
							2022	1,240,551	1,231,482													2.4
							2023	6,483,615	6,394,528													-1.1
							2024	2,564,138	2,543,757													ns
					Exposed	QUL-ZOO-1	2019	738,035	737,054	E	D	E	C	A	B	Baseline	1.9	ns	5.5	12	7.9	
							2020	1,066,664	1,012,408													
							2021	560,459	557,226													
							2022	1,240,551	1,231,482													
							2023	5,321,498	5,281,034													
							2024	2,802,274	2,792,327													
Richness (# of Taxa)	log10	-	-	0.018	Reference	QUL-ZOO-7	2019	21	21	AB	A	A	A	C	B	Baseline	ns	ns	ns	-5.2	ns	ns
							2020	22	22													ns
							2021	22	22													ns
							2022	22	22													-2.1
							2023	10	10													-1.3
							2024	17	16													ns
					Exposed	QUL-ZOO-1	2019	22	22	A	A	A	B	C	B	Baseline	ns	ns	-1.9	-6.7	-2.3	
							2020	23	23													
							2021	25	25													
							2022	22	22													
							2023	8	8													
							2024	16	16													
Simpson's Diversity	rank	-	-	0.003	Reference	QUL-ZOO-7	2019	0.882	0.876	A	B	A	BC	D	C	Baseline	-2.5	ns	-8.2	-35	-16	ns
							2020	0.833	0.824													3.1
							2021	0.886	0.894													0.73
							2022	0.672	0.702													-6.2
							2023	0.201	0.142													ns
							2024	0.533	0.536													ns
					Exposed	QUL-ZOO-1	2019	0.865	0.863	B	AB	A	C	D	C	Baseline	ns	2.2	-14	-35	-18	
							2020	0.886	0.890													
							2021	0.903	0.910													
							2022	0.672	0.702													
							2023	0.118	0.114													
							2024	0.454	0.485													
Simpson's Evenness	rank	-	-	0.048	Reference	QUL-ZOO-7	2019	0.416	0.425	AB	B	A	C	C	C	Baseline	ns	ns	-19	-19	-20	-5.5
							2020	0.285	0.246													9.8
							2021	0.412	0.429													ns
							2022	0.146	0.138													ns
							2023	0.128	0.130													ns
							2024	0.133	0.127													ns
					Exposed	QUL-ZOO-1	2019	0.341	0.342	A	A	A	B	B	B	Baseline	ns	ns	-14	-13	-14	
							2020	0.391	0.395													
							2021	0.447	0.476													
							2022	0.146	0.138													
							2023	0.140	0.141													
							2024	0.119	0.121													
Chlorophyll-a (µg/L)	rank	0.087	<0.001	0.237	Reference	QUL-ZOO-7	2019	1.77	1.97	B	B	C	A	C	C	Baseline	ns	-6.4	8.8	-6.8	-7.0	0.15
							2020	1.51	1.53													0.82
							2021	1.12	1.11													-0.37
							2022	3.22	3.15													-2.9
							2023	1.09	1.06													2.6
							2024	0.987	1.03													0.45
					Exposed	QUL-ZOO-1	2019	2.04	1.99	B	B	C	A	C	C	Baseline	ns	-7.0	5.8	-4.3	-6.7	
							2020	1.59	1.64													
							2021	1.05	1.06													
							2022	3.22	3.15													
							2023	1.34	1.41													
							2024	1.07	1.09													

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significant. µg/L = micrograms per litre.

[a] MCT = Measures of Central Tendency. Mean, geometric mean, or median depending on if analysis was conducted on untransformed, log $_{10}$-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

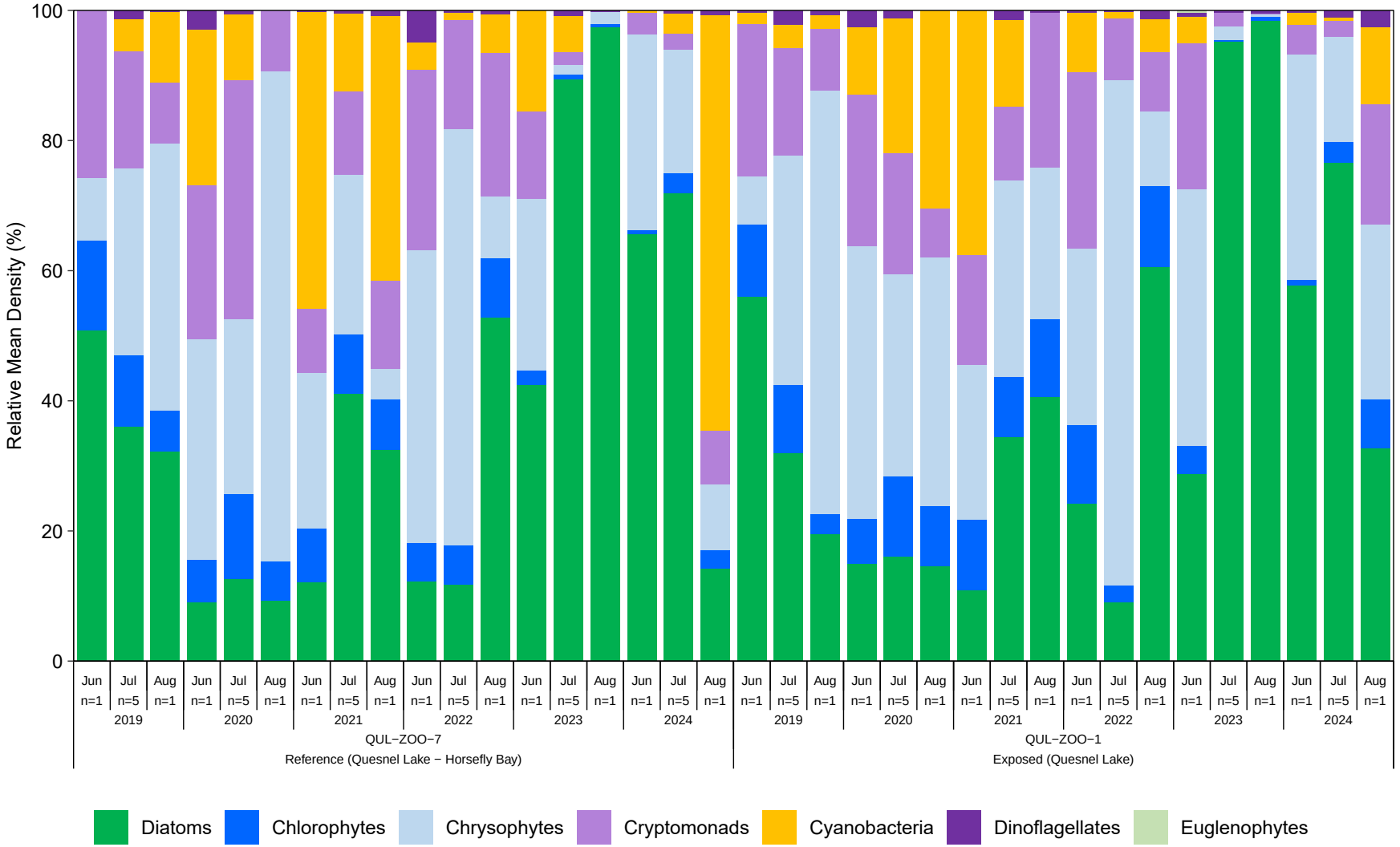

Figure 5.23: Relative Mean Densities of Major Phytoplankton Taxa for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2019 to 2024

(especially Cyanobacteria at QUL-ZOO-7; Figure 5.23; Appendix Figure E.2.9; Appendix Table C.3.5). Statistical analyses of replicated data (from July sampling events) indicated that the densities and relative densities (%) of taxa at QUL-ZOO-1 did not differ significantly from QUL-ZOO-7 in 2024, except for slightly fewer Chrysophytes at QUL-ZOO-1 relative to QUL-ZOO-7 (MODs -0.73 to -0.32 SD; Appendix Figure E.2.8, Appendix Table E.2.3).

Temporal analysis of community composition indicated there have consistently been no significant differences in the densities and relative densities (%) of Diatoms, Chlorophytes, and Cyanobacteria between the exposed and reference areas from 2019 to 2024, except for a significantly higher mean Diatom density at QUL-ZOO-1 in 2020 (Appendix Figure E.2.8, Appendix Table E.2.3). The density and relative density (%) of Chrysophytes at QUL-ZOO-1 compared to QUL-ZOO-7 were significantly higher than from 2019 to 2023, but significantly lower in 2024, although the difference was slight as outlined above. The temporal patterns in the density and relative density (%) of Chrysophytes have been similar between the exposed and reference areas (Appendix Figures E.2.8, Appendix Table E.2.3). The relative densities (%) of Cryptomonads at QUL-ZOO-1 were similar to those at QUL-ZOO-7 in most years, but significantly lower in 2022 and 2020 compared to QUL-ZOO-7 (Appendix Figure E.2.8, Appendix Tables C.3.5 and E.2.3). The remaining taxa (i.e., Dinoflagellates) represented approximately < 5% of the community at both the exposed and reference areas, therefore were not considered further. The relative similarities between the phytoplankton communities at the exposed and reference areas of Quesnel Lake from 2019 to 2024 can likely be attributed to similar water temperatures and nutrient concentrations at the surface and throughout the photic zones (Appendix Figures A.1.6 and C.1.5, Appendix Table C.1.4), given these factors are known to affect phytoplankton communities (Schnurr and Allen 2015).

Overall, the phytoplankton community at the exposed area (QUL-ZOO-1) from 2019 to 2024 was characterized by total density, taxon richness, and Simpson's Diversity that were similar to or significantly higher than at the reference area (QUL-ZOO-7), with few exceptions (density in 2023, richness in 2022 and 2023, and Simpson's Diversity in 2022). These exceptions were primarily related to significantly increased densities and dominance of Chrysophytes in 2022 and Diatoms in 2023, at both the exposed and reference areas. Simpson's Evenness of the phytoplankton community at the exposed area has consistently been similar to the reference area since 2021. The composition of the phytoplankton community at the exposed area has been consistently similar to the reference area from 2019 to 2024 in terms of the relative densities (%) of most taxa (i.e., Diatoms, Chlorophytes, and Cyanobacteria), and statistically significant differences between the areas for other taxa (i.e., Chrysophytes) have been small. The similarities between the phytoplankton communities at exposed and reference areas over time suggest an influence of local environmental factors on the phytoplankton community of Quesnel Lake.

5.2.3.1.2 Productivity

Qualitative evaluation of seasonal chlorophyll-a concentrations in 2024 indicated that productivity was highest in July and lower in June and August at both QUL-ZOO-1 and QUL-ZOO-7 (Appendix Figure E.2.7, Appendix Table C.3.5). Statistical analyses of replicated data (from July sampling events) indicated that mean chlorophyll-a concentrations at the exposed area (QUL-ZOO-1) in 2024 were significantly higher than those at the reference area (QUL-ZOO-7) but the difference was slight (0.45 MAD), suggesting that the difference was not ecologically meaningful.

Chlorophyll-a concentrations at QUL-ZOO-1 have been significantly different from QUL-ZOO-7 in each year from 2019 to 2024, but the difference has been slight (-0.37 to 0.82 MAD) in most years, except for 2022 (-2.9 MAD) and 2023 (2.6 MAD; Figure 5.24, Table 5.19). The temporal changes in mean chlorophyll-a concentrations have been the same at the exposed area compared to the reference area; concentrations were significantly higher in 2022 relative to previous years and then decreased significantly in 2023, such that concentrations in 2023 and 2024 were similar to 2021 (Figure 5.24, Table 5.19; Appendix Tables C.3.5 and C.3.6). The similar temporal changes of chlorophyll-a concentrations at both the exposed and reference areas is likely directly related to the similar nutrient concentrations, surface water temperatures, and water temperatures throughout the photic zones of both areas (Appendix Figures A.1.6 and C.1.5, Appendix Table C.1.4).

A lake's trophic status classification corresponds to its overall productivity in terms of phytoplankton biomass (chlorophyll-a) and nutrient concentration (Wetzel 2001). Based on the mean concentrations of chlorophyll-a at QUL-ZOO-1 (1.07 µg/L) and QUL-ZOO-7 (0.987 µg/L) in 2024, Quesnel Lake was classified as ultraoligotrophic (<1 µg/L; Vollenweider and Kerekes 1982; Figure 5.24; Appendix Figure E.2.7, Appendix Table C.3.6). The trophic status of Quesnel Lake in 2024 has therefore become similar to the ultraoligotrophic system that was observed in earlier years post-breach years (i.e., 2016 to 2018) compared to between 2019 and 2023, when chlorophyll-a concentrations resulted in the lake being classified as oligotrophic (<2.5 µg/L) or mesotrophic (2022; Vollenweider and Kerekes 1982; Table 5.19; Appendix Figure E.2.7, Appendix Table C.3.5).

5.2.3.2 Zooplankton

5.2.3.2.1 Community

Qualitative evaluation of seasonal data from 2024 indicated that zooplankton total density remained similar over the season at the exposed area (QUL-ZOO-1), whereas density in June was lower than July and August at the reference area (QUL-ZOO-7; Appendix Figure E.2.10,

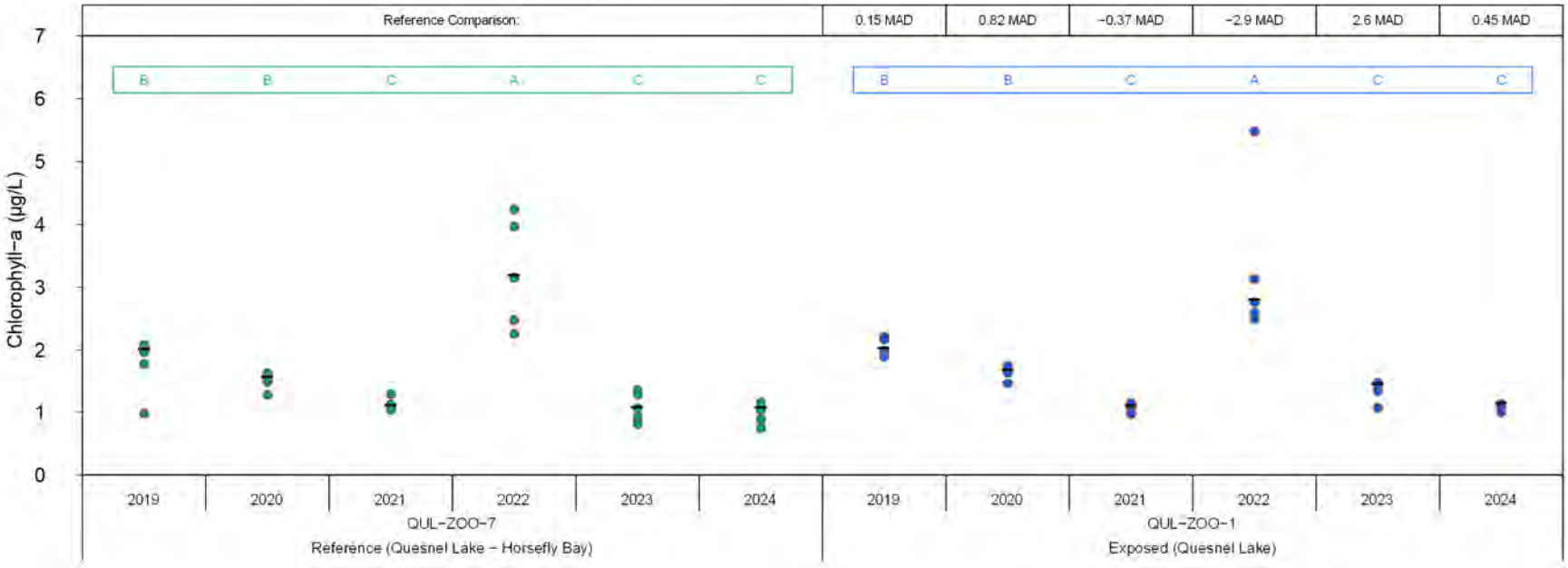

Figure 5.24: Phytoplankton Chlorophyll−a Concentrations for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: µg/L = micrograms per litre. Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of median absolute deviations (MAD; if the data were rank −transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5.

Appendix Table C.3.7). Qualitative comparisons indicate that zooplankton taxon richness was highest in August for both areas of Quesnel Lake compared to in June and July (Appendix Figure E.2.10, Appendix Table C.3.7). Statistical analyses of replicated data (from July sampling events) indicated that zooplankton mean density, taxon richness, and Simpson's Diversity were all similar between QUL-ZOO-1 and QUL-ZOO-7 in July 2024 (Figure 5.25, Table 5.20; Appendix Tables C.3.7 and C.3.8). Simpson's Evenness in July 2024 was significantly higher at QUL-ZOO-1 compared to QUL-ZOO-7; however, the MOD was small (0.43 SD), suggesting that the difference was not ecologically meaningful (Figure 5.25, Table 5.20).

Temporal analyses indicated that total density and taxon richness have not differed significantly between the exposed and reference areas in all years (2019 to 2024; Figure 5.25, Table 5.20). Total density decreased significantly from 2023 to 2024 at both the exposed and reference areas (Figure 5.25, Table 5.20), which was driven by a significant decrease in densities of all taxonomic groups between 2023 and 2024 at both areas (Appendix Figure E.2.11, Appendix Table E.2.4). Simpson's Diversity at QUL-ZOO-1 was similar to or significantly higher than at QUL-ZOO-7 in all years, whereas Simpson's Evenness was consistently slightly (i.e., MOD = 0.33 to 1.3 SD) higher at QUL-ZOO-1 compared to QUL-ZOO-7 from 2020 to 2024 (Figure 5.25, Table 5.20).

Qualitative evaluation of seasonal data from 2024 indicated that the zooplankton community from June to August was dominated by Rotifera, and the composition remained relatively similar from June to August at both areas, with slight shifts in relative densities (%) of the main taxonomic groups (Figure 5.26; Appendix Table C.3.7). Statistical analyses of replicated data (from July sampling events) indicated that the exposed and reference zooplankton communities in 2024 differed only in terms of the density and relative density (%) of Copepod Nauplii and the relative density (%) of Rotifera, although the differences were small (-0.60 to 1.2 SD; Figure 5.26; Appendix Figures E.2.11 and E.2.12, Appendix Table E.2.4).

Temporal analyses indicated that the zooplankton community at both the exposed and reference areas have been largely similar from 2019 to 2024, and have been consistently dominated by Rotifera over the monitoring period (Figure 5.26; Appendix Figure E.2.11, Appendix Table E.2.4). Specifically, the relative densities (%) of Calanoida, Cladocera, and Cyclopoida have been similar between the exposed and reference areas from 2020 to 2024. The relative densities (%) of Copepod Nauplii were consistently higher, and Rotifera were consistently lower, at QUL-ZOO-1 compared to QUL-ZOO-7 from 2019 to 2024, however the differences were small (-0.67 to 1.6 SD from 2020 to 2024; Appendix Figure E.2.11, Appendix Table E.2.4). This similarity in temporal trends in community composition at the exposed and reference areas indicates these changes were likely driven by natural variability in environmental parameters that affected the two

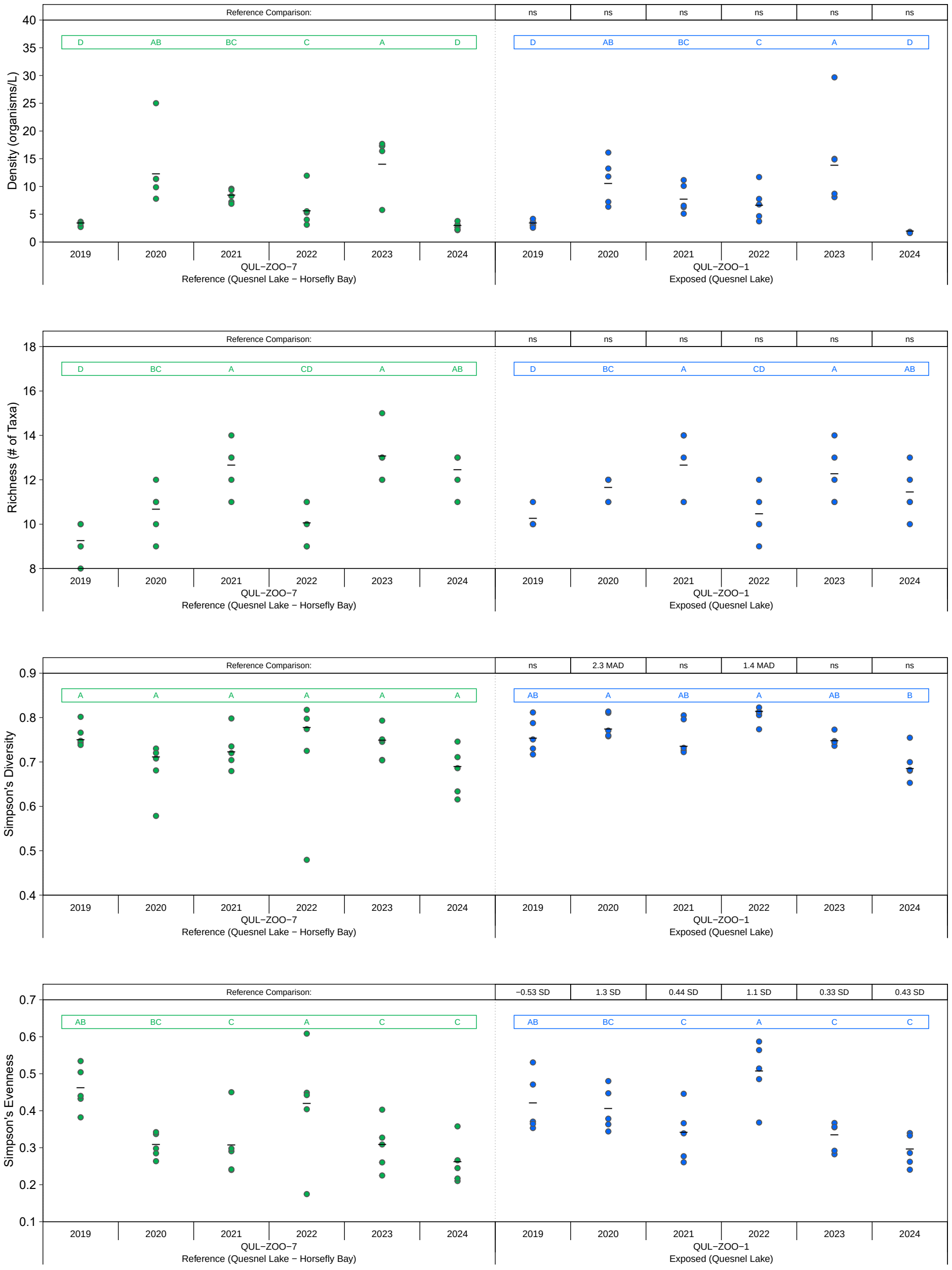

Figure 5.25: Zooplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non-significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.7.

Table 5.20: Statistical Comparisons of Zooplankton Community Metrics for Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	Mean	MCT[a]	Temporal Contrasts Within Areas											Spatial Comparison Within Years[b]
										Pairwise Comparisons Between Years						MOD Relative to Baseline[b]					
		Area	Year	Area x Year						2019	2020	2021	2022	2023	2024	2019	2020	2021	2023	2024	QUL-ZOO-1
Density (organisms/L)	log10	0.336	<0.001	0.482	QUL-ZOO-7	Reference	2019	3.21	3.18	D	AB	BC	C	A	D	Baseline	3.7	2.6	4.1	ns	ns
							2020	13.1	12.0												ns
							2021	8.27	8.20												ns
							2022	5.98	5.35												ns
							2023	14.9	13.8												ns
							2024	2.77	2.71												ns
					QUL-ZOO-1	Exposed	2019	3.27	3.22	D	AB	BC	C	A	D	Baseline	3.2	2.3	4.0	ns	
							2020	10.9	10.3												
							2021	7.84	7.49												
							2022	5.98	5.35												
							2023	15.3	13.6												
							2024	1.69	1.69												
Richness (# of Taxa)	none	0.726	<0.001	0.168	QUL-ZOO-7	Reference	2019	9	9	D	BC	A	CD	A	AB	Baseline	1.3	3.2	ns	3.0	ns
							2020	10.6	10.6												ns
							2021	13	13												ns
							2022	10	10												ns
							2023	13	13												ns
							2024	12	12												ns
					QUL-ZOO-1	Exposed	2019	10	10	D	BC	A	CD	A	AB	Baseline	1.3	2.2	ns	1.1	
							2020	12	12												
							2021	13	13												
							2022	10	10												
							2023	12	12												
							2024	11	11												
Simpson's Diversity	rank	-	-	0.062	QUL-ZOO-7	Reference	2019	0.759	0.747	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns
							2020	0.684	0.708												2.3
							2021	0.727	0.720												ns
							2022	0.719	0.774												1.4
							2023	0.740	0.745												ns
							2024	0.678	0.686												ns
					QUL-ZOO-1	Exposed	2019	0.759	0.751	AB	A	AB	A	AB	B	Baseline	ns	ns	ns	ns	
							2020	0.782	0.771												
							2021	0.756	0.732												
							2022	0.719	0.774												
							2023	0.749	0.745												
							2024	0.694	0.682												
Simpson's Evenness	none	0.051	<0.001	0.398	QUL-ZOO-7	Reference	2019	0.459	0.459	AB	BC	C	A	C	C	Baseline	ns	-2.0	ns	-2.6	-0.53
							2020	0.305	0.305												1.3
							2021	0.304	0.304												0.44
							2022	0.416	0.416												1.1
							2023	0.305	0.305												0.33
							2024	0.259	0.259												0.43
					QUL-ZOO-1	Exposed	2019	0.418	0.418	AB	BC	C	A	C	C	Baseline	ns	-1.0	ns	-1.6	
							2020	0.403	0.403												
							2021	0.338	0.338												
							2022	0.416	0.416												
							2023	0.330	0.330												
							2024	0.292	0.292												
Dry Weight Biomass (mg/L)	rank	0.868	<0.001	0.361	QUL-ZOO-7	Reference	2019	0.00474	0.00481	B	A	B	B	A	C	Baseline	2.4	ns	ns	-4.0	ns
							2020	0.00703	0.00698												ns
							2021	0.00412	0.00406												ns
							2022	0.00382	0.00403												ns
							2023	0.00916	0.00866												ns
							2024	0.00115	0.00110												ns
					QUL-ZOO-1	Exposed	2019	0.00390	0.00396	B	A	B	B	A	C	Baseline	2.8	ns	ns	-3.3	
							2020	0.00724	0.00655												
							2021	0.00327	0.00279												
							2022	0.00455	0.00458												
							2023	0.0104	0.0108												
							2024	0.000908	0.000894												

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significant. mg/L = milligrams per litre.

[a] MCT = Measures of Central Tendency. Mean, geometric mean, or median depending on if analysis was conducted on untransformed, log $_{10}$-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Remediated Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

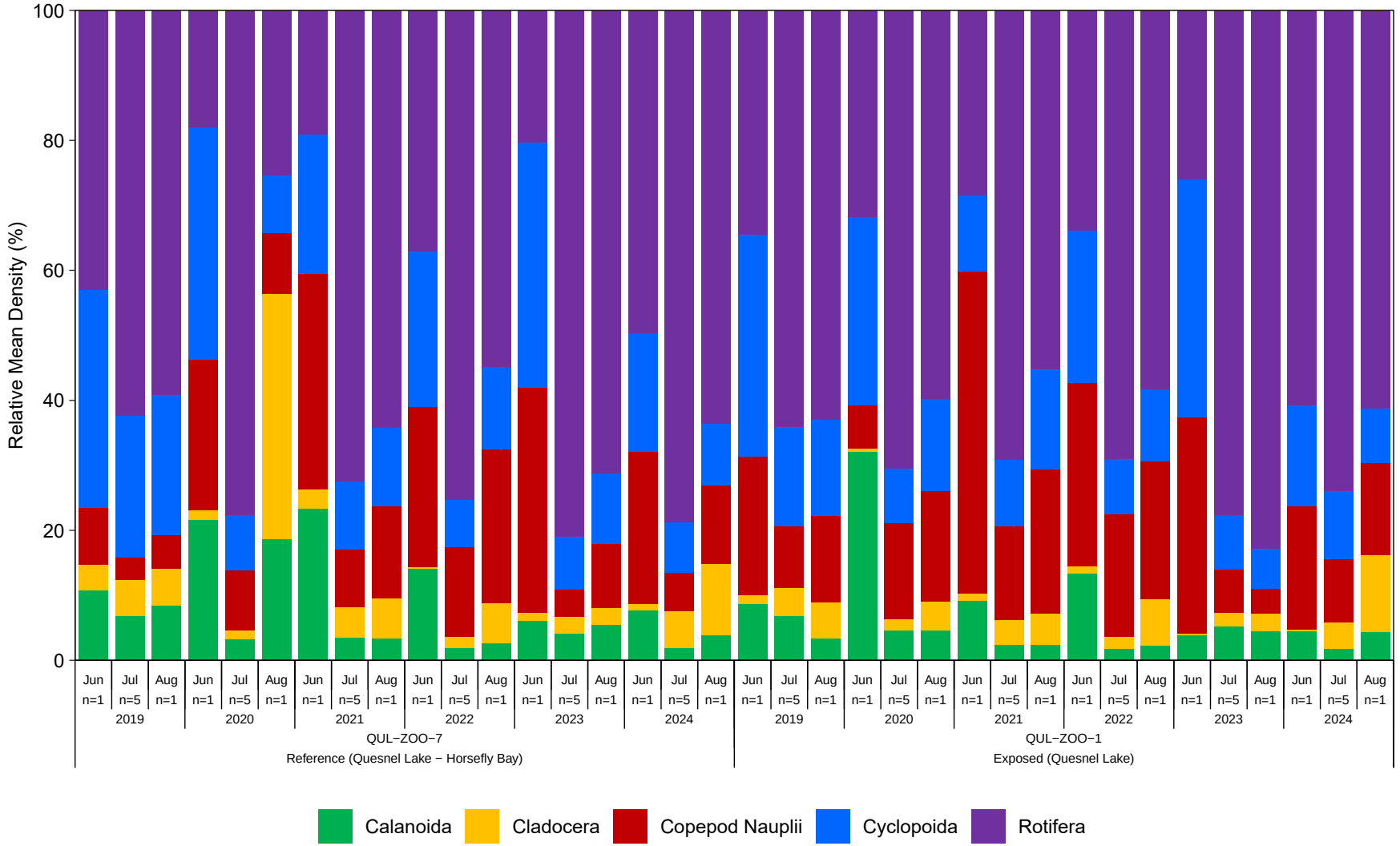

Figure 5.26: Relative Mean Densities of Major Zooplankton Taxa for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2019 to 2024

areas similarly (e.g., water temperature, nutrient availability, and phytoplankton community; Appendix Figures A.1.6 and C.1.5, Appendix Table C.1.4).

Overall, the zooplankton community at the exposed area of Quesnel Lake from 2019 to 2024 has been characterized by density and taxon richness that were similar to the reference area, and Simpson's Diversity that was similar to or significantly higher than at the reference area. Simpson's Evenness of the exposed zooplankton community has been consistently higher than at the reference area since 2021, but the difference has been slight. Community composition at the exposed area has largely been similar to the reference area from 2020 to 2024, except for consistent but small differences in the relative densities of Copepod Nauplii and Rotifera (higher and lower than at the reference area, respectively). Although there was some temporal variability in zooplankton community metrics, the changes (i.e., direction and relative magnitude) were generally similar between the exposed and reference areas. The similarity between the exposed and reference areas for most endpoints over the monitoring period suggests that changes in the zooplankton community were largely driven by environmental conditions common to both areas (e.g., water temperatures and nutrient concentrations) over time.

5.2.3.2.2 Productivity

Qualitative evaluation of seasonal data from 2024 indicated that zooplankton biomass (dw) at both QUL-ZOO-1 and QUL-ZOO-7 was comparable among June, July, and August (Appendix Figure E.2.10, Appendix Table C.3.7).

Statistical analyses of replicated data (from July sampling events) indicated that mean zooplankton biomass (dw) was consistently similar between QUL-ZOO-1 and QUL-ZOO-7 from July 2019 to 2024 (Figure 5.27, Table 5.20; Appendix Tables C.3.7 and C.3.8). The temporal changes in zooplankton biomass (dw) were similar at both areas throughout the monitoring period (i.e., significantly higher in 2020 and 2023 relative to 2019, but significantly lower in 2024 relative to all prior years) indicating these temporal changes were likely driven by natural variability in environmental parameters that similarly affected the two areas (e.g., water temperature, nutrient availability, and phytoplankton community; Appendix Figures A.1.6 and C.1.5, Appendix Table C.1.4). The consistent similarity in zooplankton productivity between exposed and reference areas throughout the monitoring period suggests a lack of mine-related influence on zooplankton productivity in Quesnel Lake

5.2.4 Zooplankton Tissue Quality

Zooplankton tissue quality monitoring was completed annually between 2022 and 2024 with three sampling events per year (June, July, and August) in exposed (QUL-ZOO-1) and reference

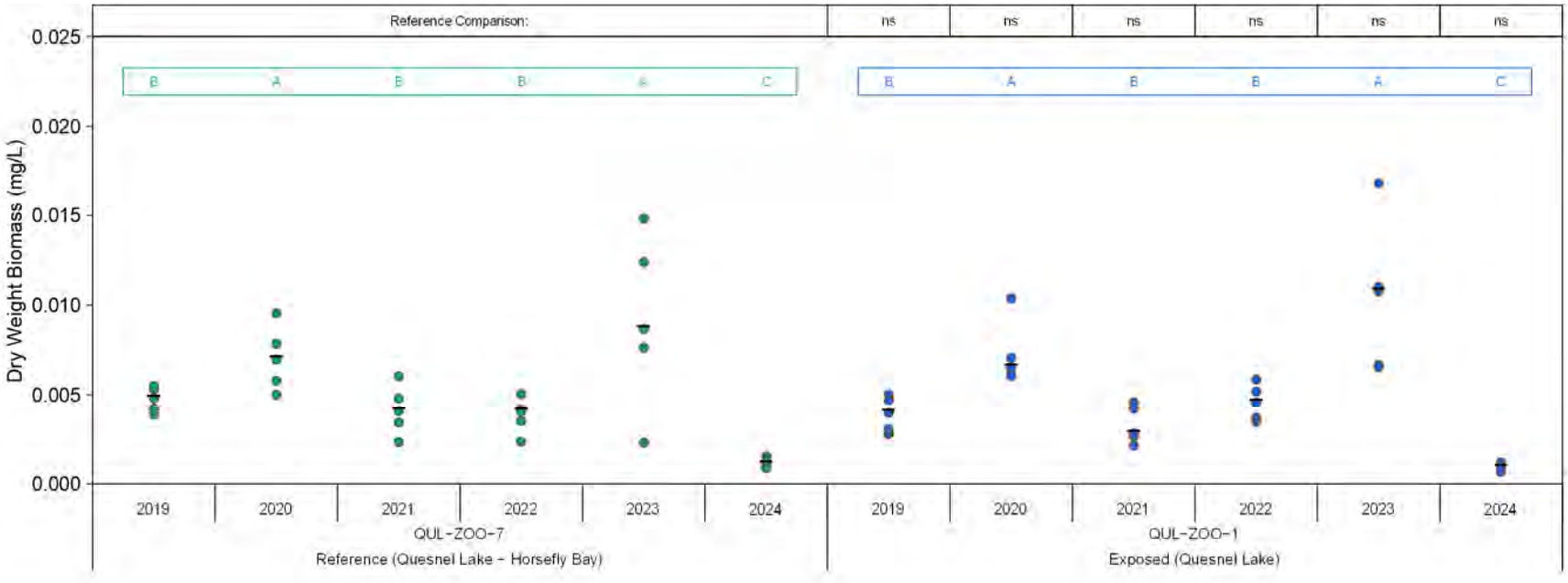

Figure 5.27: Zooplankton Biomass (Total Dry Weight) for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/L = milligrams per litre. Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of median absolute deviations (MAD; if the data were rank −transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.7.

(QUL-ZOO-7) areas of Quesnel Lake (Figure 3.3, Table 3.6). Replicated results from July (n=5) were statistically contrasted (see Section 3.4.3).

A review of the 2024 zooplankton tissue quality results (Appendix B) indicated that these data can be used with an appropriate level of confidence for interpretation, although some natural heterogeneity in analyte results were considered during data interpretation (see Section 5.1.4 for details). A review of 2024 supporting water data quality indicated that these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

Data interpretation was focused on primary and secondary analytes (Table 2.4) with a significantly positive relative (exposed-reference) difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis *Area×Year* interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant[56]).

Of the primary and secondary analytes, copper, molybdenum, tin, and titanium exhibited a significant *Area×Year* interaction with exposed concentrations that were significantly higher than reference in 2024 (MOD = 280%, 267%, 495%, and 283%, respectively); a difference that has not been previously observed (i.e., 2019 to 2023; Appendix Table E.3.3). The significant *Area×Year* interaction indicated that the relative (exposed-reference) differences in concentrations of these four analytes has differed significantly among years (Figure 5.28, Table 5.21; Appendix Table E.3.3). Specifically, the relative differences of copper, tin, and titanium concentrations were significantly higher in 2024 than in all prior years (i.e., 2019 to 2023), and for molybdenum in 2024 were similar to 2022 but significantly higher than all remaining prior years (Figure 5.28, Table 5.21; Appendix Table E.3.3). Despite the significant temporal increase in 2024, relative to reference, concentrations of copper, molybdenum, tin, and titanium in exposed zooplankton tissues in 2024 remained within the range of previous post-breach years (i.e., 2014 and 2023) although the variability among samples was often greater in 2024 than in prior years (Appendix Figure C.4.2). The temporal increase in the relative differences of concentrations of these four analytes in 2024 was driven, at least in part, by a decrease in concentrations in reference tissues (Figure 5.28). Continued monitoring will help to determine whether the observed increase in copper, molybdenum, tin, and titanium concentrations of exposed zooplankton tissues in 2024, relative to reference, is part of a long-term trend or a single anomalous year.

The remaining primary and secondary analytes had concentrations in exposed zooplankton tissues that were similar to reference in all monitoring years (i.e., the Area×Year interaction was not significant; Appendix Table E.3.3).

[56] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from 2019 to 2024 were combined for the analyses.

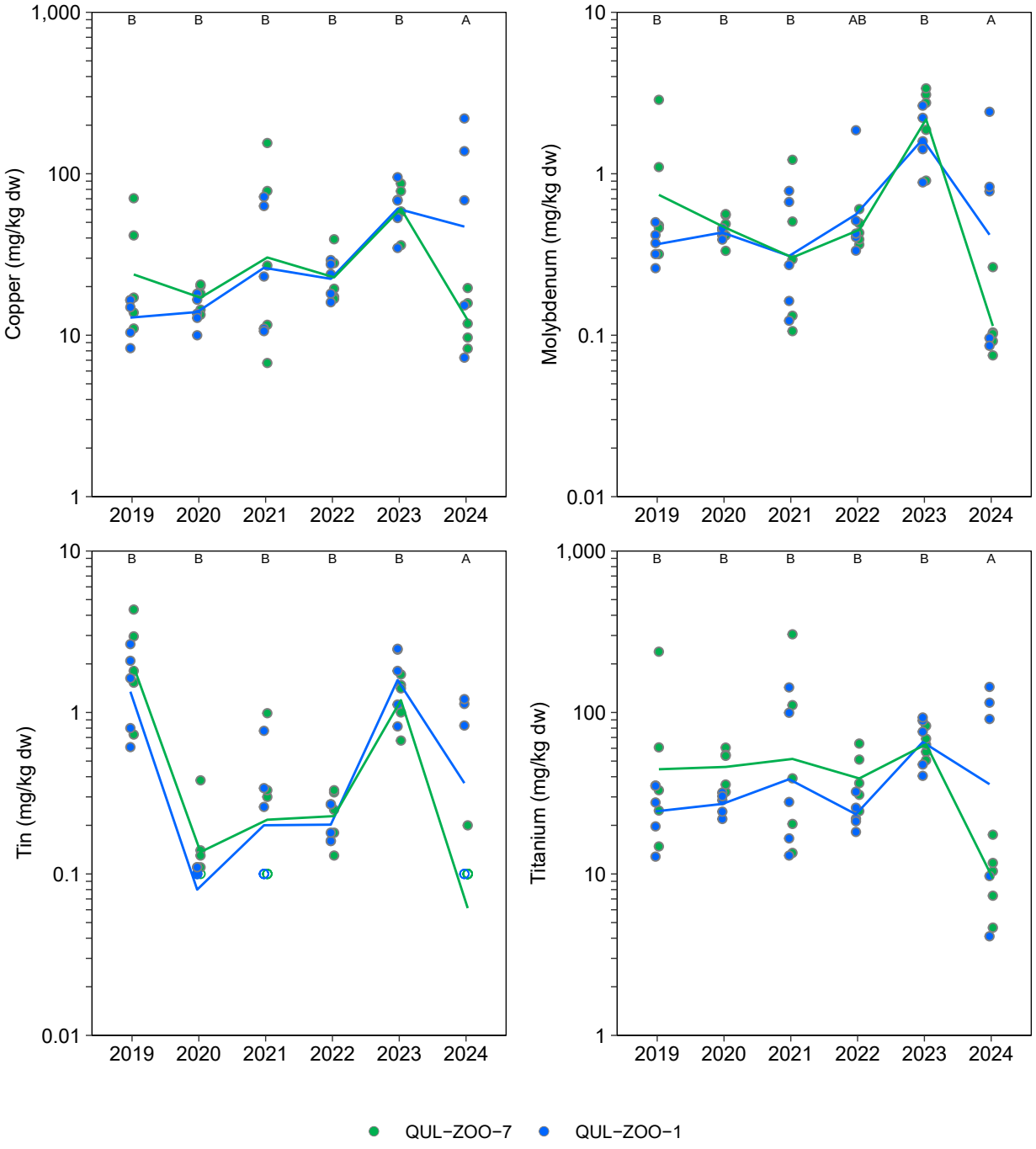

Figure 5.28: Zooplankton Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for primary or secondary analytes with a significant and positive exposed − reference difference in 2024 or in all monitoring years. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed : Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed : Reference). Only years with samples from both reference and exposed areas are plotted.

Table 5.21: Summary of Statistical Contrasts for Zooplankton Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed - Reference Relative Difference for Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Analyte		Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[a]						Magnitude of Difference for Exposed Mean Relative to Reference (%)[b]					
		Post-Breach Period						Post-Breach Period					
		2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Primary Analytes	Copper	baseline	ns	ns	ns	ns	603	ns	ns	ns	ns	ns	280
Secondary Analytes	Molybdenum	baseline	ns	ns	ns	ns	646	ns	ns	ns	ns	ns	267
	Tin	baseline	ns	ns	ns	ns	748	ns	ns	ns	ns	ns	495
	Titanium	baseline	ns	ns	ns	ns	599	ns	ns	ns	ns	ns	283

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: ns = not significant. Baseline = first year of data included in analysis. Data were analysed in units of mg/kg dry weight. Only years with samples from both reference and exposed were included in the analysis.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

The increased relative differences of copper, tin, and titanium concentrations in zooplankton tissues in 2024 were not mirrored in surface water quality results for Quesnel Lake, with molybdenum being an exception. Post-breach (2015 to 2024) surface water quality in exposed areas of Quesnel Lake has showed temporal stability for most analytes. The exceptions are total and dissolved molybdenum, dissolved sodium, and total and dissolved selenium, which were the only primary or secondary analytes that showed significant increasing trends from 2015 to 2024 in surface water from QUL-18 (near QUL-ZOO-1) and/or QUL-2a exposed water quality monitoring stations (Figure 3.3; Appendix Table E.3.4). Significant increasing trends in total and dissolved selenium, as well as dissolved molybdenum were identified at both exposed stations (QUL-18 and QUL-2a), whereas an increasing trend was identified at only one of the two stations for the remaining analytes (QUL-18 [total molybdenum] or QUL-2a [dissolved sodium]; Appendix Figures C.1.6 to C.1.8, Appendix Table E.3.4). In 2024, the GEF for acute dissolved copper showed a significant decreasing trend at the exposed station QUL-2a (Appendix Table E.3.4).

There is no existing BCWQG for dissolved aqueous selenium (BCMOWLRS 2025). However, total selenium concentrations in routine water quality samples from QUL-18 and QUL-2a remained approximately 10-times lower than the BCWQG for total selenium (2 µg/L; BCMOWLRS 2025) from 2015 to 2024 (Appendix Figure C.1.8) as did total selenium concentrations in spot water quality samples from QUL-ZOO-1 (exposed) and QUL-ZOO-7 (reference) in 2024 (Appendix Table C.1.4). In addition, zooplankton selenium concentrations did not differ significantly between the exposed and reference areas from 2019 to 2024 (Appendix Table E.3.3). Zooplankton selenium concentrations at both QUL-ZOO-1 (exposed) and QUL-ZOO-7 (reference) in 2024 were below the BC interim guideline for aquatic life (4 mg/kg dw; BCMOE 2014), except for one sample at QUL-ZOO-1 (4.35 mg/kg dw; Appendix Table C.4.2). Mean zooplankton tissue selenium concentrations at the exposed area were also below the guideline in 2018 to 2023, while results from 2015 to 2017 exceeded the guidelines (Appendix Figure C.4.2). Concentrations of selenium in zooplankton tissue at the reference area exceeded the BC interim tissue guideline in 2015 to 2017, 2019, 2021, and 2023 indicating that selenium concentrations in zooplankton tissue were naturally higher than the guideline in some areas of Quesnel Lake (Appendix Figure C.4.2, Appendix Table C.4.2).

Of the remaining water quality analytes identified as increasing since 2015 at the exposed area(s), BCWQGs exist only for total molybdenum, and not for dissolved molybdenum or sodium (BCMOWLRS 2024, 2025; Appendix Figure C.1.6). Concentrations of total molybdenum from 2015 to 2024 remained approximately 20,000-times lower than the BCWQG (Appendix Figure C.1.8, Appendix Table C.1.4), indicating no risk aquatic life. Although a significant temporal increase in the molybdenum concentrations of exposed zooplankton tissues

was observed in 2024, relative to reference, this was driven (at least in part) by a decrease in reference results (Figure 5.28). Combined, these results indicate little to no evidence that the increase in molybdenum concentrations in water and zooplankton tissue might present a risk to aquatic life. A measurable increase of sodium concentrations in zooplankton tissues was not observed from 2019 to 2024, indicating no influence of the increased aqueous sodium concentrations on zooplankton tissue quality (Appendix Table E.3.3).

Given the observed significant temporal increase in the copper concentrations of exposed zooplankton tissue in 2024, relative to reference, the potential impacts of copper concentrations on aquatic life were evaluated by comparing dissolved copper concentrations to the relevant BLM-based BCWQG to calculate GEFs (refer to Section 3.8.3.3 for details). The dissolved copper GEFs in surface water did not change significantly from 2015 to 2024 at QUL-120a (reference) or QUL-18 (exposed) and decreased significantly at QUL-2a (exposed; Appendix Figure C.1.7, Appendix Table E.3.4). The GEFs observed in 2024 for Quesnel Lake exposed areas (QUL-18 and QUL-2a) were typically within the range of previous years and results remained within the range of copper GEFs reported for the reference (QUL-120a), which suggests little risk to aquatic life in the near term (Appendix Figure C.1.7).

5.2.5 Benthic Invertebrate Community

Benthic invertebrate community monitoring in 2024 was completed at two deep exposed areas (QUL-PNF and QUL-PFF1) with an unimpacted deep area (QUL-PREF1) serving as a reference (Figure 3.2, Table 3.7). Prior benthic invertebrate community monitoring within the 2022 to 2024 period included annual monitoring of the deep near-field (QUL-PNF) area (Figure 3.2, Table 3.7). Comparisons to reference were only possible in years when the deep reference area (QUL-PREF1) was sampled (Table 3.7).

A review of the 2024 benthic invertebrate community results indicated these data were of acceptable quality and can be used with a high degree of confidence in data interpretation (see Section 5.1.5 for details).

The mean benthic invertebrate densities at the near-field (QUL-PNF) and far-field (QUL-PFF1) areas in 2024 were significantly lower than reference (QUL-PREF1) but did not differ significantly from one another. Taxonomic richness, Simpson's Evenness, and Simpson's Diversity at QUL-PNF and QUL-PFF1 in 2024 did not differ significantly from the reference area (QUL-PREF1), nor from one another (Figure 5.29, Table 5.22; Appendix Tables C.5.4 and C.5.5).

Densities at both QUL-PNF and QUL-PFF1 have remained significantly lower than the densities at the reference area (QUL-PREF1) since 2014 (in years when comparison to reference was possible), though the magnitude of difference has decreased at both exposed areas

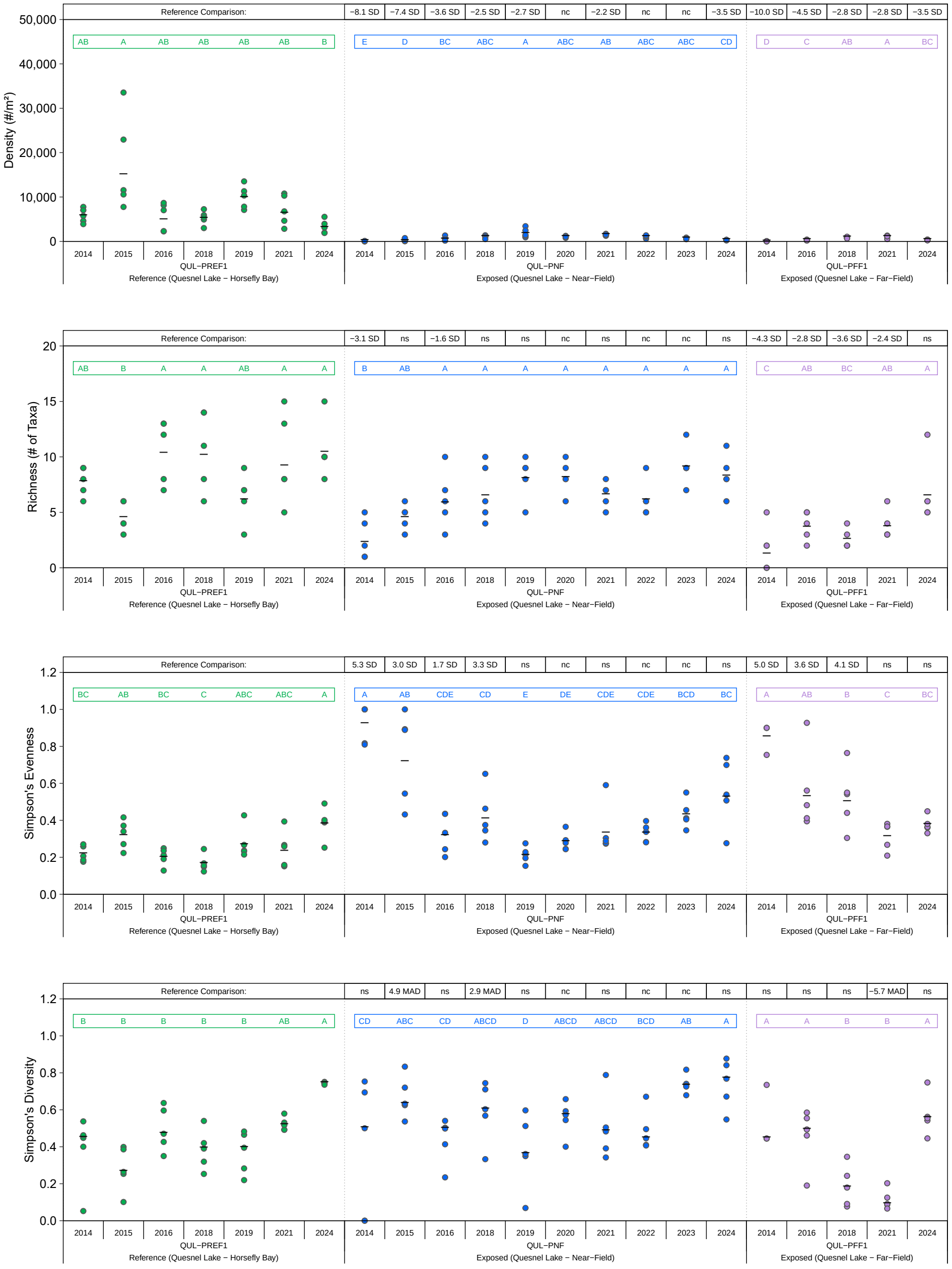

Figure 5.29: Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area.
A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'nc' indicates no comparisons were possible; 'ns' indicates a non−significant contrast.

Table 5.22: Statistical Comparisons of Benthic Invertebrate Community Metrics for Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas																Spatial Comparison Within Years	
										Pairwise Comparisons Between Years										MOD Relative to Baseline[b]										
		Area	Year	Area x Year						2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
Density (#/m²)	log10(x+1)	-	-	<0.001	Reference	QUL-PREF1	2014	5,844	5,629	AB	A	AB	AB	AB	nc	AB	nc	nc	B	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-8.1	-10.0
							2015	17,367	14,877																					-7.4	nc
							2016	5,712	4,813																					-3.6	-4.5
							2018	5,326	5,091																					-2.5	-2.8
							2019	10,066	9,736																					-2.7	nc
							2021	7,063	6,295																					-2.2	-2.8
							2024	3,294	3,025																					-3.5	-3.5
					Exposed	QUL-PNF	2014	39.8	27.5	E	D	BC	ABC	A	ABC	AB	ABC	ABC	CD	Baseline	2.2	4.2	5.5	6.2	5.4	6.0	5.4	4.8	3.6		-1.9
							2015	216	119																						nc
							2016	590	445																						ns
							2018	1,061	1,003																						ns
							2019	1,900	1,682																						nc
							2020	999	987																						nc
							2021	1,472	1,463																						ns
							2022	995	957																						nc
							2023	677	666																						nc
							2024	301	298																						ns
						QUL-PFF1	2014	22.5	7.49	D	nc	C	AB	nc	nc	A	nc	nc	BC	Baseline	nc	5.2	7.0	nc	nc	7.3	nc	nc	5.5		
							2016	267	258																						
							2018	854	840																						
							2021	1,040	996																						
							2024	317	311																						
Richness (# of Taxa)	log10(x+1)	-	-	0.003	Reference	QUL-PREF1	2014	7.80	7.72	AB	B	A	A	AB	nc	A	nc	nc	A	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-3.1	-4.3
							2015	4.60	4.47																					ns	nc
							2016	10.6	10.3																					-1.6	-2.8
							2018	10.6	10.1																					ns	-3.6
							2019	6.40	6.09																					ns	nc
							2021	9.80	9.17																					ns	-2.4
							2024	10.8	10.4																					ns	ns
					Exposed	QUL-PNF	2014	2.60	2.25	B	AB	A	A	A	A	A	A	A	A	Baseline	ns	2.3	2.6	3.2	3.2	2.6	2.4	3.5	3.3		ns
							2015	4.60	4.50																						nc
							2016	6.20	5.82																						ns
							2018	7.00	6.46																						-2.3
							2019	8.20	8.01																						nc
							2020	8.20	8.10																						nc
							2021	6.60	6.53																						-1.5
							2022	6.20	6.07																						nc
							2023	9.20	9.08																						nc
							2024	8.40	8.26																						ns
						QUL-PFF1	2014	1.80	1.22	C	nc	AB	BC	nc	nc	AB	nc	nc	A	Baseline	nc	2.3	ns	nc	nc	2.3	nc	nc	3.8		
							2016	3.80	3.64																						
							2018	2.60	2.52																						
							2021	3.80	3.68																						
							2024	6.80	6.45																						

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2
Magnitude of Difference (MOD) > 2

Notes: "-" = no data available. "nc" = no comparison. "ns" = no significance. ANOVA = analysis of variance. SD = standard deviation.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table 5.22: Statistical Comparisons of Benthic Invertebrate Community Metrics for Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	Mean	MCT[a]	Temporal Contrasts Within Areas																Spatial Comparison Within Years	
										Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year						2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
Simpson's Evenness	log10	-	-	<0.001	Reference	QUL-PREF1	2014	0.219	0.216	BC	AB	BC	C	ABC	nc	ABC	nc	nc	A	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	2.0	5.3	5.0
							2015	0.324	0.316																					3.0	nc
							2016	0.203	0.198																					1.7	3.6
							2018	0.168	0.163																					3.3	4.1
							2019	0.275	0.266																					ns	nc
							2021	0.246	0.231																					ns	ns
							2024	0.379	0.377																					ns	ns
					Exposed	QUL-PNF	2014	0.925	0.921	A	AB	CDE	CD	E	DE	CDE	CDE	BCD	BC	Baseline	ns	-3.9	-3.0	-5.4	-4.3	-3.8	-3.8	-2.8	-2.1		ns
							2015	0.752	0.715																						nc
							2016	0.329	0.315																						1.9
							2018	0.417	0.405																						ns
							2019	0.213	0.210																						nc
							2020	0.285	0.282																						nc
							2021	0.347	0.330																						ns
							2022	0.332	0.329																						nc
							2023	0.434	0.428																						nc
							2024	0.552	0.523																						ns
						QUL-PFF1	2014	0.851	0.848	A	nc	AB	B	nc	nc	C	nc	nc	BC	Baseline	nc	ns	-2.0	nc	nc	-3.7	nc	nc	-3.0		
							2016	0.555	0.527																						
							2018	0.520	0.498																						
							2021	0.318	0.310																						
							2024	0.377	0.375																						
Simpson's Diversity	rank	-	-	<0.001	Reference	QUL-PREF1	2014	0.380	0.448	B	B	B	B	B	nc	AB	nc	nc	A	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	4.0	ns	ns
							2015	0.281	0.264																					4.9	nc
							2016	0.496	0.470																					ns	ns
							2018	0.384	0.390																					2.9	ns
							2019	0.369	0.395																					ns	nc
							2021	0.522	0.517																					ns	-5.7
							2024	0.744	0.745																					ns	ns
					Exposed	QUL-PNF	2014	0.389	0.500	CD	ABC	CD	ABCD	D	ABCD	ABCD	BCD	AB	A	Baseline	ns	ns	ns	ns	ns	ns	ns	3.1	3.6		ns
							2015	0.670	0.633																						nc
							2016	0.438	0.498																						ns
							2018	0.592	0.603																						-5.7
							2019	0.378	0.361																						nc
							2020	0.553	0.573																						nc
							2021	0.502	0.483																						-5.2
							2022	0.486	0.446																						nc
							2023	0.738	0.730																						nc
							2024	0.741	0.768																						ns
						QUL-PFF1	2014	0.541	0.444	A	nc	A	B	nc	nc	B	nc	nc	A	Baseline	nc	ns	-3.5	nc	nc	-4.7	nc	nc	ns		
							2016	0.457	0.493																						
							2018	0.187	0.179																						
							2021	0.114	0.0904																						
							2024	0.570	0.554																						

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2
Magnitude of Difference (MOD) > 2

Notes: "-" = no data available. "nc" = no comparison. "ns" = no significance. ANOVA = analysis of variance. SD = standard deviation.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

over time (Figure 5.29, Table 5.22). Additionally, mean densities at both exposed areas have been significantly higher in all years compared to 2014 (immediately post-breach) and have been temporally stable (i.e., have not changed significantly) since 2022 at QUL-PNF. The density at QUL-PNF in 2024 was similar to most prior years since 2015 but was significantly lower than in 2019 and 2021 (Figure 5.29, Table 5.22). A significant decrease in density was observed at QUL-PFF1 between 2021 and 2024, to a mean density that was similar to 2016 and 2018. This is consistent with slight declines in density at both at the near-field area (QUL-PNF) and the reference area (QUL-PREF1) since 2021, though this decline was only significant at QUL-PNF.

Taxonomic richness at the near-field area (QUL-PNF) has been stable since 2015 and has not differed significantly from reference since 2018, suggesting stabilization of richness at this area. At the far-field area (QUL-PFF1), richness increased significantly between 2014 and 2016, and again between 2018 and 2024 to a richness that was similar to reference conditions in 2024 (Figure 5.29, Table 5.22; Appendix Tables C.5.4 and C.5.5). Simpson's Evenness at the near field area (QUL-PNF) has been stable since 2021 and similar to the reference area since 2019 (in years where comparison was possible). At the far-field area, Simpson's Evenness has been stable since 2016, and similar to the reference area since 2021 (Figure 5.29, Table 5.22). Simpson's Diversity at the near-field area (QUL-PNF) has been similar to or significantly higher than the reference (QUL-PREF1) in all years (i.e., since 2014) while at the far-field area Diversity was significantly different (lower) than reference only in 2021 due to particularly low Simpson's Diversity that year. A significant increase in Simpson's Diversity was observed at QUL-PFF1 between 2021 and 2024, which returned Simpson's Diversity to values that were similar to those in 2014 and 2016 (Figure 5.29, Table 5.22). At the near-field area, Simpson's Diversity has been temporally stable from 2021 to 2024, with Diversity observed in 2024 similar to most prior years except 2014, 2016, 2019, and 2022 (Figure 5.29, Table 5.22).

The benthic invertebrate community at both the near-field (QUL-PNF) and far-field (QUL-PFF1) areas in 2024 was dominated by Chironomidae (88.6% and 88.7% mean relative density, respectively), which has been observed at both these area since 2014 (Figure 5.30; Appendix Figures E.4.6 and E.4.7, Appendix Tables C.5.4 and E.4.4). The relative density (%) of Chironomidae at both QUL-PNF and QUL-PFF1 in 2024 was significantly higher than at the reference area (QUL-PREF1), which is consistent with 2015 and 2016 results at QUL-PNF, and with the results in most prior years at QUL-PFF1 (i.e., 2016 to 2021; Appendix Figure E.4.6, Appendix Table E.4.4). The benthic invertebrate community at QUL-PNF and QUL-PFF1 in 2024 also differed from the reference area in terms of significantly lower Oligochaeta (%), which is consistent with all prior years, but did not differ from reference in the relative densities of any other taxa (i.e., EPT and Arachnida; Appendix Figure E.4.6, Appendix Table E.4.4).

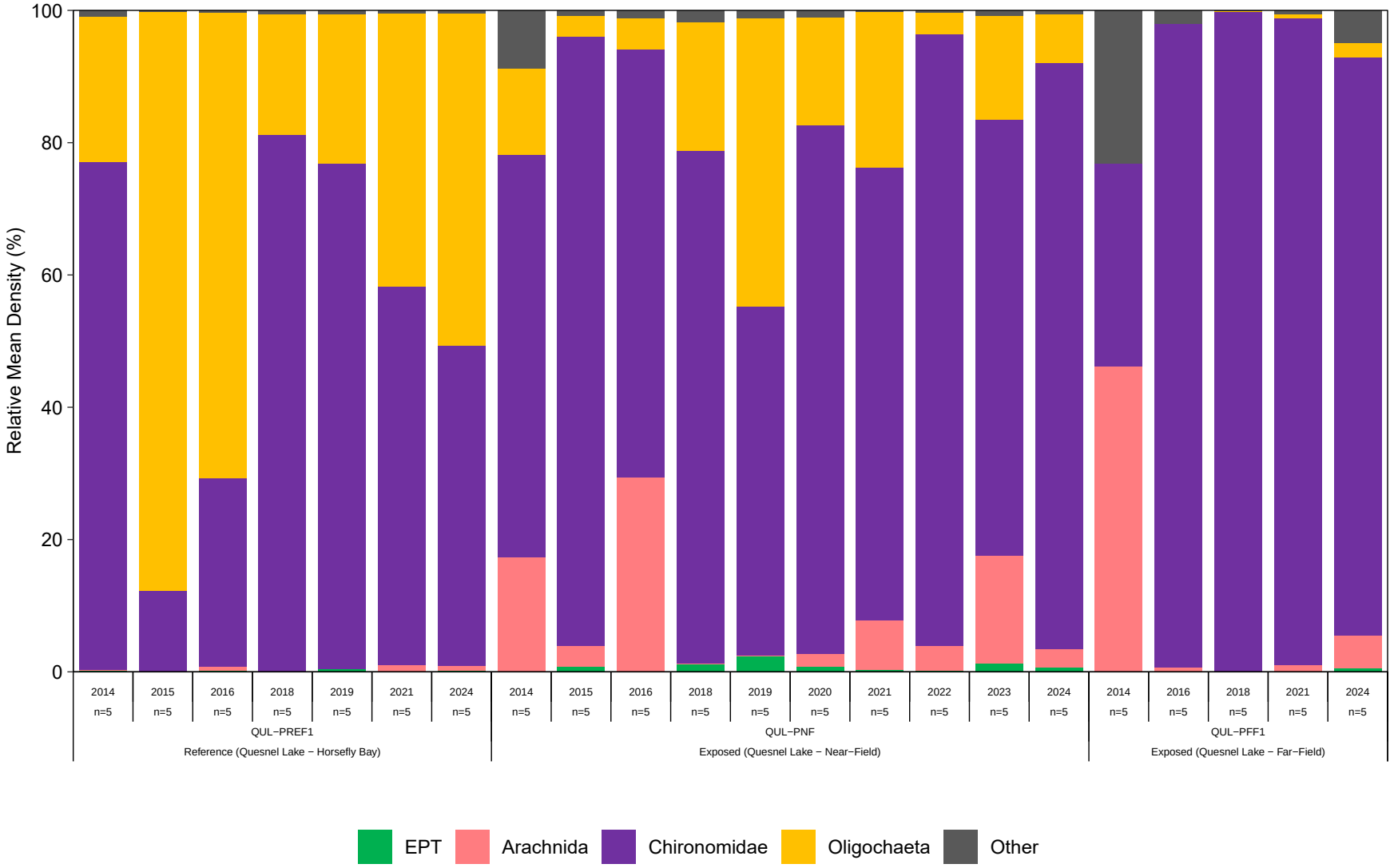

Figure 5.30: Relative Mean Densities of Major Benthic Invertebrate Taxa for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. QUL−PREF1 was not sampled in 2020, 2022, or 2023; QUL−PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023.

The benthic invertebrate community in Quesnel Lake in 2024 was very similar to all prior monitoring years. This was evidenced by mean relative densities (%) of major benthic invertebrate taxa at all areas in 2024 that did not differ significantly compared to all previous years, except for EPT taxa (known to be sensitive to habitat disturbances and water pollution; Lenat 1988, Herman and Nejadhashemi 2015) and Chironomidae. The relative density (%) of EPT at the near-field and reference areas in 2024 was significantly lower than in 2019, and Chironomidae (%) at the far-field area in 2024 was significantly higher than in 2014 (Appendix Figure E.4.6, Appendix Table E.4). Overall, the relative densities (%) of taxa at the exposed areas have not changed significantly since at least 2020. Densities of the two most dominant taxa (Chironomidae and Oligochaeta) at the two exposed areas have been significantly lower than reference in all years (2014 to 2024), consistent with total density results (Table 5.22; Appendix Figure E.4.6, Appendix Table E.4.4). At the QUL-PNF near-field area, the densities of both Chironomidae and Oligochaeta have remained stable since at least 2016. At the QUL-PFF1 far-field area, the density of Oligochaeta has been stable since 2014, while the density of Chironomidae decreased significantly between 2021 and 2024 but remained significantly higher than in 2014 (Table 5.22; Appendix Figure E.4.6, Appendix Table E.4.4). Densities of Arachnida and EPT at both exposed areas have been similar to reference in all years (i.e., 2014 to 2024), except for EPT at QUL-PFF1 which has remained significantly lower than reference from 2014 to 2024 (Appendix Figure E.4.6, Appendix Table E.4.4).

Multivariate analysis (CA) was used to further evaluate temporal changes in community composition from 2014 to 2024 at the near-field (QUL-PNF), far-field (QUL-PFF1), and reference (QUL-PREF1) for years with available data. The first two axes of the CA explained a total of 47.4% of the community variation (30.9% and 16.5% for CA Axes 1 and 2, respectively; Appendix Figures E.4.6 and E.4.8, Appendix Tables C.5.4, C.5.5, E.4.4 and E.4.6). Significantly lower CA Axis 1 scores were observed at both the near-field and far-field areas in 2024 compared to reference, consistent with most prior years (except 2016 at the near-field area). In addition, CA Axis 1 scores for QUL-PNF were significantly higher compared to QUL-PFF1 in most years where comparison was possible, except 2014 and 2024. The benthic invertebrate community at the near-field and far-field areas in 2024 did not differ from reference along CA Axis 2 or 3 (Appendix Figure E.4.6, Appendix Table E.4.4), therefore these axes were not discussed further. Temporal evaluation indicated CA Axis 1 scores have not changed significantly since 2018 and 2016 at the near-field and far-field areas, respectively (Appendix Figure E.4.6, Appendix Table E.4.4). This lack of temporal change and the significant difference in CA Axis 1 scores compared to reference in all years was consistent with the continued differences in community composition at QUL-PNF and QUL-PFF1 relative to reference: primarily the significantly higher Chironomidae and lower Oligochaeta relative densities (%). These CA results

suggest no substantial or consistent change has occurred in Quesnel Lake community composition since at least 2018, which is consistent with the temporal stability in the relative densities of the taxa since at least 2020 at the exposed areas.

Evaluation of statistically significant correlation results indicated that benthic invertebrate total density, Oligochaeta (density and relative density [%]), Chironomidae (density), and CA Axis 1 were positively correlated with sediment TOC and sediment PCA Axis 1 (representing lower concentrations of several analytes in sediment). These same five benthic community endpoints were also negatively correlated with bottom water temperature and specific conductance, sediment percent fines, sediment concentrations of arsenic, copper, and manganese, and sediment PCA Axis 2 (representing higher sediment analyte concentrations; Appendix Figures E.1.4 and E.4.9, Appendix Tables E.1.9, E.1.0 and E.4.5). Similarly, taxonomic richness was positively correlated with sediment TOC and negatively correlated with bottom water temperature and specific conductance, and sediment PCA Axis 2 (Appendix Table E.4.5, Appendix Figure E.4.9). Tailings impacted sediments from the breach were characterized by higher proportions of fines and lower TOC content compared to reference sediments, and concentrations of analytes of interest (arsenic, copper, iron, and manganese) elevated above reference and BCWSQG (see Section 5.2.1.1). Therefore, these significant correlation results suggested that physical and chemical characteristics of the deep exposed sediments (i.e., finer particle size, lower TOC content, and elevated concentrations of copper, arsenic, and manganese compared to reference) were related to lower total density, taxon richness, Chironomidae (density), and Oligochaeta (density and %). The positive correlation between Chironomidae (density), total density (which is dominated by Chironomidae) and sediment TOC content is consistent with the documented intolerance of chironomids (*Chironomus tentans*) to sediments with TOC below 1% (Suedel et al. 1993), and poor survival in sediments with TOC below 0.5% (Suedel and Rodgers 1994). Mean TOC concentrations in deep exposed sediments from Quesnel Lake in 2024 were 0.635 ± 0.162% at QUL-PNF and 0.425 ± 0.205 % at QUL-PFF1 (see Section 5.2.1.1).

Simpson's Evenness and Chironomidae (%) were negatively correlated with sediment TOC and PCA Axis 1, and positively correlated with temperature, sediment percent fines, and sediment concentrations of copper. Simpson's Evenness was also positively correlated with sediment arsenic concentrations, while Chironomidae (%) was positively correlated with sediment PCA Axis 2 and sediment manganese concentrations (Appendix Figure E.4.9, Appendix Table E.4.5). The direction of these correlations was opposite to those discussed above (for total density and Chironomidae density) because Chironomidae (%) were more dominant at the exposed areas (QUL-PNF and QUL-PFF1) compared to the reference area (QUL-PREF1), despite lower densities of this taxa at the exposed areas relative to reference (Figure 5.30; Appendix Figure

E.4.6, Appendix Table E.4.4). The correlations with Simpson's Evenness were driven primarily by, and in some cases leveraged by, results from the early post-breach years in which Simpson's Evenness at the exposed areas was higher than at the reference area (i.e., 2014 to 2018 at both QUL-PNF and QUL-PFF1; Figure 5.29; Appendix Figures E.4.6 and E.4.9, Appendix Tables E.4.4 and E.4.6). Therefore, higher Chironomidae (%) and Simpson's Evenness at the exposed areas were related with the characteristics associated with breach-impacted sediments.

In addition to the correlations between benthic invertebrate community endpoints and bottom water quality discussed above (i.e., temperature and specific conductance), DO (% or mg/L) was positively correlated with total density, Chironomidae (density and %), and negatively correlated with Simpson's Evenness. The relationships with bottom water quality variables (temperature, specific conductance, and DO) were often highly leveraged by immediate post-breach results (i.e., 2014) and the ranges of the water quality variables for majority of results were small and therefore likely not a driving factor in the observed differences in the benthic invertebrate community endpoints (Figure E.4.5, Appendix Table E.4.5). Station depth was also positively correlated with Oligochaeta (density and %) and CA Axis 1, and negatively correlated with Chironomidae (%; Appendix Figure E.4.9, Appendix Table E.4.5). However, these relationships were largely driven by the differences in station depths between the QUL-PFF1 far-field area compared to the QUL-PNF near-field and reference areas, therefore because station depth and sediment characteristics covary, the potential influence of each of these variables on the benthic invertebrate community endpoints cannot be distinguished from one another.

Overall, the benthic invertebrate communities at the deep near-field and far-field areas in 2024 were similar to each other in terms of total density, taxon richness, and Simpson's Evenness and Diversity. Although the benthic invertebrate communities at the near- and far-field areas have shown recovery since 2014, they remained similar to 2015 conditions. Despite this, some recovery towards reference conditions has occurred at both the exposed areas for taxon richness, Simpson's Evenness, and Simpson's Diversity, with these endpoints being similar to reference conditions since 2019 or earlier at the near-field area and since 2021 or 2024 at the far-field area. Total density at both exposed areas was significantly lower in 2024 compared to 2021 (at the far-field area this was due to a significant decrease in Chironomidae density) but remained similar to all other years since 2015, and density has remained significantly lower than reference in all post-breach years. Benthic invertebrate community composition at the deep exposed areas have shown very few temporal changes since 2014, and continued to differ from reference in terms of significantly lower relative densities of Oligochaeta, consistent with all prior years. The differences in benthic invertebrate community composition between the exposed and reference areas appeared related to a greater proportion of fines, lower proportion of TOC, and higher metal concentrations in sediment at the exposed areas compared to the reference area;

sediment properties which were consistent with the presence of breach-impacted sediments at this deep exposed near-field area.

5.2.6 Fish Community, Catchability, and Population

Fishing efforts in Quesnel Lake and Quesnel River were completed annually between 2022 and 2024 to collect the fish species required for fish tissue quality monitoring in these areas (see Section 5.2.7): peamouth chub, northern pikeminnow, and lake trout from Quesnel Lake, and rainbow trout from Quesnel River. Total fish catches and CPUE associated with these fishing efforts in 2024 are summarized in Appendix Tables C.6.12 to C.6.16. The supporting *in situ* water quality measurements and habitat data recorded during fish efforts are summarized in Appendix Figure A.1.7 and Appendix Table A.1.5.

Comparisons of CPUE for hoop netting efforts in exposed and reference areas of Quesnel Lake in 2024 indicated that the catchability of the target species northern pikeminnow was higher in the exposed area relative to the reference area in 2024, consistent with results from 2019, 2021, 2022, 2023 (Minnow 2020a, 2022a, 2023a, 2024a). The catchability of the target species peamouth chub was also higher in the exposed fishing area relative to the reference fishing area in 2024, consistent with results from 2021 and 2022 (Minnow 2022a, 2023a). For non-target species, catchability of longnose sucker, burbot (*Lota lota*), and sockeye salmon (*Oncorhynchus nerka*) were 11.3-, 2.2-, and 1.9-times higher, respectively, at the exposed area (near Hazeltine Creek) than at the reference area (near Grain Creek) in 2024 (Appendix Table C.6.12). Conversely, the catchability of mountain whitefish (*Prosopium williamsoni*), largescale sucker, and redside shiner were 13.8-, 4.2-, and 1.8-times lower at the exposed area (near Hazeltine Creek) than at the reference area (near Grain Creek) in 2024. Kokanee (*Oncorhynchus nerka*), bull trout (*Salvelinus confluentus*), and rainbow trout were not at the exposed area (near Hazeltine Creek) but were caught at the reference area (near Grain Creek) but in 2024 (Appendix Table C.6.12).

Comparisons of CPUE for gill net sets in Quesnel Lake in 2024 indicated that the catchability of most non-target species except for mountain whitefish, longnose sucker, and rainbow trout was greater at the exposed area (near Cedar Point) than at the reference area (East Arm; Appendix Table C.6.13). Catchability of the target species lake trout by gill netting in 2024 was lower at the exposed area than at the reference area (by 15-times; Appendix Table C.6.13), but for both areas was within the range of prior years (2019 to 2022; Appendix Table C.6.13; Minnow 2020a, 2021a, 2022a, 2023a).

The CPUE of angling efforts for rainbow trout in 2024 in the Quesnel River was 2.4-times higher than 2023, the same as 2022, 1.6-times lower than 2021, 1.1-times higher than 2020, and

2.5-times higher than 2019 (Appendix Table C.6.14; Minnow 2020a, 2021a, 2022a, 2023a, 2024a).

Temporal comparisons could not be made for the minnow trapping methods used at the exposed (near Hazeltine Creek) and reference (near Grain Creek) areas (Appendix Table C.6.14) or the angling methods used at the reference area (near Grain Creek; Appendix Table C.6.15) since these techniques were used for the first time in 2024 at these areas.

5.2.7 Fish Tissue Quality

Fish tissue quality was completed annually between 2022 and 2024 at exposed and unimpacted (reference) areas of Quesnel Lake, and in Quesnel River (exposed; Figure 3.6, Table 3.8). In Quesnel Lake, annual fish tissue quality monitoring has evaluated peamouth chub and northern pikeminnow collected near Hazeltine Creek and lake trout collected near Cedar Point, with an area near Grain Creek serving as reference for peamouth chub and northern pikeminnow and an area in the East Arm serving as a reference for lake trout.[57] In Quesnel River, annual fish tissue quality monitoring has evaluated rainbow trout (Figure 3.6, Table 3.8).

A review of the 2024 fish tissue quality results (Appendix B) indicated that these data can be used with an acceptable level of confidence for interpretation, although some natural heterogeneity in analyte results were considered during data interpretation (see Section 5.1.7 for details). A review of the 2024 fish aging results (Appendix B) indicated that laboratory accuracy for aging data can be used with a high level of confidence for interpretation (see Section 5.1.7 for details).

5.2.7.1 Comparisons to Guidelines and Thresholds

Muscle and whole-body samples of fish from Quesnel Lake and Quesnel River in 2024 had mean selenium concentrations that were consistently below consumption guidelines for the protection of human health (7.3 mg/kg dw and 14.5 mg/kg dw for moderate and high fish consumption, respectively; BCMOE 2014), which was consistent with all prior years (i.e., 2015 to 2023; Table 5.23; Appendix Tables C.7.5 to C.7.11). Mean mercury concentrations in muscle and whole-body samples of fish from Quesnel Lake and Quesnel River in 2024 were also below the human health guideline (0.5 mg/kg ww; CFIA 2015) but exceeded the human health guideline in muscle tissue of exposed (in 2019 and 2023) and reference lake trout (in 2020 and 2021; Table 5.23; Appendix Tables C.7.5 to C.7.11).

[57] Lake trout have been targeted for annual collection from the East Arm of Quesnel Lake (reference area). In 2023, angling techniques were used to target lake trout in Quesnel Lake (in accordance with conditions of DFO Permit XR 195 2023) and no lake trout were captured from the East Arm (reference area) despite considerable angling effort.

Table 5.23: Fish Muscle and Whole-body Mercury and Selenium Concentrations from Quesnel Lake (Exposed and Reference) and Quesnel River (Exposed) Relative to Human Health Consumption Guidelines, 2015 to 2024 [a]

Waterbody or Area		Species	Year/Season	Sample Size	Mercury		Selenium		
					Human Health (CFIA 2015)		Human Health (BCMOE 2014)		
					Guideline = 0.5 mg/kg ww		Moderate Consumption = 14.5 mg/kg dw		
							High Consumption = 7.3 mg/kg dw		
					Mean	Frequency > Guideline	Mean	Frequency > Moderate	Frequency > High
Quesnel Lake	East Arm (Reference)	Lake Trout	Fall 2015 (Minnow 2017g)	10	0.260	10%	1.60	0%	0%
	near Cedar Point (Exposed)	Lake Trout		10	0.220	10%	1.90	0%	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		7	0.244	0%	2.02	0%	0%
	near Likely (Exposed)	Kokanee		8	0.0920	0%	2.40	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0646	0%	2.17	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Spring 2016 (Minnow 2017g)	8	0.150	0%	1.60	0%	0%
		Northern Pikeminnow		8	0.0600	0%	2.10	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.240	0%	2.80	0%	0%
		Northern Pikeminnow		8	0.0630	0%	3.08	0%	0%
Quesnel Lake	near Hazeltine Creek (Exposed)	Northern Pikeminnow	Fall 2017 (Minnow 2018e)	8	0.0540	0%	2.32	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0928	0%	3.23	0%	13%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2018 (Minnow 2019a)	8	0.139	0%	2.08	0%	0%
		Northern Pikeminnow		8	0.0392	0%	1.72	0%	0%
	East Arm (Reference)	Lake Trout		8	0.443	13%	2.21	0%	0%
	North Arm (Reference)	Kokanee		8	0.0944	0%	1.97	0%	0%
	near Cedar Point (Exposed)	Lake Trout		8	0.313	0%	2.18	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.123	0%	3.03	0%	0%
		Northern Pikeminnow		8	0.0492	0%	2.37	0%	0%
	near Likely (Exposed)	Kokanee		8	0.0873	0%	2.11	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0497	0%	2.36	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2019 (Minnow 2020a)	8	0.139	0%	2.08	0%	0%
		Northern Pikeminnow		8	0.0503	0%	1.60	0%	0%
	East Arm (Reference)	Lake Trout		8	0.481	50%	1.87	0%	0%
	near Cedar Point (Exposed)	Lake Trout		9	0.305	11%	1.76	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.137	0%	2.90	0%	0%
		Northern Pikeminnow		8	0.0497	0%	3.36	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0395	0%	2.35	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2020 (Minnow 2021a)	8	0.124	0%	1.72	0%	0%
		Northern Pikeminnow		8	0.0631	0%	1.82	0%	0%
	East Arm (Reference)	Lake Trout		8	0.625	63%	1.96	0%	0%
	near Cedar Point (Exposed)	Lake Trout		8	0.319	13%	1.87	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.144	0%	3.26	0%	0%
		Northern Pikeminnow		8	0.0679	0%	3.12	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0545	0%	1.96	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2021 (Minnow 2022a)	8	0.146	0%	1.76	0%	0%
		Northern Pikeminnow		8	0.0726	0%	1.81	0%	0%
	East Arm (Reference)	Lake Trout		8	0.632	63%	2.07	0%	0%
	near Cedar Point (Exposed)	Lake Trout		8	0.243	0%	1.77	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.182	0%	3.94	0%	0%
		Northern Pikeminnow		8	0.0797	0%	2.95	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0544	0%	2.48	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2022 (Minnow 2023a)	8	0.163	0%	2.36	0%	0%
		Northern Pikeminnow		8	0.109	0%	1.83	0%	0%
	East Arm (Reference)	Lake Trout		8	0.494	25%	1.90	0%	0%
	near Cedar Point (Exposed)	Lake Trout		8	0.316	25%	2.10	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.206	0%	4.30	0%	0%
		Northern Pikeminnow		8	0.0975	0%	3.62	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0605	0%	3.00	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2023[b] (Minnow 2024a)	8	0.171	0%	2.00	0%	0%
		Northern Pikeminnow		8	0.0859	0%	1.94	0%	0%
	near Cedar Point (Exposed)	Lake Trout		4	0.886	50%	2.04	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.232	0%	2.95	0%	0%
		Northern Pikeminnow		8	0.0742	0%	2.95	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0917	0%	2.37	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2024	5	0.131	0%	1.82	0%	0%
		Northern Pikeminnow		8	0.0448	0%	2.14	0%	0%
	East Arm (Reference)	Lake Trout		8	0.381	13%	1.79	0%	0%
	near Cedar Point (Exposed)	Lake Trout		8	0.212	0%	1.96	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	0.233	0%	2.94	0%	0%
		Northern Pikeminnow		8	0.0474	0%	3.65	0%	0%
Quesnel River (Exposed)		Rainbow Trout		8	0.0589	0%	2.19	0%	0%

Mean mercury concentration greater than the Health Canada's Human Health guideline for muscle tissue in fish (0.5 mg/kg dw; CFIA 2015).
Mean selenium concentration greater than the Human Health guideline for moderate fish consumption (14.5 mg/kg dw; BCMOE 2014).
Mean selenium concentration greater than the Human Health guideline for high fish consumption (7.3 mg/kg dw; BCMOE 2014).

Notes: mg/kg ww = milligrams per kilogram wet weight. mg/kg dw = milligrams per kilogram dry weight. > = greater than. % = percent. guidelines for the protection of human health were applied to edible fish tissues only (i.e., muscle) not whole-body tissue results (e.g., northern pikeminnow results for 2016 to 2024).

[a] Muscle tissue concentrations are presented for all species except for northern pikeminnow, for which whole-body tissue concentrations are presented except for data from Fall 2015 and Fall 2017 (muscle tissue concentrations presented for northern pikeminnow).

[b] Gill netting was not approved by Department of Fisheries and Oceans (DFO) in 2023 for the collection of lake trout from Quesnel Lake. As such, lake trout in Quesnel Lake were targeted using angling methods. Four lake trout were captured near Cedar Point (exposed) and no lake trout were captured in the East Arm (reference) in 2023 using angling.

Mercury bioaccumulation in fish is positively related to fish age (Kidd and Batchelar 2012). Therefore, given the longevity of lake trout and their trophic position it is not unexpected for muscle mercury concentrations in larger/older fish to naturally exceed the human health guideline at both the exposed and reference areas.

Mean selenium concentrations in fish muscle or whole-body samples from Quesnel Lake and Quesnel River were below the guideline for the protection of aquatic life in 2024 (4 mg/kg dw; BCMOE 2014). When considering individual sample results, two (25%) of the whole-body northern pikeminnow samples from 2024 had selenium concentrations that exceeded the aquatic life guideline (Appendix Tables C.7.5 to C.7.11), which was within the historic range of guideline exceedances for this species (Table 5.24). In prior years, the guideline for the protection of aquatic life (4 mg/kg dw) was exceeded in exposed muscle samples of peamouth chub (13% to 63% of samples in 2015, 2018, 2021, and 2022), whole-body samples of northern pikeminnow (25% to 38% of samples in 2019, 2020, and 2022), and muscle samples of rainbow trout (13% of samples in 2017 and 2022; Table 5.24).

As indicated previously (Section 5.1.7.1), the analysis of ovary tissue is recommended for assessing the effects of selenium on fish (e.g., Luoma and Presser 2009; Janz et al. 2010; DeForest et al. 2012; Janz 2012). Selenium analysis was completed for ten fish ovary samples from Quesnel Lake (exposed: n=4; reference: n=6) and five samples from Quesnel River in 2024. Selenium concentrations in the exposed ovary tissues from 2024 (peamouth chub: n=2; lake trout: n=2) remained below the guideline for the protection of aquatic life (11 mg/kg dw[58]; BCMOE 2014) and below the threshold for reproductive effects (20 mg/kg dw; DeForest et al. 2012; Table 5.25; Appendix Tables C.7.5 to C.7.11). In contrast, 40% of the reference peamouth chub ovary tissues in 2024 exceeded the guideline for the protection of aquatic life but remained below the threshold for reproductive effects (Table 5.25; Appendix Table C.7.10). This suggests natural elevation of selenium in peamouth chub ovaries, as was previously observed in 2022 and 2023 (Table 5.25). In prior years, selenium concentrations in ovary samples of exposed peamouth chub exceeded the guideline for the protection of aquatic life (25% to 86% of samples from 2018 to 2023) and the threshold for reproductive effects (25% to 43% of samples in 2018 and 2022), while selenium concentrations in lake trout ovary samples (exposed and reference) have remained below the aquatic life guideline (Table 5.25).

The mean selenium concentration of ovary samples from exposed rainbow trout in 2024 (27.9 mg/kg dw) was the highest observed to date (by 1.8-times), exceeded the guideline for the protection of aquatic life by 2.5-times, and exceeded the threshold for reproductive effects

[58] This guideline includes a two-fold uncertainty factor (BCMOE 2014).

Table 5.24: Fish Muscle and Whold-body Selenium Concentrations from Quesnel Lake (Exposed and Reference) and Quesnel River (Exposed) Relative to the British Columbia Guideline for the Protection of Aquatic Life, 2015 to 2024

Waterbody or Area		Species	Year/Season	Tissue	Sample Size	Selenium	
						Aquatic Life Guideline (4 mg/kg dw)	
						Mean	Frequency > Guideline
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2015 (Minnow 2017g)	Whole-body	8	2.20	0%
		Redside Shiner		Whole-body	8	2.00	0%
	East Arm (Reference)	Lake Trout		Muscle	10	1.60	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	10	1.90	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Muscle	7	2.02	0%
		Peamouth Chub		Whole-body	8	3.10	13%
		Redside Shiner		Whole-body	8	2.70	0%
	near Likely (Exposed)	Kokanee		Muscle	8	2.40	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.17	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Spring 2016 (Minnow 2017g)	Whole-body	8	2.10	0%
		Peamouth Chub		Muscle	8	1.60	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	3.08	0%
		Peamouth Chub		Muscle	8	2.80	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow	Fall 2017 (Minnow 2018e)	Whole-body	8	2.32	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	3.23	13%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2018 (Minnow 2019a)	Whole-body	8	1.72	0%
		Peamouth Chub		Muscle	8	2.08	0%
	East Arm (Reference)	Lake Trout		Muscle	8	2.21	0%
	North Arm (Reference)	Kokanee		Muscle	8	1.97	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	2.18	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	2.37	0%
		Peamouth Chub		Muscle	8	3.03	13%
	near Likely (Exposed)	Kokanee		Muscle	8	2.11	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.36	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2019 (Minnow 2020a)	Whole-body	8	1.60	0%
		Peamouth Chub		Muscle	8	2.08	0%
	East Arm (Reference)	Lake Trout		Muscle	8	1.87	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	1.76	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	3.36	38%
		Peamouth Chub		Muscle	8	2.90	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.35	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2020 (Minnow 2021a)	Whole-body	8	1.82	0%
		Peamouth Chub		Muscle	8	1.72	0%
	East Arm (Reference)	Lake Trout		Muscle	8	1.96	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	1.87	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	3.12	25%
		Peamouth Chub		Muscle	8	3.26	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	1.96	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2021 (Minnow 2022a)	Whole-body	8	1.81	0%
		Peamouth Chub		Muscle	8	1.76	0%
	East Arm (Reference)	Lake Trout		Muscle	8	2.07	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	1.77	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	2.95	0%
		Peamouth Chub		Muscle	8	3.94	38%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.48	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2022 (Minnow 2023a)	Whole-body	8	1.83	0%
		Peamouth Chub		Muscle	8	2.36	0%
	East Arm (Reference)	Lake Trout		Muscle	8	1.90	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	2.10	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	3.62	25%
		Peamouth Chub		Muscle	8	4.30	63%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	3.00	13%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2023[a] (Minnow 2024a)	Whole-body	8	1.94	0%
		Peamouth Chub		Muscle	8	2.00	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	4	2.04	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	2.95	0%
		Peamouth Chub		Muscle	8	2.95	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.37	0%
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2024	Whole-body	8	2.14	0%
		Peamouth Chub		Muscle	5	1.82	0%
	East Arm (Reference)	Lake Trout		Muscle	8	1.79	0%
	near Cedar Point (Exposed)	Lake Trout		Muscle	8	1.96	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		Whole-body	8	3.65	25%
		Peamouth Chub		Muscle	8	2.94	0%
Quesnel River (Exposed)		Rainbow Trout		Muscle	8	2.19	0%

Mean selenium concentration greater than the BC Aquatic Life guideline for muscle tissue or whole-body in fish (4 mg/kg dw; BCMOE 2014).

Notes: mg/kg dw = milligrams per kilogram dry weight. > = greater than. % = percent. The guideline for the protection of aquatic life was applied to fish muscle and whole-body tissue concentrations.

[a] Gill netting was not approved by Department of Fisheries and Oceans (DFO) in 2023 for the collection of lake trout from Quesnel Lake. As such, lake trout in Quesnel Lake were targeted using angling methods. Four lake trout were captured near Cedar Point (exposed) and no lake trout were captured in the East Arm (reference) in 2023 using angling.

Table 5.25: Fish Ovary Selenium Concentrations from Quesnel Lake (Exposed and Reference) and Quesnel River (Exposed) Relative to Guidelines and Thresholds, 2015 to 2024

Waterbody or Area		Species	Year/Season	Sample Size	Selenium		
					Mean	Frequency > Guideline or Threshold	
						BC Aquatic Life Guideline (11 mg/kg dw)	Threshold[a] (20 mg/kg dw)
Quesnel Lake	East Arm (Reference)	Lake Trout	Fall 2015 (Minnow 2017g)	2	3.30	0%	0%
	near Cedar Point (Exposed)	Lake Trout		3	5.10	0%	0%
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		4	5.08	0%	0%
	near Likely (Exposed)	Kokanee		1	5.40	0%	0%
Quesnel River (Exposed)		Rainbow Trout		1	9.51	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2018 (Minnow 2019a)	4	9.43	0%	0%
	East Arm (Reference)	Lake Trout		1	10.1	0%	0%
	North Arm (Reference)	Kokanee		5	3.73	0%	0%
	near Cedar Point (Exposed)	Lake Trout		4	6.96	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		4	14.3	50%	25%
	near Likely (Exposed)	Kokanee		8	4.28	0%	0%
Quesnel River (Exposed)		Rainbow Trout		2	2.76	50%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2019 (Minnow 2020a)	4	9.43	0%	0%
	East Arm (Reference)	Lake Trout		3	4.22	0%	0%
	near Cedar Point (Exposed)	Lake Trout		2	9.30	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		4	9.74	25%	0%
Quesnel River (Exposed)		Rainbow Trout		1	14.1	100%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2020 (Minnow 2021a)	1	6.04	0%	0%
	East Arm (Reference)	Lake Trout		3	3.02	0%	0%
	near Cedar Point (Exposed)	Lake Trout		4	4.72	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		6	8.57	33%	0%
Quesnel River (Exposed)		Rainbow Trout		1	5.39	0%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2021[b] (Minnow 2022a)	4	10.3	0%	0%
	near Cedar Point (Exposed)	Lake Trout		6	4.29	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	9.74	25%	0%
Quesnel River (Exposed)		Rainbow Trout		1	16.2	100%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2022 (Minnow 2023a)	6	11.2	50%	0%
	East Arm (Reference)	Lake Trout		1	4.16	0%	0%
	near Cedar Point (Exposed)	Lake Trout		5	6.43	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		7	17.7	86%	43%
Quesnel River (Exposed)		Rainbow Trout		5	11.5	80%	0%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2023[c] (Minnow 2024a)	8	10.6	50%	0%
	near Cedar Point (Exposed)	Lake Trout		3	4.77	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		8	12.3	63%	0%
Quesnel River (Exposed)		Rainbow Trout		5	15.1	80%	20%
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2024	5	10.3	40%	0%
	East Arm (Reference)	Lake Trout		1	5.10	0%	0%
	near Cedar Point (Exposed)	Lake Trout		2	4.30	0%	0%
	near Hazeltine Creek (Exposed)	Peamouth Chub		2	8.79	0%	0%
Quesnel River (Exposed)		Rainbow Trout		5	27.9	80%	60%

Mean selenium concentration greater than the BC Aquatic Life guideline for ovary tissue in fish (11 mg/kg dw; BCMOE 2014).

Mean selenium concentration greater than DeForest et al. (2012) threshold for ovary tissue in fish (20 mg/kg dw) and the BC Aquatic Life guideline (BCMOE 2014).

Notes: mg/kg dw = milligrams per kilogram dry weight, > = greater than, % = percent. BC = British Columbia.

[a] Ovary selenium threshold as described in DeForest et al. (2012).

[b] No female lake trout were collected from the Quesnel Lake East Arm (reference) in 2021, therefore results for lake trout from this area are not displayed in 2021.

[c] Gill netting was not approved by Department of Fisheries and Oceans (DFO) in 2023 for the collection of lake trout from Quesnel Lake. As such, lake trout in Quesnel Lake were targeted using angling methods. Four lake trout were captured near Cedar Point (exposed) and no lake trout were captured in the East Arm (reference) in 2023 using angling.

by 1.4-times (Table 5.25; Appendix Table C.7.11). Selenium concentrations in 80% of the exposed rainbow trout ovaries from 2024 exceeded the aquatic life guideline; a result that was within the range guideline exceedances observed in previous years (range = 50 to 100% of samples in 2018, 2019, and 2021 to 2023). In contrast, selenium concentrations in rainbow trout ovaries in 2024 exceeded the threshold for reproductive effects for the second time (the first time being in 2023), but the 2024 results marked the highest rate of exceedance to date (60%; Table 5.20; Appendix Table C.7.11). The increased guideline and threshold exceedance rate for selenium concentrations in rainbow trout ovaries in 2024 could be related to the early development stage of the collected ovary tissues (Table C.6.20) since selenium concentrations have been shown to be inversely related to ovary tissue development (i.e., higher selenium concentrations in ovary tissues at earlier development stages; Brix et al. 2025). In addition, high variability was observed in the reported ovary tissue analyte concentrations (due to sample heterogeneity; see Appendix B.10 for more details). Continued monitoring will help to determine whether the 2024 rainbow trout ovary results are part of a long-term trend. Temporal trends in fish tissue quality from Quesnel Lake and Quesnel River are discussed in the next section (Section 5.2.7.2).

5.2.7.2 Spatial and Temporal Comparisons

Age and morphological measures (fork length and body weight) of lake trout, peamouth chub, and northern pikeminnow from Quesnel Lake, and rainbow trout from Quesnel River between 2015 and 2024 are summarized in Table 5.26 (see Appendix Tables C.6.17 to C.6.20 for detailed 2024 data). Statistical comparisons exhibited a significant *Area×Year* interaction for at least one of the physical measures for two of the species with paired exposed and reference data in 2024 (i.e., peamouth chub and northern pikeminnow)[59]. The physical measures of lake trout did not exhibit a significant *Area×Year* interaction, indicating there has been no significant temporal change in the relative (exposed-reference) difference of their morphological measures (Table 5.27). The size (length or weight) and age of exposed peamouth chub in 2024 were similar to those from the reference area, and were similar to all prior years (i.e., 2016 to 2023) except for being significantly shorter and lighter than peamouth chub caught in 2020 (Table 5.27; Appendix Table E.6.9). The size (length and weight) and age of exposed northern pikeminnow in 2024 were similar to those from the reference area, but were significantly younger than in 2022,

[59] Results of the two-way ANOVA for age, fork length, and body size may differ among tissue types for the same species in the same area due to sub-sampling (i.e., the number of females sampled for ovary tissue may be a subset of the total samples) or differences in data availability across years for the different tissue types (e.g., peamouth chub kidney and ovary data were collected from 2018 to 2024 compared to 2016 to 2024 for peamouth chub muscle and liver tissue). In 2024, discussion of age and body size focused on results of two-way ANOVA for muscle tissues (peamouth chub and lake trout) and whole-body tissues (northern pikeminnow), or one-way ANOVA for muscle tissues (rainbow trout).

Table 5.26: Age and Body Size Data of Fish Collected for Tissue Quality Monitoring from Quesnel Lake (Exposed and Reference) and Quesnel River (Exposed), 2015 to 2024

Waterbody or Area		Species	Year/ Season	Sample Size	Age (Years)		Fork Length (cm)		Body Weight (Grams)	
					Mean	Range	Mean	Range	Mean	Range
Quesnel Lake	near Grain Creek (Reference)	Peamouth Chub	Fall 2015 (Minnow 2017g)	8	-	-	20.3	18.8 - 21.2	93.4	80.9 - 113
	East Arm (Reference)	Lake Trout		10	10	4 - 19[a]	48.7	34.4 - 63.4	1,230	430 - 2,670
	near Cedar Point (Exposed)	Lake Trout		10	9	4 - 14	51.4	37.2 - 66.2	1,573	550 - 3,220
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		7	7.7	3 - 10	29.2	18.2 - 35.3	375	68 - 650
		Peamouth Chub		8	-	-	20.5	18.0 - 23.0	103	65 - 145
	near Likely (Exposed)	Kokanee		8	3.0	-	25.8	25.2 - 26.6	182	140 - 215
Quesnel River (Exposed)		Rainbow Trout		8	4.0	2 - 6	28.8	21.5 - 34.0	296	143 - 443
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Spring 2016 (Minnow 2017g)	8	3.0	2 - 4	11.2	9.0 - 13.0	14.0	7.8 - 21.5
		Peamouth Chub		8	10	7 - 14	21.1	20.1 - 22.3	107	84 - 142
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	3.0	-	11.4	9.8 - 13.0	13.6	8.4 - 20.0
		Peamouth Chub		8	9.0	6 - 15	20.5	18.6 - 22.9	103	66 - 150
Quesnel Lake	near Hazeltine Creek (Exposed)	Northern Pikeminnow	Fall 2017 (Minnow 2018e)	8	2.9	2 - 3	8.9	7.4 - 10.9	7.6	3.9 - 14.0
Quesnel River (Exposed)		Rainbow Trout		8	4.4	2 - 6	31.3	21.5 - 37.1	343	97 - 523
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2018 (Minnow 2019a)	8	4.0	3 - 5	13.2	11.7 - 15.6	25.7	14.3 - 39.5
		Peamouth Chub		8	8.0	5 - 12	19.4	15.6 - 21.6	94.7	51.5 - 134
	East Arm (Reference)	Lake Trout		8	19	12 - 35	59.6	55.0 - 66.5	2,306	1,700 - 3,100
	North Arm (Reference)	Kokanee		8	2.7	2 - 3	30.4	29.0 - 31.6	335	250 - 370
	near Cedar Point (Exposed)	Lake Trout		8	12	8 - 19	57.7	53.0 - 67.0	2,000	1,460 - 3,200
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	2.7	2 - 3	13.4	11.4 - 15.6	24.7	15.3 - 38.0
		Peamouth Chub		8	7.0	4 - 10	18.6	15.3 - 23.3	81.8	36.5 - 156
	near Likely (Exposed)	Kokanee		8	2.4	2 - 3	30.7	29.5 - 32.6	373	330 - 425
Quesnel River (Exposed)		Rainbow Trout		8	5.0	3 - 6	32.5	27.0 - 36.8	415	245 - 640
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2019 (Minnow 2020a)	8	4.0	3 - 5	17.5	13.2 - 23.2	69.3	23.8 - 142
		Peamouth Chub		8	8.0	5 - 10	19.2	17.4 - 21.5	87.0	58.0 - 131
	East Arm (Reference)	Lake Trout		8	18	8 - 22	56.9	49.5 - 63.9	2,134	1,610 - 2,555
	near Cedar Point (Exposed)	Lake Trout		9	12	8 - 24	59.5	50.2 - 80.0	2,739	1,450 - 6,025
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	3.0	2 - 5	15.7	12.4 - 18.9	44.2	24.6 - 74.7
		Peamouth Chub		8	7.0	4 - 10	19.2	13.8 - 24.7	90.0	30.0 - 170
Quesnel River (Exposed)		Rainbow Trout		8	4.0	3 - 5	28.1	24.6 - 34.2	254	150 - 465
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2020 (Minnow 2021a)	8	3.8	3 - 6	15.3	13.2 - 23.7	45.4	24.6 - 152.1
		Peamouth Chub		8	5.4	2 - 9	17.5	12.9 - 21.4	67.9	25.1 - 112.2
	East Arm (Reference)	Lake Trout		8	14	5 - 28	59.3	52.3 - 71.6	2,472	1,750 - 3,950
	near Cedar Point (Exposed)	Lake Trout		8	13	5 - 20	56.9	37.8 - 67.8	2,455	580 - 4,550
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	4.4	3 - 6	18.3	13.5 - 21.7	76.4	29 - 119
		Peamouth Chub		8	8.1	5 - 10	21.5	17.2 - 24.9	134.3	61 - 221
Quesnel River (Exposed)		Rainbow Trout		8	3.4	2 - 5	30.1	23.6 - 34.2	309	140 - 500
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2021 (Minnow 2022a)	8	4.9	3 - 7	17.5	13.3 - 24	62.0	21.7 - 155
		Peamouth Chub		8	7.8	5 - 12	18.8	14.7 - 23.1	79.2	41 - 144
	East Arm (Reference)	Lake Trout		8	24	13 - 44	60.6	52.6 - 68.4	2,444	1,750 - 2,850
	near Cedar Point (Exposed)	Lake Trout		8	11	7 - 13	56.4	47.5 - 61.5	1,929	850 - 2,450
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	4.6	3 - 6	17.4	13.4 - 20.8	57.1	23.5 - 92
		Peamouth Chub		8	8.0	5 - 12	21.6	19.2 - 23.5	118	77 - 160
Quesnel River (Exposed)		Rainbow Trout		8	2.8	2 - 4	29.0	20.5 - 37.3	316	114 - 660
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2022 (Minnow 2023a)	8	2.6	2 - 4	14.8	13.5 - 16.6	41.0	36.0 - 57.0
		Peamouth Chub		8	6.3	3 - 14	20.2	17.1 - 22.8	101	66.0 - 135
	East Arm (Reference)	Lake Trout		8	12.4	7 - 19	59.1	50.0 - 65.0	2,350	1,440 - 3,100
	near Cedar Point (Exposed)	Lake Trout		8	6.6	2 - 15	55.4	42.5 - 64.5	1,981	760 - 3,400
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	3.8	2 - 6	17.3	13.6 - 21.8	64.9	33.0 - 130
		Peamouth Chub		8	8.1	6 - 10	21.6	20.0 - 22.9	138	115 - 170
Quesnel River (Exposed)		Rainbow Trout		8	3.4	2 - 5	27.4	19.4 - 33.6	258	110 - 450
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2023[b] (Minnow 2024a)	8	3.8	1 - 8	18.2	13.5 - 26.7	77.9	24.1 - 215
		Peamouth Chub		8	8.5	5 - 11	22.4	20.8 - 24.0	121	100 - 147
	near Cedar Point (Exposed)	Lake Trout		4	26.5	22 - 31	67.7	63.5 - 75.0	3,538	2,400 - 5,100
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	2.5	1 - 4	17.1	14.7 - 19.8	53	36.0 - 74
		Peamouth Chub		8	9.9	5 - 16	22.5	20.1 - 24.2	125	81 - 153
Quesnel River (Exposed)		Rainbow Trout		8	4.5	4 - 6	33.9	32.1 - 36.4	375	300 - 550
Quesnel Lake	near Grain Creek (Reference)	Northern Pikeminnow	Fall 2024	8	4.0	3 - 4	13.5	12.0 - 15.6	23.9	16.0 - 31.0
		Peamouth Chub		5	9.0	6 - 13	20.5	18.8 - 24.0	103	72 -175
	East Arm (Reference)	Lake Trout		8	18.0	10 - 24	63.1	56.0 - 70.5	2,906	2,400 - 3,500
	near Cedar Point (Exposed)	Lake Trout		8	10.0	6 - 24	52.7	17.5 - 72.9	2,191	980 - 5,100
	near Hazeltine Creek (Exposed)	Northern Pikeminnow		8	3.0	2 - 5	12.7	10.6 - 15.2	19.9	12.3 - 30.0
		Peamouth Chub		8	10.0	7 - 12	20.9	19.0 - 24.1	101	70 - 132
Quesnel River (Exposed)		Rainbow Trout		8	4.0	2 - 5	33.1	26.9 - 39.1	372	200 - 605

Note: "-" = no data / not calculated.

[a] Sample size is n = 9 for age estimate.

[b] Gill netting was not approved by Department of Fisheries and Oceans (DFO) in 2023 for the collection of lake trout from Quesnel Lake. As such, lake trout in Quesnel Lake were targeted using angling methods. Four lake trout were captured near Cedar Point (exposed) and no lake trout were captured in the East Arm (reference) in 2023 using angling.

Table 5.27: Summary of Statistical Contrasts of Exposed - Reference Relative Differences of Fish Tissue Primary and Secondary Analyte Concentrations for Quesnel Lake (Exposed and Reference), 2015 to 2024[a]

	Parameter	Tissue[b]	Peamouth Chub: Two-way ANOVA															Northern Pikeminnow: Two-way ANOVA															Lake Trout: Two-way ANOVA														
			Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]								Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]								Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]							
			Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period							
			2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024
	Age	-	baseline	ns	ns	ns	ns	ns	-	ns	ns	ns	ns	ns	ns	ns	-	ns	baseline	ns	ns	ns	ns	ns	-	ns	ns	-27	-26	ns	ns	43	-	ns	baseline	ns								-33							
	Fork Length	-	ns	ns	ns	23	ns	ns	ns	ns	ns	ns	ns	23	15	ns	ns	ns	baseline	ns	ns	23	ns	ns	ns	ns	ns	ns	ns	21	ns	16	ns	ns	baseline	ns								ns							
	Body Weight	-	ns	ns	ns	90	ns	ns	ns	ns	ns	ns	ns	102	56	40	ns	ns	baseline	ns	ns	94	ns	ns	ns	ns	ns	ns	ns	95	ns	ns	ns	ns	baseline	ns								ns							
Primary Analytes	Arsenic (non-essential)	muscle/whole-body	baseline	ns	-56	ns	ns	ns	-49	-60	77	ns	ns	119	129	ns	ns	ns	baseline	-71	ns	ns	ns	ns	ns	ns	ns	125	ns	ns	216	81	94	ns	ns	baseline	ns								67							
		ovary	-	baseline	ns	-	ns				-	ns		-	ns				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver[e]	baseline	ns	ns	-68	ns	-83	-58	-61	94	ns	ns	ns	ns	-66	ns	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-60	ns	ns	ns	-	ns	ns	ns	-46	ns	ns	ns	-	133
		kidney[e]	-	baseline	ns						-	24							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								46							
	Copper (essential)	muscle/whole-body	baseline	-35	ns	-32	-58	ns	ns	-51	48	ns	33	ns	-38	ns	61	-27	baseline	ns								ns								baseline	ns	ns	ns	ns	ns	-	51	ns	ns	ns	-25	ns	ns	-	ns
		ovary	-	baseline	ns	-	ns				-	ns		-	ns				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver[e]	baseline	ns	ns	ns	ns	ns	ns	ns	ns	108	45	ns	ns	ns	ns	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	-77	-82	-80	-	ns	ns	ns	ns	-59	-68	-64	-	ns
		kidney[e]	-	baseline	ns						-	15							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								ns							
	Iron (essential)	muscle/whole-body	baseline	ns							ns								baseline	ns								ns								baseline	ns								-32							
		ovary	-	baseline	ns	-	ns				-	ns		-	ns				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver[e]	baseline	ns							49								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								-58							
		kidney[e]	-	baseline	ns						-	14							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								-36							
	Selenium (essential)	muscle/whole-body	baseline	ns	ns						74								baseline	ns								67								baseline	ns	ns	-19	-27	ns	-	ns	17	ns	ns	ns	-15	ns	-	ns
		ovary[e]	-	baseline	ns	-	ns				-	18	-	18					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver[e]	baseline	ns							27								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								-22							
		kidney[e]	-	baseline	ns						-	36							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	-54	ns	-	-50	ns	ns	ns	ns	-47	ns	-	-43
Secondary Analytes	Barium	muscle/whole-body	baseline	ns	ns	ns	ns	ns	ns	83	ns	ns	ns	ns	ns	60	96	132	baseline	ns	ns	ns	ns	ns	ns	-66	71	ns	93	ns	ns	96	ns	-42	<LRL	baseline	ns	ns	**3,473**	183	-	107	<LRL	ns	ns	ns	**ns**	126	-	ns
		ovary	-	baseline	ns	-	ns				-	32							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							28								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LRL	baseline	-62	ns	**4,402**	<LRL	-	<LRL	<LRL	ns	-49	ns	**ns**	<LRL	-	<LRL
		kidney	-	baseline	ns						-	89							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-65	-47	-46	ns	-	-61	113	164	ns	ns	ns	131	-	ns
	Cadmium (non-essential)	muscle/whole-body	baseline	<LRL		ns	ns	ns	ns	<LRL	99	<LRL		99				<LRL	baseline	ns								110								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		ovary	-	baseline	ns	-	ns				-	37	-	37					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							116								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-74	ns	ns	ns	-	ns	ns	ns	-65	ns	ns	ns	-	ns
		kidney	-	baseline	ns						-	151							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	-	ns	ns							
	Calcium	muscle/whole-body	baseline	ns	ns	-48	ns	ns	ns	169	ns	ns	ns	-50	ns	ns	ns	162	baseline	ns	ns	ns	ns	ns	ns	-49	ns	ns	55	ns	ns	ns	ns	-55	-	baseline	ns	81	119	ns	-	76	-41	ns	ns	ns	ns	ns	-	ns
		ovary	-	baseline	ns	-	ns				-	-21	-	-21					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							ns								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								-21							
		kidney	-	baseline	ns						-	37							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns								ns							
	Manganese	muscle/whole-body	baseline	ns	ns	ns	ns	ns	ns	213	ns	ns	ns	ns	ns	55	ns	209	baseline	ns	ns	ns	ns	ns	ns	-59	ns	ns	128	ns	ns	ns	ns	-41	baseline	ns	ns	42	92	81	-	37	ns	ns	-25	ns	58	49	-	ns
		ovary	-	baseline	ns	-	ns				-	ns	-	ns					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							15								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	-	ns								
		kidney	-	baseline	ns						-	32							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	-	-33	42	32	ns	49	78	101	-	ns

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold** = Data for either exposed or reference in the indicated year were entirely below the laboratory reporting limit (LRL), leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available for analysis (i.e., either data was not collected for the given analyte and time period or data were omitted from analysis because > 50% of data fora given analyte were <LRL in all time periods). "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ns" = not significant. "ww" = wet weight. "Exp" = exposed. "Ref" = reference. "ANOVA" = Analysis of Variance. "MLE" = Maximum Likelihood Estimation. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Age, fork length, and body weight results are those that are associated with muscle tissue analyses.

[a] Statistical approaches included ANOVA, ANCOVA, and MLE and for each case depended on data suitability (see complete statistical results in Appendix Tables E.6.9 to E.6.16). This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). If no significant change was detected in the exposed-reference difference among years (i.e., the Area x Year interaction was not significant), data from all years were combined for the analyses.

[b] Muscle tissue was analyzed for peamouth chub and lake trout, while whole-body tissue was analyzed for northern pikeminnow. Lake trout ovary tissues could not be analyzed using two-way ANOVA due to insufficient sample sizes at the reference area. See

[c] Magnitude of difference (MOD) calculated on back transformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[d] Magnitude of difference (MOD) calculated on back transformed least-squares means as (Exp-Ref)/Ref x 100%.

[e] Organ in which the specific metal is known to accumulate (references in Appendix Table E.6.22).

Table 5.27: Summary of Statistical Contrasts of Exposed - Reference Relative Differences of Fish Tissue Primary and Secondary Analyte Concentrations for Quesnel Lake (Exposed and Reference), 2015 to 2024[a]

Parameter		Tissue[b]	Peamouth Chub: Two-way ANOVA																Northern Pikeminnow: Two-way ANOVA																Lake Trout: Two-way ANOVA															
			Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]								Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]								Magnitude of Difference in (Exposed - Reference) Relative to Baseline Period (%)[c]								Magnitude of Difference for Exposed Mean Relative to Reference (%)[d]							
			Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period								Post-Breach Period							
			2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024
Secondary Analytes	Mercury (ww) (non-essential)	muscle/whole-body	baseline	-42	-32	-45	-36	ns	ns	ns	63	ns	ns	ns	ns	ns	35	72	-	baseline	ns						-	ns							baseline	ns							-34							
		ovary	-	baseline	ns	-	ns				-	ns	-	ns					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							57								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-57	ns	-53	ns	-	ns	-37	ns	-73	ns	-70	-49	-	ns
		kidney	-	baseline	ns	ns	ns	ns	ns	ns	-	ns	42	ns	ns	83	ns	76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns							-38							
	Molybdenum (essential)	muscle/whole-body	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	-42	-37	-50	-36	ns	-38	ns	ns	-24	ns	-35	ns	ns	ns	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		ovary	-	baseline	ns	-	ns				-	-15	-	-15					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							31								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns							ns							
		kidney	-	baseline	ns						-	42							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns							ns							
	Phosphorus (essential)	muscle/whole-body	baseline	ns	ns	-21	ns	ns	ns	ns	11	ns	ns	-12	ns	ns	ns	24	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-37	baseline	-17	-22	-25	-15	ns	-	ns	19	ns	ns	-10	ns	30	-	ns
		ovary	-	baseline	ns	-	ns	ns	ns	ns	-	ns	-	ns					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							11								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	-	ns	ns							
		kidney	-	baseline	-32	-31	ns	ns	-39	-46	-	63	ns	ns	40	ns	ns	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	24	70	-	ns	ns	ns	ns	ns	19	63	-	ns
	Sodium	muscle/whole-body	baseline	ns	-21	ns	ns	ns	ns	ns	26	43	ns	ns	27	ns	16	ns	baseline	ns							ns								baseline	ns	ns	ns	ns	40	-	42	-30	ns	-35	-30	ns	ns	-	ns
		ovary	-	baseline	ns	-	ns	ns	ns	ns	-	ns	-	ns					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	49	ns	ns	ns	ns	ns	ns	ns	59	ns	ns	32	ns	ns	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-39	-51	ns	ns	-	ns	ns	ns	-33	-46	ns	ns	-	ns
		kidney	-	baseline	-45	-51	ns	-37	-35	-48	-	111	ns	ns	60	33	37	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	-34	-35	-39	-44	ns	-	-41	59	ns	ns	ns	ns	37	-	ns
	Strontium	muscle/whole-body	baseline	ns	ns	-65	ns	ns	ns	337	ns	ns	ns	-67	ns	ns	ns	320	baseline	ns	ns	ns	ns	ns	ns	-50	ns	ns	ns	-37	ns	ns	ns	-61	baseline	ns	ns	ns	ns	ns	-	ns								
		ovary	-	baseline	ns	-	ns				-	-21	-	-21					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							ns	ns							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns							-21							
		kidney	-	baseline	ns						-	43							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns							-20							
	Titanium	muscle/whole-body	-	-	-	baseline	<LRL	-92	<LRL	<LRL	-	-	-	472	<LRL	ns	<LRL	<LRL	-	-	-	baseline	ns	<LRL		ns	-	-	-	ns	<LRL		ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		ovary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	-	-	-	baseline	ns	<LRL			-	-	-	ns	<LRL				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		kidney	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	aselin	ns				-	-	-	182				
	Uranium	muscle/whole-body	baseline	<LRL	ns	ns	<LRL	ns	ns	ns	ns	<LRL	ns		<LRL	ns			baseline	-81	ns	ns	ns	ns	-67	-86	ns	-77	ns	-56	-52	ns	-59	-83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		ovary	-	baseline	ns	-	ns				-	ns	-	ns					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							ns								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		kidney	-	baseline	ns						-	37							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LRL	baseline	ns						<LRL	ns						
	Vanadium (essential)	muscle/whole-body	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	-89	621	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	ns	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		ovary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							119								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LRL	baseline	**-99**	<LRL	-75	<LRL	-	ns	<LRL	ns	**ns**	<LRL	-67	<LRL	-	ns
		kidney	-	baseline	ns						-	93							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LRL	baseline	ns			<LRL			<LRL	ns				<LRL		
	Zinc (essential)	muscle/whole-body	baseline	ns	ns	ns	-29	ns	ns	ns	ns	ns	ns	ns	-30	ns	ns	-23	baseline	ns	ns	ns	ns	ns	28	-23	ns	ns	ns	-16	ns	ns	ns	-32	baseline	ns	ns	ns	ns	ns	-	ns	ns							
		ovary	-	baseline	ns	-	-36	ns	ns	-41	-	ns	ns	-	-28	ns	ns	-34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		liver	baseline	ns							11								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	ns	-47	-44	-37	-32	-	ns	ns	ns	-37	-33	-25	ns	-	ns
		kidney	-	baseline	ns						-	13							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	baseline	-27	ns	ns	ns	ns	-	-32	20	ns	ns	ns	ns	36	-	-18

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold** = Data for either exposed or reference in the indicated year were entirely below the laboratory reporting limit (LRL), leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available for analysis (i.e., either data was not collected for the given analyte and time period or data were omitted from analysis because > 50% of data fora given analyte were <LRL in all time periods). "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ns" = not significant. "ww" = wet weight. "Exp" = exposed. "Ref" = reference. "ANOVA" = Analysis of Variance. "MLE" = Maximum Likelihood Estimation. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Age, fork length, and body weight results are those that are associated with muscle tissue analyses.

[a] Statistical approaches included ANOVA, ANCOVA, and MLE and for each case depended on data suitability (see complete statistical results in Appendix Tables E.6.9 to E.6.16). This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). If no significant change was detected in the exposed-reference difference among years (i.e., the Area x Year interaction was not significant), data from all years were combined for the analyses.

[b] Muscle tissue was analyzed for peamouth chub and lake trout, while whole-body tissue was analyzed for northern pikeminnow. Lake trout ovary tissues could not be analyzed using two-way ANOVA due to insufficient sample sizes at the reference area. See

[c] Magnitude of difference (MOD) calculated on back transformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[d] Magnitude of difference (MOD) calculated on back transformed least-squares means as (Exp-Ref)/Ref x 100%.

[e] Organ in which the specific metal is known to accumulate (references in Appendix Table E.6.22).

significantly shorter than in 2020 and 2022, and significantly lighter relative to 2020 (Table 5.27; Appendix Table E.6.10). The size (length and weight) and age of lake trout have been temporally stable over the entire monitoring period (i.e., no significant *Area×Year* interaction), with lake trout size being similar at the exposed and reference areas, but exposed lake trout being significantly younger than those from the reference area (Table 5.27; Appendix Table E.6.11). Temporal comparisons of the physical measures of rainbow trout were made without contrasts between areas because associated reference data were not collected (see Section 3.7.1). Rainbow trout from Quesnel River in 2024 were of similar size (length and weight) and age relative to all prior years (i.e., 2015 to 2023; Table 5.28; Appendix Table E.6.18).

Data interpretation of paired exposed and reference results (i.e., peamouth chub, northern pikeminnow, and lake trout[60]) was focused on primary and secondary analytes (Table 2.4) with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 (if the analysis *Area×Year* interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant[61]). Data interpretation of exposed data only (i.e., no associated reference results; lake trout [ovary] and rainbow trout [all tissues]) was focused on primary and secondary analytes with a significant *Year* effect and analyte concentrations that were significantly higher in 2024 than one or more prior years.

Increasing analyte concentrations at exposed areas relative to reference areas over time, or consistently elevated analyte concentrations at the exposed area relative to reference, were not detected for most analytes in tissues of peamouth chub, northern pikeminnow, or lake trout (excluding ovary; Figures 5.31 and 5.32, Table 5.27; Appendix Figures E.6.8 to E.6.11, Appendix Tables E.6.9 to E.6.16) or over time in lake trout (ovary only) and rainbow trout (all tissues; Table 5.28; Appendix Figures E.6.12 to E.6.16, Appendix Tables E.6.17 to E.6.21). The four primary analytes (arsenic, copper, iron, and selenium) and 13 secondary analytes (barium, cadmium, calcium, manganese, mercury [ww], molybdenum, phosphorus, sodium, strontium, titanium, uranium, vanadium, and zinc) met the criteria outlined above for inclusion in data interpretation for peamouth chub, northern pikeminnow, and lake trout (excluding ovary) tissues (Table 5.27). A subset of these analytes met the criteria for inclusion in data interpretation for lake trout (ovary only) and rainbow trout (all tissues; Table 5.28): one primary analyte (selenium) and three secondary analytes (phosphorus, sodium, and zinc).

[60] Paired exposed and reference data was available for lake trout muscle, liver, and kidney tissue only. Lake trout ovary data was analyzed using a one-way ANOVA due to an insufficient (i.e., $n < 2$) sample size for the reference area in 2024.

[61] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from all available years were combined for the analyses.

Table 5.28: Summary of Temporal Comparisons of Fish Tissue Primary and Secondary Analyte Concentrations for Quesnel Lake (Exposed) and Quesnel River (Exposed), 2015 to 2024[a]

Parameter		Tissue	Lake Trout: One-way ANOVA								Rainbow Trout: One-way ANOVA								
			Magnitude of Difference Relative to Baseline Period[c] (%)								Magnitude of Difference Relative to Baseline Period[c] (%)								
			Post-Breach Period								Post-Breach Period								
			2015	2018	2019	2020	2021	2022	2023	2024	2015	2017	2018	2019	2020	2021	2022	2023	2024
Age		muscle	baseline	ns	ns	ns	ns	ns	-	ns	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Fork Length		muscle	baseline	ns	ns	ns	ns	ns	ns	ns	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Body Weight		muscle	baseline	ns	ns	ns	ns	ns	153	ns	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Primary Analytes	Selenium	muscle	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns
		ovary[b]	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	baseline	-	-	-	ns	ns	ns
	(essential)	liver[b]	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns
		kidney[b]	-	-	-	-	-	-	-	-	baseline	56.2	ns	ns	ns	ns	ns	77.2	80.5
Secondary Analytes	Phosphorus	muscle	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	18.0	34.3	ns	19.7
		ovary	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	baseline	-	-	-	ns	ns	ns
	(essential)	liver	-	-	-	-	-	-	-	-	baseline	ns	ns	21.6	27.9	29.1	ns	19.8	ns
		kidney	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	35.6	ns	ns	ns	ns
	Sodium	muscle	-	-	-	-	-	-	-	-	baseline	ns	-44.5	-36.3	-43.5	-44.4	-30.8	-39.2	-41.8
		ovary	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	baseline	-	-	-	143	ns	124
		liver	-	-	-	-	-	-	-	-	baseline	42.6	ns	39.8	ns	55.2	ns	ns	ns
		kidney	-	-	-	-	-	-	-	-	baseline	95.0	82.2	131	189	103	92.5	117	160
	Zinc	muscle	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns
		ovary	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	baseline	-	-	-	ns	ns	ns
	(essential)	liver	-	-	-	-	-	-	-	-	baseline	-27.5	ns	ns	ns	ns	-28.3	ns	ns
		kidney	-	-	-	-	-	-	-	-	baseline	ns	ns	ns	41	ns	ns	ns	36.7

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis. "ANOVA" = one way analysis of variance. ANCOVA = one-way analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww). Age, fork length, and body weight results are those that are associated with muscle tissue analyses. Lake trout ovary tissue was assessed using a one-way ANOVA as the sample size from the Quesnel Lake East Arm reference area in 2024 was insufficient for a two-way ANOVA (n < 2). Statistical comparisons of lake trout muscle, liver, and kidney were conducted using a two-way ANOVA and are presented in Table 5.27.

[a] Statistical approaches included ANOVA, ANCOVA, and MLE and for each case depended on data suitability (see complete statistical results in Appendix Tables E.6.17 to E.6.21). This table only presents results for primary and secondary analytes with a significant Year effect, and a mean exposed concentration in 2024 that was significantly higher than baseline (i.e., significant positive MOD in 2024).

[b] Organ in which the specific metal is known to accumulate (references in Appendix Table E.6.22).

[c] Magnitude of difference (MOD) calculated on back transformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/ (Exp_{predicted})\times100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

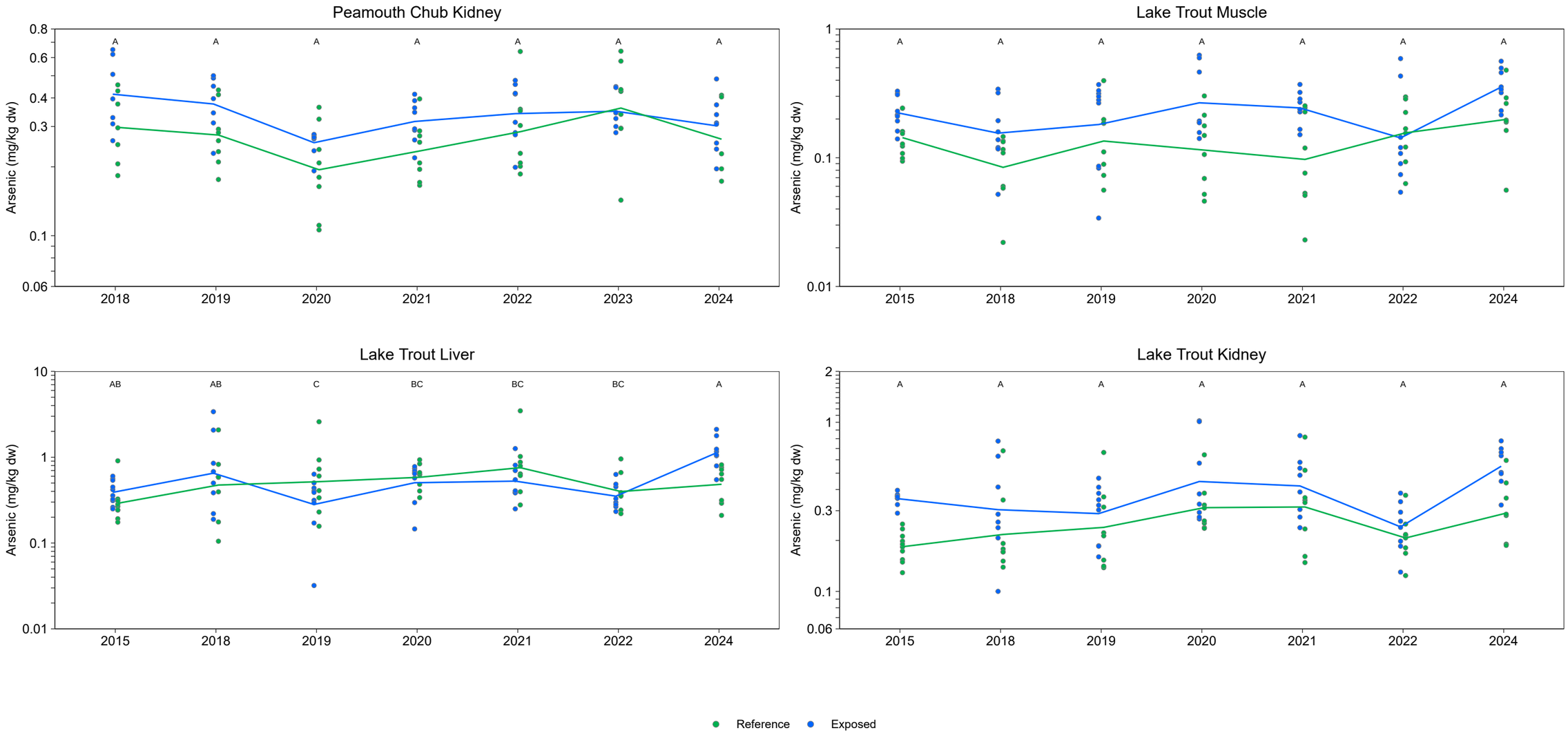

Figure 5.31: Fish Tissue Primary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for primary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

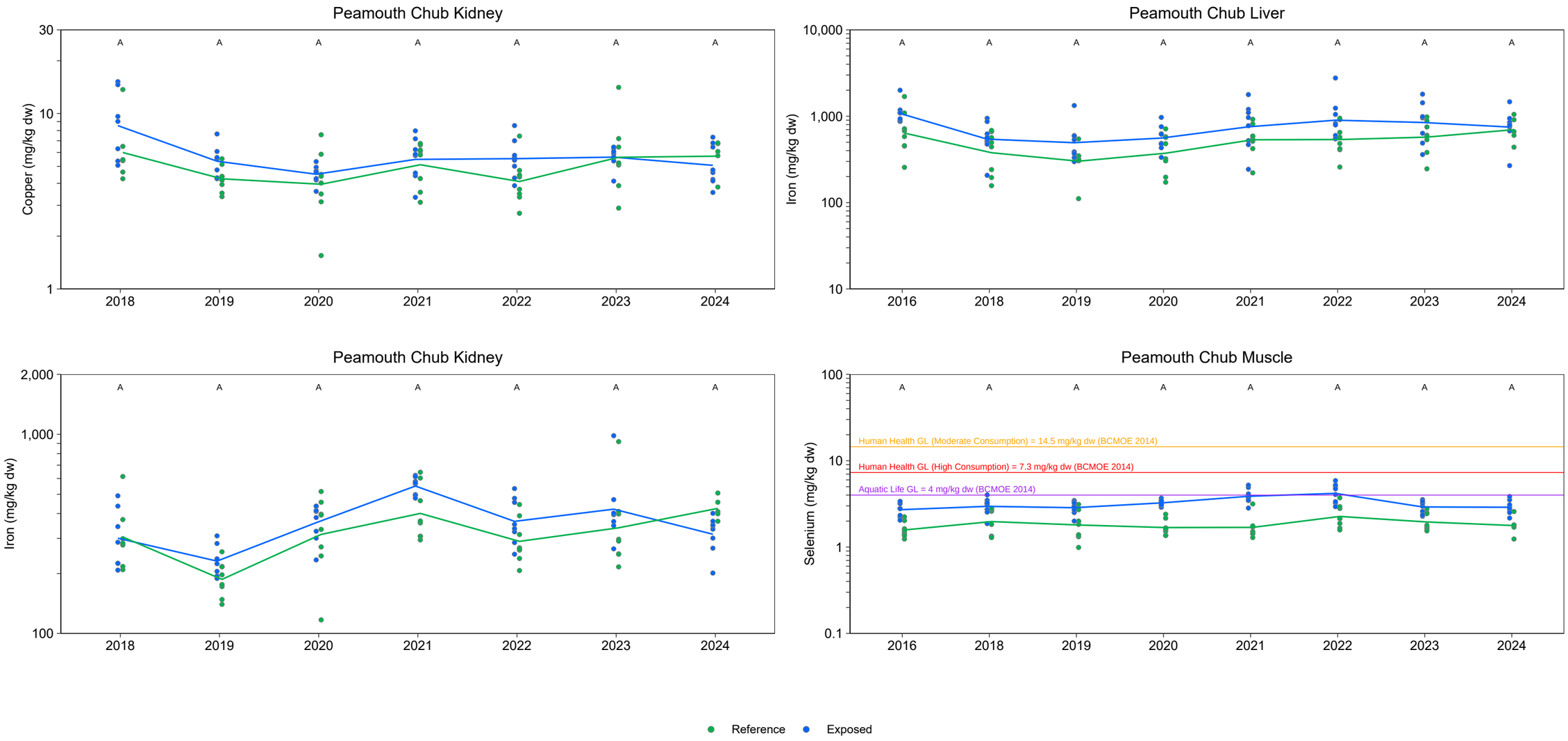

Figure 5.31: Fish Tissue Primary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for primary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

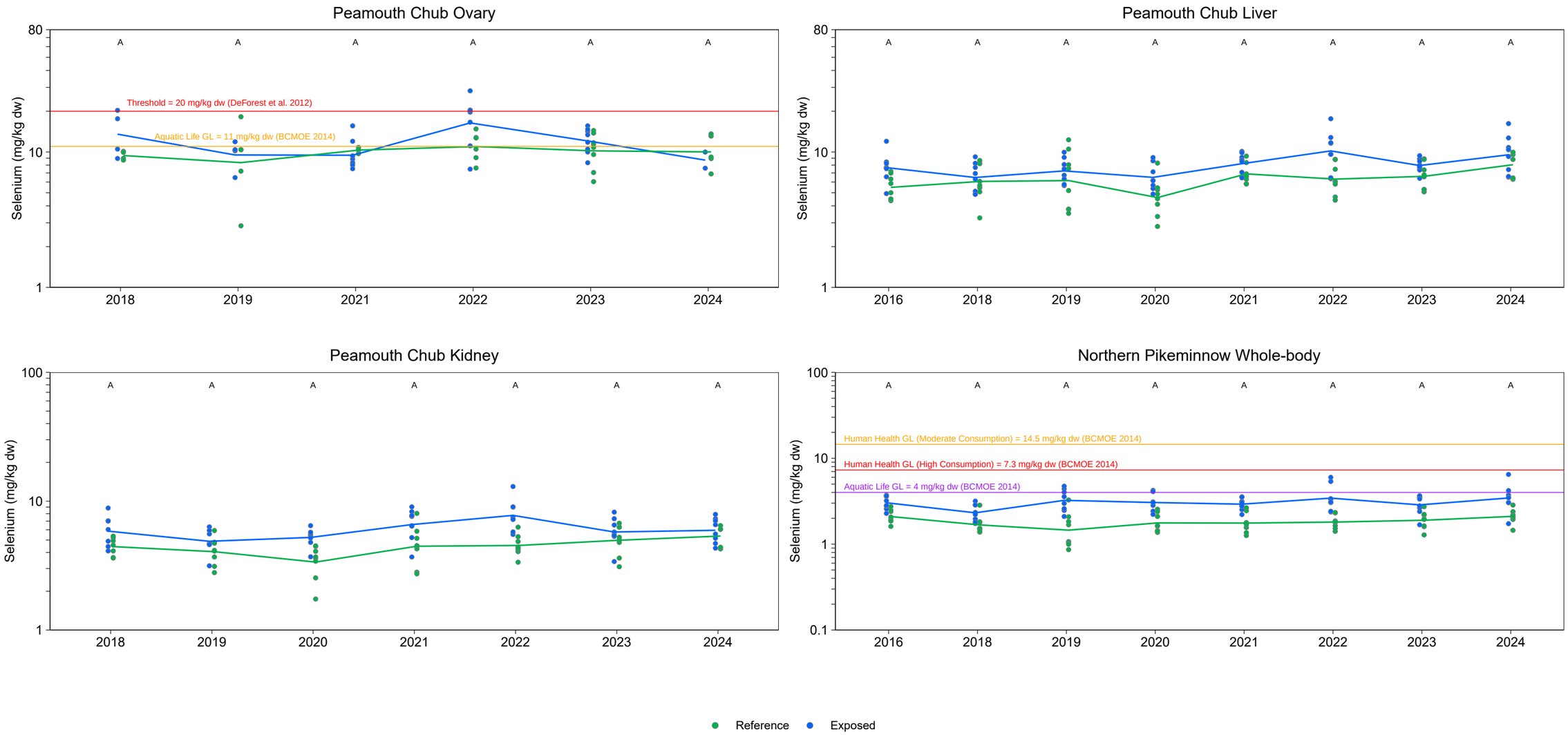

Figure 5.31: Fish Tissue Primary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for primary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

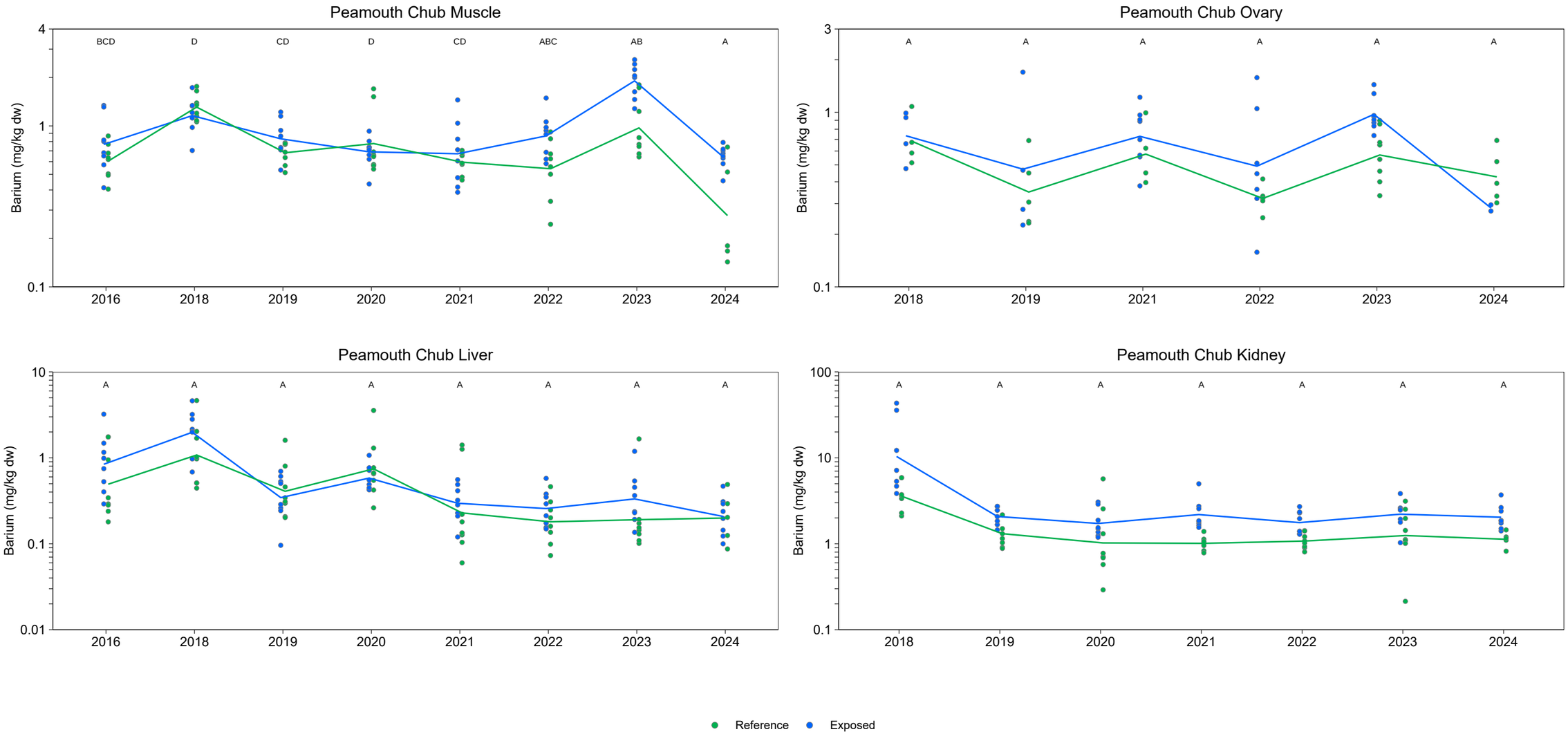

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed - Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

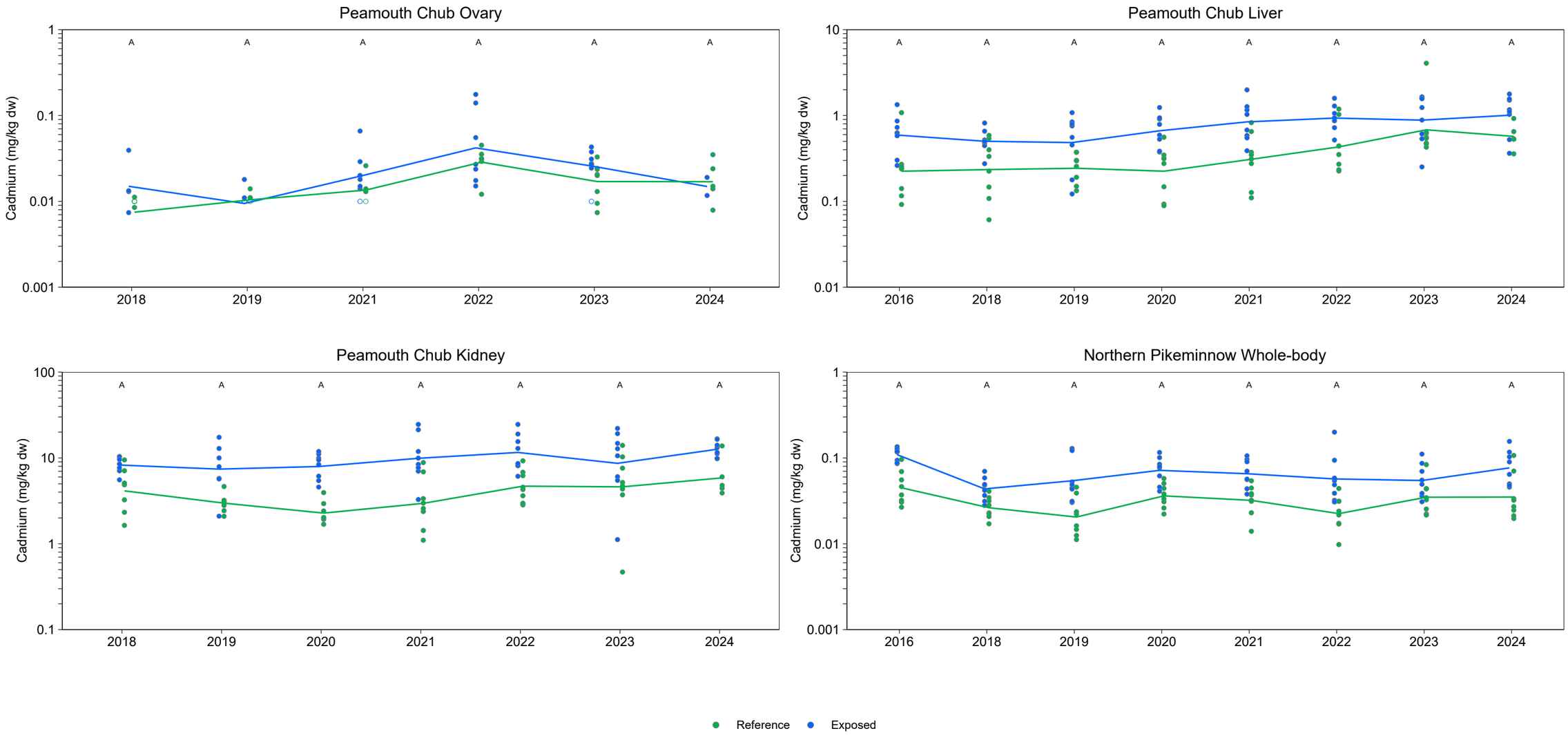

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

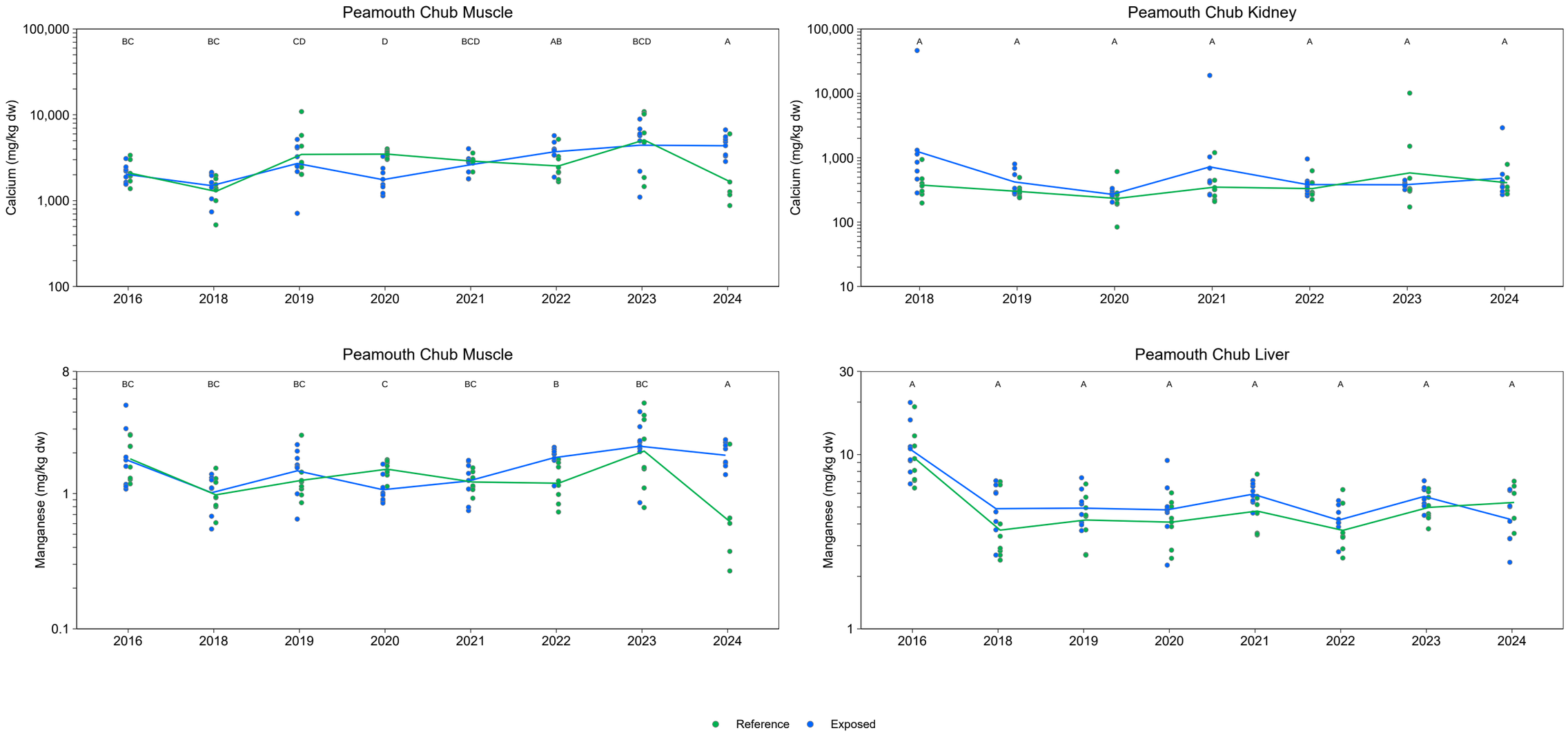

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

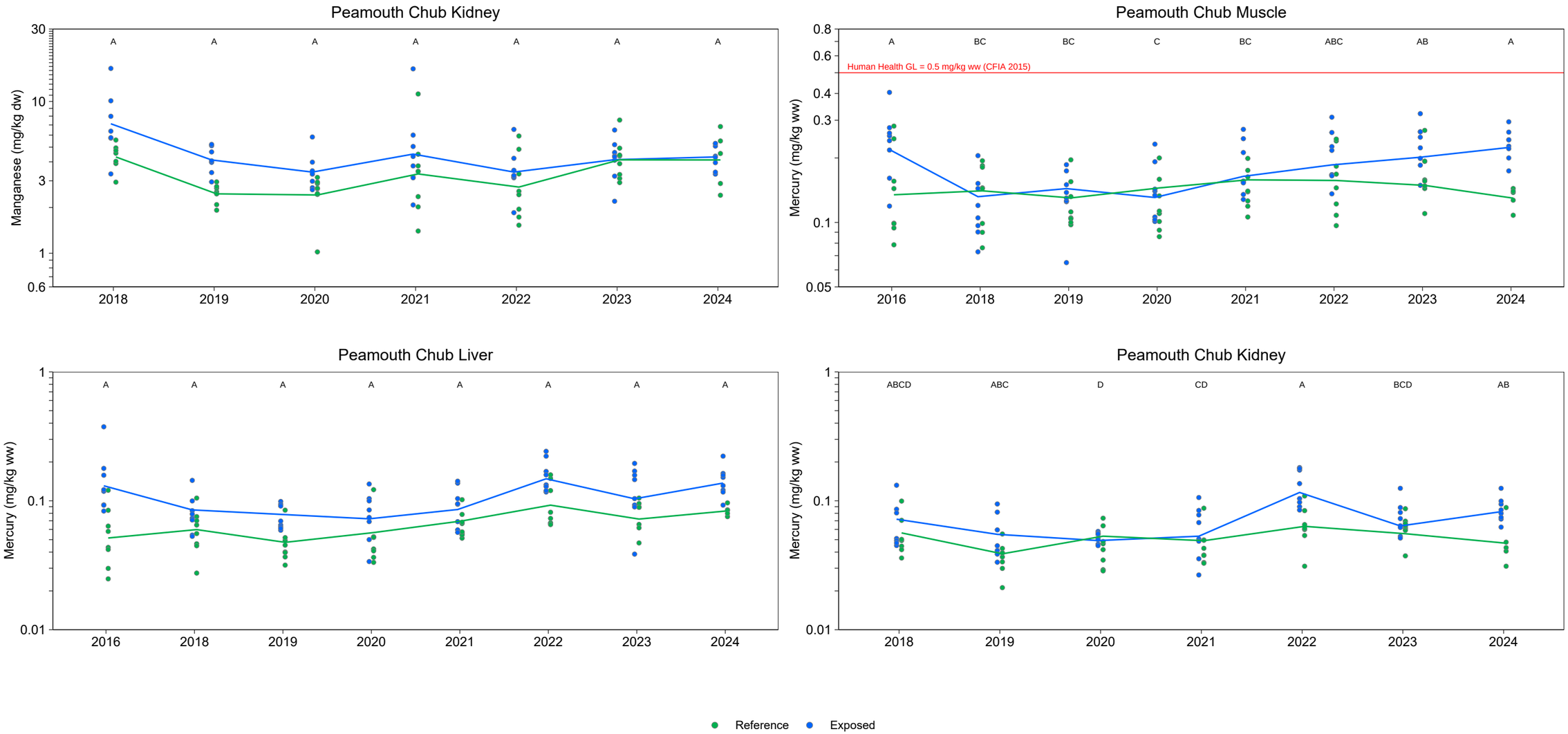

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

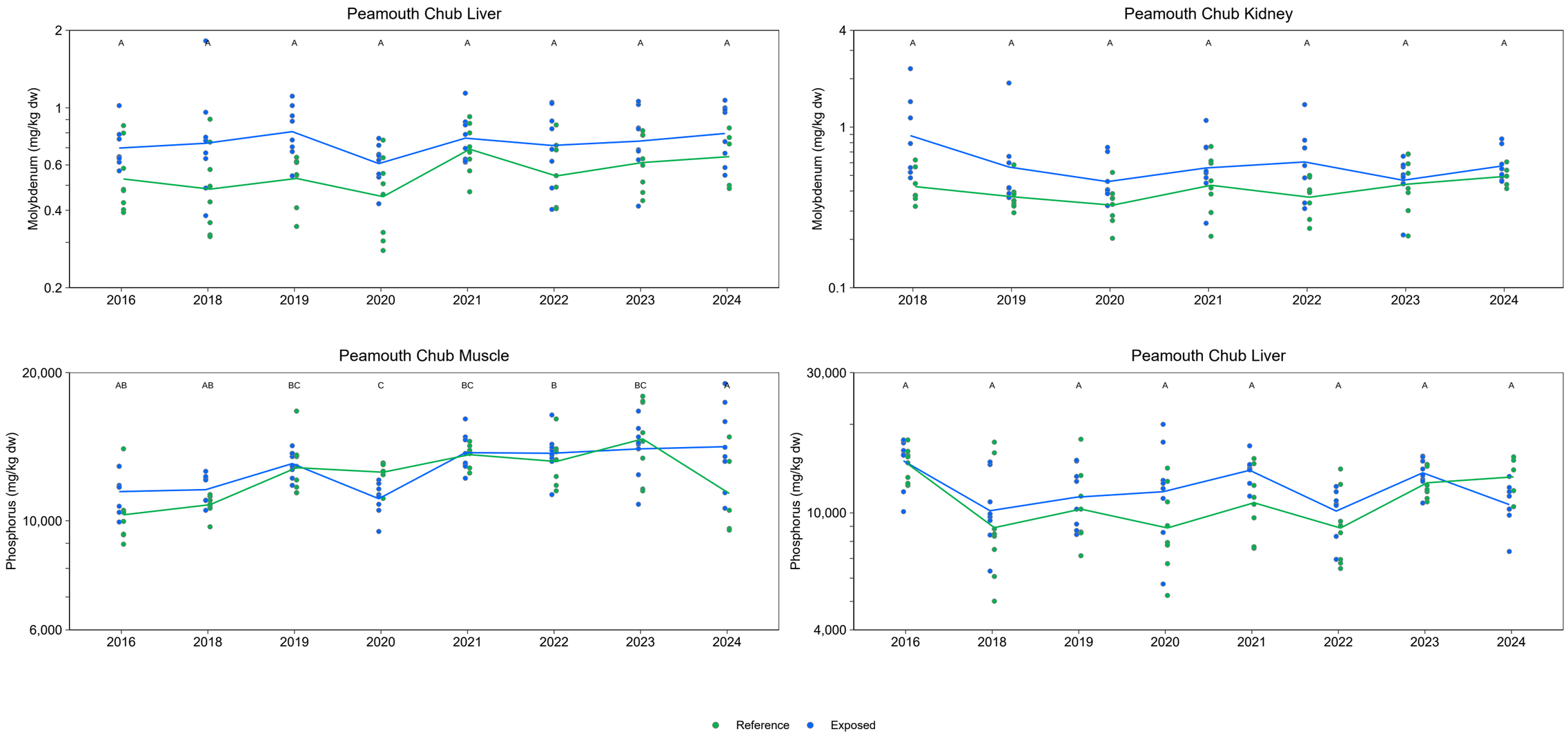

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

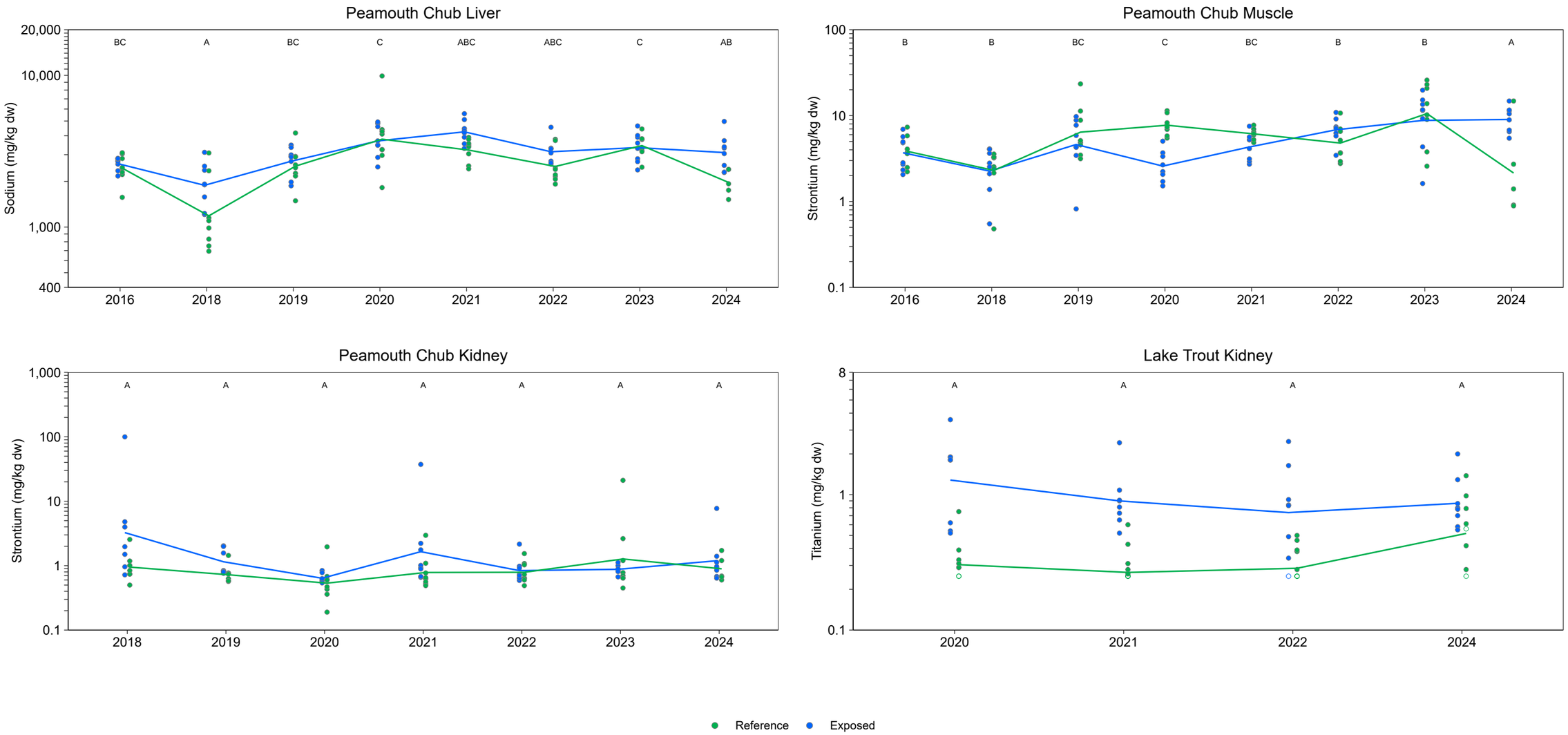

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

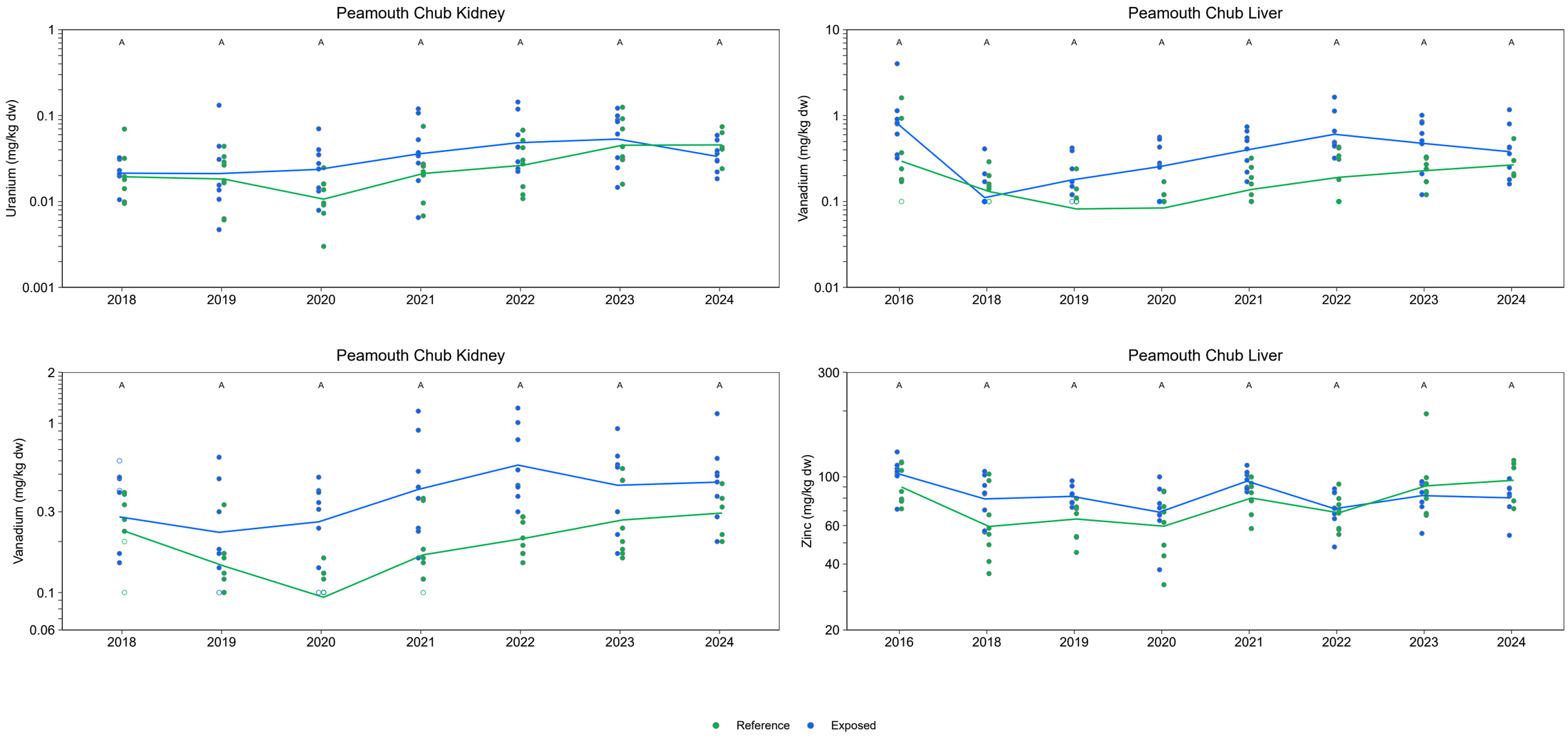

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

Notes: GL = Guideline, ww = wet weight, dw = dry weight. Green represents reference areas and blue represents exposed areas. Plots are only included for secondary analytes that had either a significant Area × Time interaction term and were higher at exposed than reference areas in 2024 or had no significant interaction but had a higher exposed magnitude of difference across all years for a given species and tissue type. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

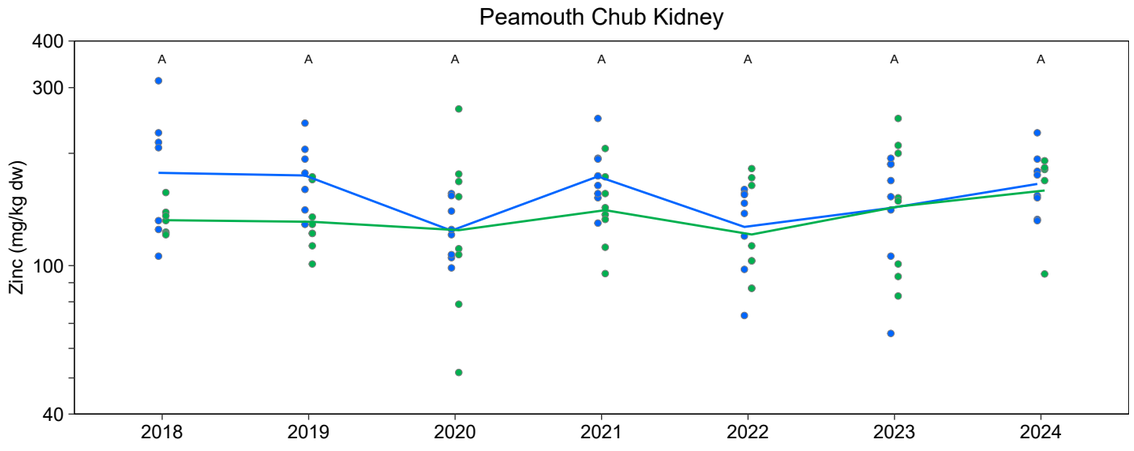

Figure 5.32: Fish Tissue Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for Quesnel Lake (Exposed and Reference), 2015 to 2024

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Concentrations of the primary analytes arsenic, copper, iron, and selenium in most exposed peamouth chub, northern pikeminnow, and lake trout (excluding ovary) tissues were either statistically similar to or significantly lower than reference in 2024, or lacked a significant *Area×Year* interaction in the analyses (Figure 5.31, Table 5.27; Appendix Figures E.6.8 to E.6.11, Appendix Tables E.6.9 to E.6.16). The absence of a significant *Area×Year* interaction indicates that the relative differences in analyte concentrations were temporally stable and did not change significantly among years (i.e., the geometric mean concentrations at the exposed area were trending the same as the geometric mean concentrations at the reference area). Arsenic in lake trout liver tissue was the only occurrence of a primary analyte with a significant *Area×Year* interaction and significantly higher concentrations in exposed tissues compared to reference in 2024 (Figure 5.31, Table 5.27; Appendix Table E.6.15). Although 2024 is the first year that arsenic concentrations in exposed lake trout liver were significantly higher than reference, the relative (exposed-reference) difference of arsenic concentrations in this tissue has not increased significantly compared to the first year of monitoring (i.e., 2015; Figure 5.31; Appendix Table E.6.15). Combined, these results indicate there is no sustained increase in the concentrations of primary analytes in exposed peamouth chub, northern pikeminnow, and lake trout (excluding ovary) tissues, as evidenced by analyte concentrations that were: 1) similar to or significantly lower than at the reference area in 2024 (indicating no mine-related influence), and/or 2) temporally stable over the monitoring period, and/or 3) similar to or significantly lower than in prior years in 2024, relative to reference.

The concentrations of 13 secondary analytes (i.e., barium, cadmium, calcium, manganese, mercury [ww], molybdenum, phosphorus, sodium, strontium, titanium, uranium, vanadium, and zinc) had significant *Area×Year* interaction terms for at least one tissue type from peamouth chub, northern pikeminnow, and/or lake trout (excluding ovary) and had analyte concentrations in exposed tissues that were significantly higher than reference in 2024 (i.e., positive relative [exposed-reference] difference) or in all monitoring years (if the *Area×Year* interaction was not significant; Figure 5.32, Table 5.27; Appendix Figures E.6.8 to E.6.11, Appendix Tables E.6.9 to E.6.14). For most of the analyte-tissue combinations identified for these 13 secondary analytes, the relative differences were either temporally stable (i.e. the *Area×Year* interaction was not significant), or the exposed tissue analyte concentrations in 2024 were higher than reference in only one tissue type within a fish species (i.e., sodium, titanium, and uranium), indicating no sustained increase in secondary analyte concentrations in the exposed fish tissues over time. Therefore, these analyte-tissue combinations were excluded from further discussion. There were seven occurrences of secondary analyte-tissue combinations in 2024 that were exceptions to the above observations; each had a significant *Area×Year* interaction term and secondary analyte concentrations that were significantly higher in at least two exposed fish

tissues in 2024, compared to reference (Table 5.27, Figure 5.32; Appendix Tables E.6.9 to E.6.16). These seven analyte-tissue combinations occurred in peamouth chub tissues only and are discussed in further detail below.

The secondary analyte-tissue combinations in peamouth chub tissues that met the criteria for further discussion were as follows: barium, calcium, manganese, mercury (ww), phosphorus, and strontium concentrations in muscle, and mercury (ww) concentrations in kidney (Figure 5.32, Table 5.27; Appendix Tables E.6.9 and E.6.13). Specifically, mercury (ww) concentrations in the muscle and kidney tissues of exposed peamouth chub and phosphorous concentrations in exposed peamouth chub muscle were significantly higher than reference in 2024, but the relative differences in 2024 were the same as in the first year of monitoring (i.e., 2016 and 2018, respectively; Figure 5.32, Table 5.27; Appendix Tables E.6.9 and E.6.13). Concentrations of barium, calcium, manganese, and strontium in exposed peamouth chub muscle were significantly higher than at the reference area in 2024, with the relative differences for these analytes in 2024 significantly higher compared to one or more prior years (i.e., 2016 to 2023; Figure 5.32, Table 5.27; Appendix Table E.6.9). The 2024 results for exposed peamouth chub muscle represent a temporal change for three of these analytes (calcium, manganese, and strontium), which have had exposed concentrations that were similar to or significantly lower than reference from 2016 to 2023. The relative differences for calcium, manganese, and strontium in peamouth chub muscle in 2024 were significantly higher than most (calcium) or all (manganese and strontium) prior years. From 2016 to 2021, exposed barium concentrations were similar to reference and increased to significantly higher than reference from 2022 to 2024; however, the relative difference of barium concentrations has not changed significantly over the last three years (i.e., 2022 to 2024; Figure 5.32, Table 5.27; Appendix Table E.6.9). The significantly higher relative differences of barium, calcium, manganese, and strontium concentrations in peamouth chub muscle in 2024 were related (at least in part) to observed decreases in reference tissue analyte concentrations (Figure 5.32).

One female lake trout was captured from the reference area in Quesnel Lake in 2024 (Appendix Tables C.6.17), therefore data analysis and interpretation for lake trout ovary tissue focused on temporal changes at the exposed area from 2015 to 2024 (i.e., no comparisons to reference were possible; see Section 3.7.3.2 for details). Three primary analytes (arsenic, copper, and iron) and six secondary analytes (barium, cobalt, manganese, mercury [ww], silver, and zinc) were identified as having a significant *Year* effect; however, concentrations of these analytes in exposed lake trout ovary tissues in 2024 were similar to the first year of monitoring (i.e., 2015 for most analytes, except silver [2020]). This result was consistent with that observed in most prior years, except for 2022, when barium and silver concentrations were significantly lower than the first year of monitoring (i.e., 2018) and silver was significantly higher

than the first year of monitoring (i.e., 2020), respectively (Table 5.28; Appendix Figure E.6.12, Appendix Table E.6.17). As such, there has been no sustained temporal increase in primary or secondary analyte concentrations in exposed lake trout ovary tissues.

Data analysis and interpretation of rainbow trout from Quesnel River focused on temporal changes from 2015 to 2024 since there is no corresponding reference area for Quesnel River (i.e., no comparisons to reference were possible; see Section 3.7.3.2 for details). The primary analytes arsenic, copper, iron, and selenium were identified as having a significant *Year* effect in at least one rainbow trout tissue (muscle, liver, or kidney). However, selenium in rainbow trout kidney tissue was the only analyte that met the criteria for further discussion (i.e., the analyte concentration was significantly higher in 2024 than one or more prior years; Table 5.28; Appendix Figures E.6.13 to E.6.16, Appendix Tables E.6.18 to E.6.21). Mean concentrations of selenium in rainbow trout kidney tissues in 2023 and 2024 were significantly higher compared to the first year of monitoring (i.e., 2015) and 2020 but similar to all remaining prior years (Table 5.28; Appendix Figure E.6.16, Appendix Table E.6.21). Selenium concentrations in rainbow trout kidney tissue over the last four years (i.e., 2021 to 2024) have been temporally stable and were similar to the second year of monitoring (i.e., 2017; Table 5.28; Appendix Figure E.6.16, Appendix Table E.6.21), indicating no sustained increase in the selenium concentrations of exposed rainbow trout kidney tissues. Despite the higher rate of selenium guideline/threshold exceedances identified in rainbow trout ovaries in 2024 compared to prior years (see Section 5.2.7.1), selenium concentrations in rainbow trout ovary tissue did not exhibit a significant *Year* effect (i.e., have not changed significantly over the entire monitoring period; Table 5.28; Appendix Table E.6.19). Since pre-breach data are not available for lake trout ovary tissues, definitive conclusions as to the potential factors influencing the rate of selenium guideline/threshold exceedances in the post-breach period cannot be made (e.g., due to a breach or post-breach mine-related influence or due to inherent temporal variability that may have existed pre-breach).

Three secondary analytes were identified in rainbow trout as having a significant *Year* effect and concentrations that were significantly higher in 2024 than one or more prior years (phosphorous, sodium, and zinc; Appendix Figures E.6.13 to E.6.16, Appendix Tables E.6.18 to E.6.21). For simplicity, only those secondary analytes that were significantly higher in 2024 than in one or more prior years, and in more than one rainbow trout tissue, were discussed further (i.e., phosphorus, and zinc were not discussed further; Table 5.28; Appendix Tables E.6.18 to E.6.21). Sodium concentrations in exposed rainbow trout ovary in 2022 and 2024 were significantly higher than the first year of monitoring with replication (i.e., 2018) while sodium concentrations in exposed rainbow trout kidney have been consistently higher than the first year of monitoring (i.e., 2015; Appendix Figures E.6.14 and E.6.16; Appendix Tables E.6.19

and E.6.21). Despite this, sodium concentrations in rainbow trout ovary in 2024 were similar to those from 2022 and 2023, and have been stable since 2021, in rainbow trout kidney tissues, suggesting no sustained increases in tissue sodium concentrations over time (Table 5.28; Appendix Figures E.6.13 and E.6.15, Appendix Tables E.6.18 and E.6.20). Overall, there have been no sustained increases in secondary analyte concentrations in exposed rainbow trout tissues since at least 2022.

6 RESULTS – CREEK HABITAT

6.1 Hazeltine Creek

6.1.1 Sediment Quality

Sediment quality monitoring was completed annually between 2022 and 2024, with monitoring in each year including one area in upper Hazeltine Creek (HAC-U [HAC-R2]), and one in lower Hazeltine Creek (HAC-D [HAC-R5]), with upper and lower Edney Creek (EDC-U and EDC-D [EDC-REF]) serving as reference areas, respectively (Figure 4.1, Table 4.1) [62].

A review of the 2024 sediment quality results (Appendix B) indicated that the data met the established DQOs and can be used with a high level of confidence for interpretation (see Section 5.1.1 for details).

6.1.1.1 Upper Hazeltine Creek

Sediments collected from upper Hazeltine Creek (HAC-U) in 2024 were composed primarily of silt and clay (mean = 74.2% and 19.3%, respectively) and were higher in silt content than the reference sediments (EDC-U), which were composed predominantly of sand and silt (mean = 47.0% and 42.7%, respectively; Table 6.1; Appendix Tables D.2.6 and D.2.7). The silt and clay content of the sediments from HAC-U in 2024 were within the range of those previously observed from 2018 to 2023 (Table 6.1; silt = 30.5% to 77.7%, clay = 13.4% to 21.0%). The mean sand content of HAC-U sediments in 2024 (6.48%) was higher than 2023 (3.90%), but lower than from 2018 to 2022 (range of 11.2% to 38.5%; Table 6.1; Appendix Tables D.2.3, D.2.6, and D.2.7). The presence of fine sediments (i.e., silt and clay) in these erosional sampling areas has been limited in some years, particularly in Edney Creek, which has necessitated opportunistic sampling in both the exposed and reference areas (as described in Section 4.1.1). Therefore, variability in particle size is likely related, at least in part, to temporal changes in the presence of fine sediments in these erosional habitats. The deposition of fines in pool areas of Hazeltine Creek is thicker than in Edney Creek, which is likely related to the lack of natural flow regime (see Section 4.1.1); therefore, temporal changes in sediment particle size in upper Hazeltine Creek are also likely influenced by sediment accumulation.

The total nitrogen content of HAC-U sediments (mean = 0.782%) was 2.4-times higher than at the reference area (mean = 0.330%) in 2024, which is consistent with results from 2021 and 2023 which were 2.10- to 2.95-times higher than at the reference area, respectively. The total nitrogen

[62] For HRWG reporting, HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas. The original area names only (i.e., HAC-U, HAC-D, and EDC-D) are used throughout the remainder of this report section (Section 6.1.1).

Table 6.1: **Summary of Sediment Quality Results for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2014 to 2024**

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]		Reference (Upper Edney Creek) EDC-U													
						2018		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Reference (EDC-U; 2018 to 2024)	Pre-Breach (Upper Hazeltine Creek)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																			
Moisture	%	-	-	79.7	-	70.6	14.8	64.6	11.2	58.1	6.76	55.2	4.59	61.9	9.59	59.8	6.28	60.5	13.8
pH (1:2 soil:water)	pH	-	-	6.01	-	6.76	0.337	6.30	0.187	6.36	0.372	6.81	0.357	6.75	0.246	6.57	0.109	6.77	0.551
Particle Size																			
% Gravel (>2 mm)	%	-	-	11.3	33.1	7.88	9.50	<1.0	-	1.06	-	4.52	3.98	1.20	0.566	2.02	0.170	1.64	0.0980
% Sand (2.0 mm - 0.063 mm)	%	-	-	76.2	64.7	35.4	4.88	45.1	11.0	64.6	9.83	56.9	12.6	55.1	14.9	49.8	10.9	47.0	18.3
% Silt (0.063 mm - 4 µm)	%	-	-	59.9	76.2	48.3	7.12	43.4	8.33	28.8	8.02	31.4	10.6	35.7	11.8	40.1	11.1	42.7	16.5
% Clay (<4 µm)	%	-	-	16.4	13.9	8.80	4.41	11.4	4.21	6.24	2.49	7.20	3.84	8.42	3.52	8.54	1.33	8.86	3.29
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon (TOC)	%	-	-	9.96	12.8	7.03	3.16	5.86	2.04	5.49	1.03	5.97	1.20	6.01	1.42	6.91	1.88	5.86	2.15
Nutrients (Bulk sediment)																			
Total Nitrogen by LECO	%	-	-	0.519	-	0.355	0.127	0.386	0.143	0.303	0.0708	0.266	0.0943	0.283	0.0937	0.266	0.0737	0.330	0.156
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	22,900	17,960	18,800	2,550	19,800	1,720	15,860	1,529	21,300	3,152	14,740	1,571	18,900	1,292	21,640	1,452
Antimony	mg/kg dw	-	-	0.420	0.370	0.312	0.0327	0.348	0.0130	0.318	0.0239	0.352	0.0829	0.300	0.0367	0.318	0.0217	0.330	0.0308
Arsenic	mg/kg dw	5.9	17	14.1	8.23	12.8	5.47	10.8	0.537	8.90	0.836	10.4	0.441	8.07	1.40	10.6	0.983	12.3	1.43
Barium	mg/kg dw	-	-	200	136	159	26.6	146	4.04	130	12.5	189	13.4	108	18.3	151	10.0	160	5.41
Beryllium	mg/kg dw	-	-	0.620	0.460	0.484	0.0871	0.518	0.0466	0.438	0.0455	0.498	0.0763	0.372	0.0487	0.482	0.0342	0.522	0.0295
Bismuth	mg/kg dw	-	-	0.140	<0.20	0.116	0.0135	0.120	0.0122	0.102	0.00566	0.112	0.00924	0.100	-	0.102	0.00566	0.126	0.00894
Boron	mg/kg dw	-	-	5.60	5.40	***<10.0***	-	***<10.0***	-	<5.0	-	5.16	-	5.06	-	5.34	0.350	5.18	0.0566
Cadmium	mg/kg dw	0.6	3.5	0.586	0.354	0.450	0.138	0.432	0.0978	0.381	0.0589	0.532	0.018	0.329	0.100	0.417	0.0419	0.500	0.108
Calcium	mg/kg dw	-	-	11,000	13,395	9,610	1,080	9,900	1,190	8,404	509	9,796	232	7,846	1,022	8,948	582	9,550	1,305
Chromium	mg/kg dw	37.3	90	75.8	40.1	55.0	5.24	65.1	6.28	52.2	2.59	66.9	7.78	46.9	5.94	58.0	3.23	60.6	4.87
Cobalt	mg/kg dw	-	-	18.1	10.4	14.6	1.62	15.7	0.404	13.1	1.24	15.9	1.33	11.6	1.93	14.4	0.778	16.9	1.12
Copper	mg/kg dw	35.7	197	48.8	94.6	41.6	5.12	41.1	2.37	32.3	2.66	45.6	13.8	26.7	4.39	37.5	3.05	43.1	3.87
Iron	mg/kg dw	21,200	43,766	35,200	29,900	32,900	5,600	31,500	1,070	27,920	2,087	30,660	1,429	24,700	3,648	31,140	1,511	33,820	1,763
Lead	mg/kg dw	35.0	91.3	8.14	6.70	6.72	0.952	7.02	0.447	5.85	0.339	6.87	0.809	6.59	0.976	6.27	0.443	7.39	0.485
Lithium	mg/kg dw	-	-	17.8	14.8	14.6	2.33	15.7	1.25	14.1	0.976	14.2	1.47	12.0	0.990	15.0	0.963	16.1	1.09
Magnesium	mg/kg dw	-	-	8,650	6,430	7,240	527	7,400	269	6,526	318	7,842	600	6,108	536	7,656	402	8,362	647
Manganese	mg/kg dw	460	1,100	2,710	1,345	1,310	456	1,300	274	905	200	1,960	858	809	250	1,005	244	1,366	488
Mercury	mg/kg dw	0.17	0.486	0.125	0.145	0.118	0.0239	0.101	0.00416	0.101	0.0014	0.103	0.018	0.0751	0.0131	0.0914	0.00886	0.0955	0.0110
Molybdenum	mg/kg dw	25	23,000	2.39	1.50	0.818	0.200	1.91	0.562	0.620	0.0863	1.43	0.346	0.578	0.0746	0.674	0.0942	0.776	0.147
Nickel	mg/kg dw	16	75	43.2	24.4	33.4	2.71	40.1	3.59	30.4	1.98	39.6	3.67	25.2	3.63	32.6	1.62	37.6	1.58
Phosphorus	mg/kg dw	-	-	1,370	1,375	1,260	83.4	1,310	83.8	1,132	82.0	1,204	63.5	1,025	48.8	1,156	68.8	1,302	94.2
Potassium	mg/kg dw	-	-	1,500	1,445	1,230	194	1,240	119	1,066	139	1,406	190	1,018	191	1,220	82.8	1,424	68.0
Selenium	mg/kg dw	2	-	0.880	3.32	0.668	0.131	0.622	0.0303	0.488	0.089	0.664	0.157	0.394	0.0961	0.476	0.0623	0.632	0.125
Silver	mg/kg dw	0.5	-	0.206	0.160	0.187	0.0176	0.181	0.0148	0.139	0.0151	0.171	0.0246	0.131	0.0216	0.140	0.00709	0.191	0.0112
Sodium	mg/kg dw	-	-	340	350	251	20.2	245	20.2	266	14.0	293	53.2	255	33.3	273	11.6	280	26.9
Strontium	mg/kg dw	-	-	89.7	118	75.3	7.06	75.8	6.94	64.9	4.28	85.1	1.84	69.6	8.50	71.8	4.72	83.3	8.63
Sulphur[c]	mg/kg dw	-	-	2,300	-	1,640	602	1,980	597	1,342	327	602	153	654	67.6	934	209	806	326
Thallium	mg/kg dw	-	-	0.166	0.0941	0.132	0.0254	0.141	0.0143	0.115	0.0108	0.138	0.0174	0.107	0.0161	0.118	0.0127	0.143	0.00785
Tin	mg/kg dw	-	-	0.620	<2.0	0.394	0.0391	0.506	0.0378	0.556	0.0607	0.500	0.282	0.362	0.0841	0.462	0.0487	0.454	0.0288
Titanium	mg/kg dw	-	-	736	776	600	102	617	57.3	634	70.0	637	110	593	61.3	679	23.3	639	65.9
Uranium	mg/kg dw	-	-	2.15	1.26	1.59	0.340	1.63	0.252	1.28	0.145	1.58	0.472	1.28	0.132	1.36	0.144	1.67	0.149
Vanadium	mg/kg dw	-	-	91.6	65.3	77.5	7.57	79.1	3.55	72.7	4.39	80.8	6.85	62.4	8.04	79.3	4.88	86.0	7.71
Zinc	mg/kg dw	123	315	94.0	67.6	75.7	4.83	79.8	6.22	67.5	5.42	87.6	5.20	63.3	10.8	75.2	2.59	86.7	5.33
Zirconium	mg/kg dw	-	-	1.60	-	-	-	-	-	1.10	0.103	1.30	0.354	1.02	0.0566	1.16	0.207	1.34	0.182

Value is > Lower BC Working Sediment Quality Guideline.
Value is > Upper BC Working Sediment Quality Guideline.

Notes: dw = dry weight. ***Bold/ Italics*** - Exposed value is > both reference and pre-breach 95th percentile values; reference value is > reference 95th percentile value (< 5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. All summary statistics were calculated to three significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025)

[b] For calculation of pre-breach 95th percentile values see Appendix Table D.2.2, for calculation of reference 95th percentile values see Appendix Table D.2.3. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 6.1: Summary of Sediment Quality Results for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]		Exposed (Upper Hazeltine Creek)													
						ST16		HAC-U (HAC-R2)											
						2014		2018		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Reference (EDC-U; 2018 to 2024)	Pre-Breach (Upper Hazeltine Creek)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																			
Moisture	%	-	-	79.7	-	25.4	3.80	36.6	4.48	***84.8***	8.89	***76.6***	5.60	***83.1***	3.30	***87.3***	2.11	***88.6***	1.51	***86.8***	2.21
pH (1:2 soil:water)	pH	-	-	6.01	-	8.87	0.172	8.32	0.179	7.41	0.106	7.50	0.124	7.31	0.0986	7.18	0.0898	7.45	0.0983	7.44	0.0676
Particle Size																			
% Gravel (>2 mm)	%	-	-	11.3	33.1	<0.10	-	12.7	4.07	1.06	-	1.78	-	2.30	0.849	<1.0	-	<1.0	-	<1.0	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	76.2	64.7	69.6	6.13	38.5	2.28	11.2	12.0	32.0	11.3	12.7	3.03	12.7	2.29	3.90	2.24	6.48	1.95
% Silt (0.063 mm - 4 µm)	%	-	-	59.9	76.2	30.0	6.07	30.5	2.03	67.5	11.8	53.2	11.3	66.5	2.91	71.1	1.76	***77.7***	1.73	74.2	1.57
% Clay (<4 µm)	%	-	-	16.4	13.9	0.470	0.0742	***18.3***	0.989	***21.0***	0.945	13.4	0.653	***19.0***	1.36	16.1	1.21	***18.2***	1.24	***19.3***	1.79
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon (TOC)	%	-	-	9.96	12.8	<0.10	-	0.347	0.0634	4.44	1.12	2.28	0.550	4.47	0.725	6.74	0.682	6.67	0.468	6.46	0.511
Nutrients (Bulk sediment)																			
Total Nitrogen by LECO	%	-	-	0.519	-	<0.020	-	0.0244	0.0102	***0.656***	0.246	0.246	0.0780	***0.558***	0.116	***0.765***	0.114	***0.786***	0.0480	***0.782***	0.0883
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	22,900	17,960	10,600	286	***23,500***	1,790	15,700	1,760	17,520	1,096	18,580	1,399	16,120	536	18,820	482	18,660	1,847
Antimony	mg/kg dw	-	-	0.420	0.370	0.308	0.0268	***0.572***	0.0396	0.406	0.0688	***0.556***	0.0929	***0.426***	0.0658	0.328	0.0396	***0.474***	0.0733	0.364	0.0550
Arsenic	mg/kg dw	5.9	17	14.1	8.23	***14.7***	0.522	12.7	1.63	8.72	0.807	10.6	2.42	8.01	0.678	7.28	0.151	9.03	0.738	8.93	0.585
Barium	mg/kg dw	-	-	200	136	109	7.60	***229***	18.9	***226***	16.5	***274***	87.6	***276***	14.7	***260***	5.52	***372***	23.3	***314***	35.5
Beryllium	mg/kg dw	-	-	0.620	0.460	0.476	0.0230	0.618	0.0712	0.510	0.0292	0.558	0.0356	0.52	0.0245	0.534	0.0182	0.620	0.0141	0.550	0.0374
Bismuth	mg/kg dw	-	-	0.140	<0.20	<0.10	-	***0.158***	0.0110	0.104	-	0.102	0.00566	0.100	-	<0.1	-	<0.10	-	<0.1	-
Boron	mg/kg dw	-	-	5.60	5.40	***<10.0***	-	***10.2***	-	***14.2***	2.17	***13.2***	1.85	***16.5***	3.67	***19.8***	3.69	***27.3***	4.72	***19.0***	4.04
Cadmium	mg/kg dw	0.6	3.5	0.586	0.354	0.160	0.00857	0.257	0.0476	0.319	0.0338	0.299	0.0622	0.351	0.0236	0.354	0.0293	0.489	0.0251	0.545	0.0287
Calcium	mg/kg dw	-	-	11,000	13,395	***27,600***	702	***25,600***	8,070	***61,400***	5,990	***23,340***	5,625	***20,200***	3,973	***21,640***	1,701	***32,680***	4,764	***28,880***	5,363
Chromium	mg/kg dw	37.3	90	75.8	40.1	22.8	1.86	52.5	2.49	58.8	11.1	34.6	2.53	29.7	4.00	26.7	2.04	29.0	0.929	27.3	5.07
Cobalt	mg/kg dw	-	-	18.1	10.4	***24.0***	1.53	17.1	0.673	14.6	1.08	16.8	3.89	14.7	0.817	13.3	0.335	16.3	0.520	16.8	1.14
Copper	mg/kg dw	35.7	197	48.8	94.6	***687***	34.3	***151***	50.4	***360***	73.9	***331***	42.6	***417***	43.1	***392***	8.85	***514***	25.0	***521***	27.5
Iron	mg/kg dw	21,200	43,766	35,200	29,900	***139,000***	10,600	***41,400***	3,740	30,000	4,320	***44,640***	13,592	33,900	1,559	32,000	800	***37,580***	988	***35,660***	3,053
Lead	mg/kg dw	35.0	91.3	8.14	6.70	6.33	0.260	***8.77***	0.236	6.59	0.629	6.56	0.254	6.11	0.73	5.77	0.187	6.08	0.230	6.28	0.362
Lithium	mg/kg dw	-	-	17.8	14.8	11.8	0.713	***21.6***	0.653	14.5	1.75	17.1	0.762	13.9	1.50	13.1	0.642	14.9	0.344	13.7	1.29
Magnesium	mg/kg dw	-	-	8,650	6,430	6,570	185	***11,300***	669	***9,070***	850	***9,940***	1,037	***9,502***	595	8,508	80.7	***10,398***	378	***9,988***	796
Manganese	mg/kg dw	460	1,100	2,710	1,345	626	15.9	861	18.7	***2,880***	1,360	***2,737***	3,444	1,485	734	1,840	292	***4,304***	1,038	***3,778***	2,193
Mercury	mg/kg dw	0.17	0.486	0.125	0.145	0.0770	0.00198	0.108	0.0261	0.101	0.0153	0.111	0.00594	0.106	0.00568	0.107	0.00339	***0.147***	0.0177	0.105	0.0231
Molybdenum	mg/kg dw	25	23,000	2.39	1.50	***4.66***	0.356	1.35	0.277	***6.27***	1.43	***3.07***	0.64	***3.64***	1.24	***3.84***	0.308	***4.88***	0.963	***5.61***	0.671
Nickel	mg/kg dw	16	75	43.2	24.4	11.1	0.719	42.0	1.67	***46.4***	6.43	31.2	6.89	26.4	2.63	23.4	1.88	26.5	1.14	27.9	3.08
Phosphorus	mg/kg dw	-	-	1,370	1,375	***2,440***	133	1,050	56.3	***1,440***	202	1,352	79.8	***1,416***	79.6	***1,512***	128	***1,690***	117	***1,674***	35.8
Potassium	mg/kg dw	-	-	1,500	1,445	794	33.6	***2,730***	185	***1,680***	158	***1,624***	167	1,444	199	1,434	107	***1,546***	57.7	1,474	68.0
Selenium	mg/kg dw	2	-	0.880	3.32	1.38	0.121	0.562	0.197	2.27	0.656	1.67	0.230	3.09	0.483	***4.05***	0.622	***7.55***	2.70	***7.87***	0.487
Silver	mg/kg dw	0.5	-	0.206	0.160	***0.446***	0.0509	0.144	0.0158	0.164	0.0110	0.163	0.0164	0.173	0.00688	0.187	0.00834	0.197	0.0131	***0.222***	0.0131
Sodium	mg/kg dw	-	-	340	350	***552***	23.9	***446***	39.8	***472***	64.2	***468***	53.6	***441***	11.8	***473***	14.6	***536***	23.8	***550***	16.3
Strontium	mg/kg dw	-	-	89.7	118	85.7	2.76	***150***	22.0	***226***	11.3	***145***	19.8	***130***	8.14	***144***	6.31	***167***	11.5	***156***	7.84
Sulphur[c]	mg/kg dw	-	-	2,300	-	-	-	660	-	***2,320***	335	1,632	629	***2,460***	397	***2,718***	485	***4,552***	859	***4,718***	747
Thallium	mg/kg dw	-	-	0.166	0.0941	<0.050	-	0.129	0.00802	0.0624	0.0149	0.073	0.00675	0.0662	0.0128	0.0540	0.00480	0.0556	0.00230	0.0544	0.00423
Tin	mg/kg dw	-	-	0.620	<2.0	***1.13***	0.0737	0.568	0.120	***0.666***	0.122	***0.816***	0.131	***0.788***	0.0497	***0.704***	0.0577	***0.878***	0.0239	***0.740***	0.0880
Titanium	mg/kg dw	-	-	736	776	***1,060***	34.2	***1,100***	155	714	181	***1,100***	103	***932.6***	108	744	74.5	***1,037***	93.3	***794***	128
Uranium	mg/kg dw	-	-	2.15	1.26	1.04	0.0489	0.893	0.0549	0.732	0.0975	0.754	0.0523	0.821	0.0760	0.807	0.0391	0.806	0.0690	0.912	0.0761
Vanadium	mg/kg dw	-	-	91.6	65.3	***542***	53.0	***99.9***	16.7	79.9	14.5	***123***	13.6	***102***	6.57	***98.7***	3.91	***117***	4.44	***108***	12.7
Zinc	mg/kg dw	123	315	94.0	67.6	70.1	2.42	79.9	2.75	76.6	6.20	70.5	4.86	78.1	2.98	69.5	1.43	81.5	3.85	***94.1***	13.2
Zirconium	mg/kg dw	-	-	1.60	-	-	-	-	-	-	-	***2.68***	0.370	***2.00***	0.505	***2.02***	0.130	***1.88***	0.295	***2.42***	0.669

Value is > Lower BC Working Sediment Quality Guideline.
Value is > Upper BC Working Sediment Quality Guideline.

Notes: dw = dry weight. ***Bold/ Italics*** - Exposed value is > both reference and pre-breach 95th percentile values; reference value is > reference 95th percentile value (< 5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. All summary statistics were calculated to three significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025)

[b] For calculation of pre-breach 95th percentile values see Appendix Table D.2.2, for calculation of reference 95th percentile values see Appendix Table D.2.3. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

content of HAC-U sediments prior to 2021 has been more variable (range of 0.0244% to 0.656% in 2018 to 2020; Table 6.1). The mean TOC content of HAC-U sediments has been similar to the reference area (EDC-U) in most years (including 2024) except for 2018 and 2020, when TOC content of HAC-U sediments was significantly lower than reference (Figure 6.1; Appendix Tables D.2.6, D.2.7 and F.1.1). Following a period of temporal variability in 2018 to 2020, the relative (exposed-reference) difference of sediment TOC content has been temporally stable from 2021 to 2024 (Figure 6.1, Table 6.1; Appendix Table F.1.2). This temporal stability in TOC content of HAC-U sediments coincides with the period of temporal stability also observed for total nitrogen content (i.e., 2021 to 2024). Combined, these results indicate that following a period of temporal variability from 2018 to 2020, there is evidence that physical composition of HAC-U sediments (as evidenced by total nitrogen and TOC content) has begun to stabilize as sediment accumulation continues to occur in this remediated system. The temporal variability in both TOC content and total nitrogen observed in HAC-U in 2018 to 2020 was likely associated, at least in part, with differences in sediment texture (see Minnow 2023a, 2024a for details).

Mean analyte concentrations in the sediments (<63 µm fraction) collected from HAC-U in 2024 exceeded both pre-breach[63] and reference 95th percentile values for 19 analytes. Among these, copper, iron, manganese, and selenium were the only Analytes of Interest with mean sediment concentrations at HAC-U in 2024 that also exceeded the BCWSQG (Figure 6.1, Table 6.1; Appendix Table D.2.7).

Mean iron and selenium concentrations in HAC-U sediments in 2024 were 1.7 and 3.9-times the lower BCWSQG, respectively, while copper and manganese concentrations were 2.6-times and 3.4-times the upper BCWSQG, respectively (Figure 6.1, Table 6.1; Appendix Table D.2.7). Sediments from the reference area (EDC-U) in 2024 had mean concentrations of copper and iron that were naturally elevated above the lower BCWSQG, and a mean manganese concentration that was naturally elevated above the upper BCWSQG (Table 6.1; Appendix Tables D.2.3 and D.2.6). Copper, iron, and manganese concentrations were also naturally elevated above BCWSQG in sediments from many of the previous monitoring years at the reference area (Table 6.1; Appendix Tables D.2.3 and D.2.6), indicating that these analytes are naturally elevated in stream habitats in the vicinity of the Mount Polley Mine.

[63] TOC and analyte concentrations reported for pre-breach sediments were based predominantly on bulk sediment, but were reported for the <63 µm fraction of sediments collected post-breach. This difference in the fraction of sediment evaluated (i.e., bulk sediments for pre-breach and <63 µm fraction for post-breach) should be considered when making comparisons of TOC and analyte concentrations between the two time periods. Formal statistical temporal comparisons were conducted using data from between 2018 to 2024 which reported TOC and analyte concentrations in the <63 µm fraction of sediments (see Sections 4.1.2 and 4.1.3.2).

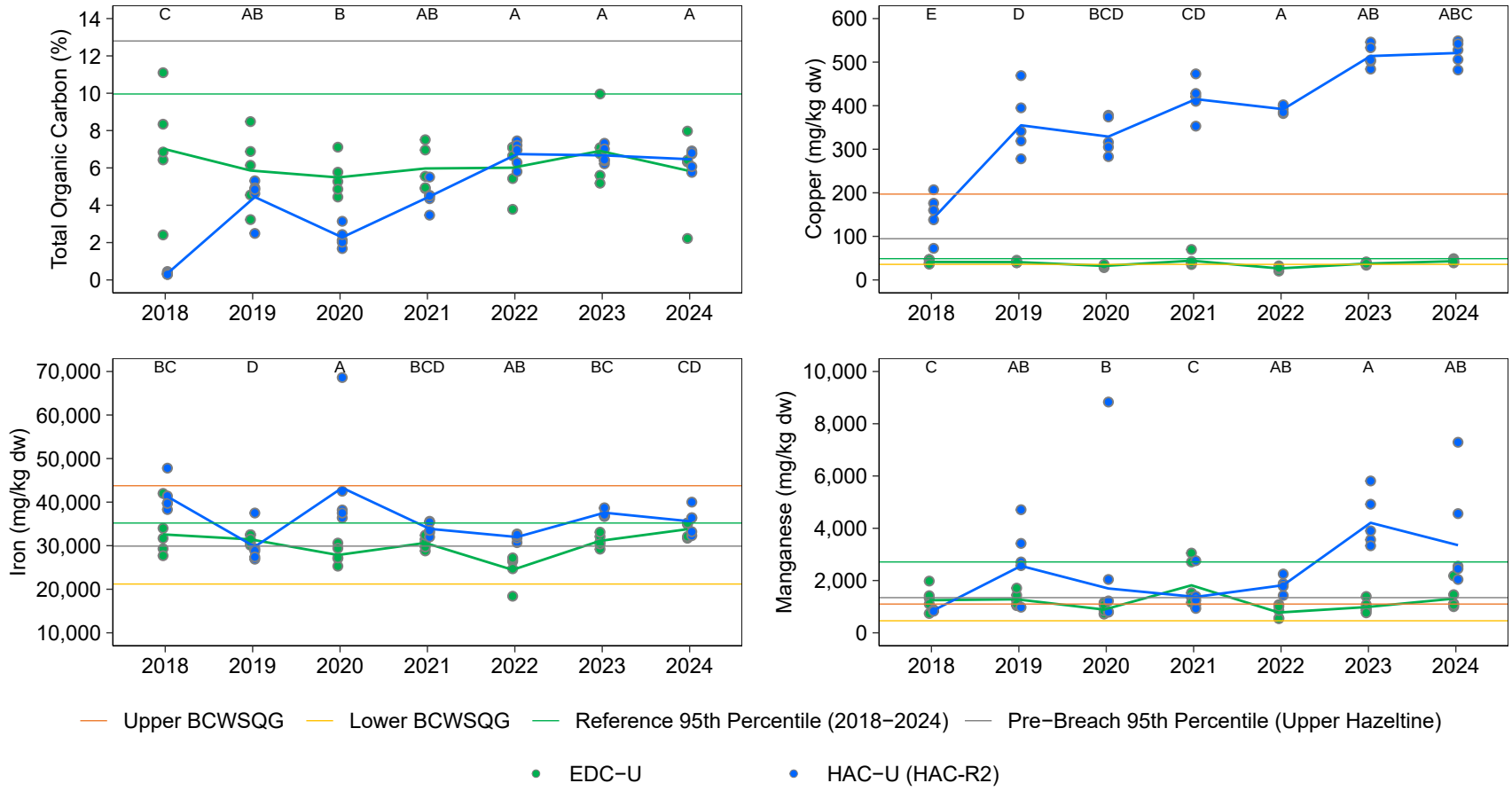

Figure 6.1: Sediment Analyte of Interest Concentrations (<63 µm Fraction) forthe Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference).

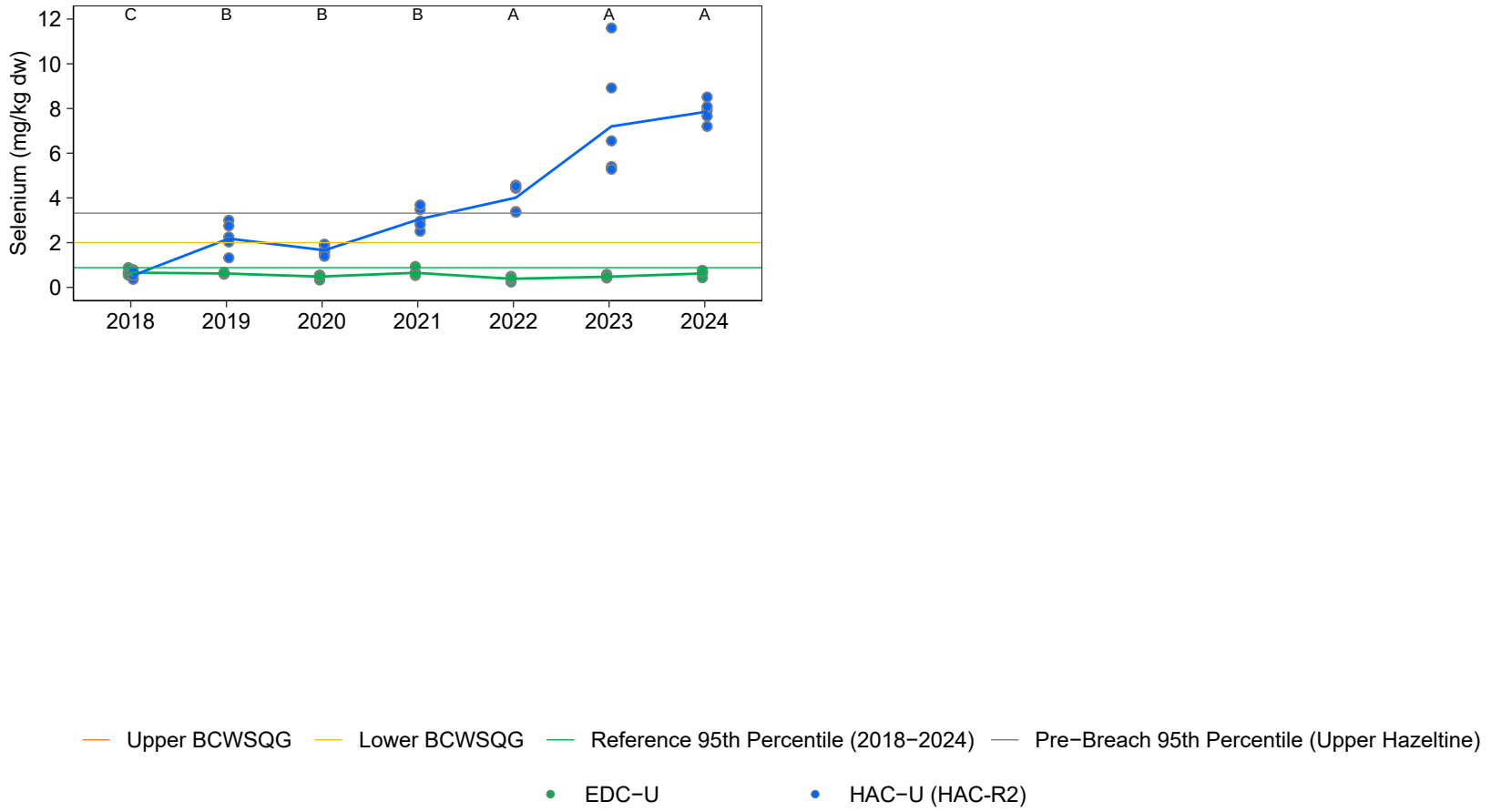

Figure 6.1: Sediment Analyte of Interest Concentrations (<63 µm Fraction) forthe Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference).

Mean iron concentrations in HAC-U sediments were not significantly different than reference (EDC-U) in 2024 (Appendix Table F.1.1), despite exceeding the reference and pre-breach 95th percentiles (Table 6.1). This differs from most prior years (except 2019 and 2021), when the iron concentrations of HAC-U sediments were significantly higher than at the reference area (Appendix Table F.1.1). The relative (exposed-reference) difference of iron concentrations in 2024 was similar to or significantly lower than all prior years (Figure 6.1; Appendix Table F.1.2), indicating there is no sustained increase in iron concentrations in upper Hazeltine Creek sediment.

The relative differences of copper, manganese, and selenium concentrations in 2024 were similar to 2022 and 2023 but significantly higher than many of the prior years (i.e., 2018 and 2019 for copper, 2018 and 2021 for manganese, and all prior years for selenium; Figure 6.1; Appendix Table F.1.2). Although copper, selenium, and manganese concentrations in HAC-U sediments did not increase significantly from 2022 to 2024, relative to reference, these analytes showed an average 1.3-, 1.9-, and 2.1-fold increase over this interval, respectively. In contrast, sediment physical characteristics have remained relatively stable from 2021 to 2024 (i.e., particle size, TOC, and total nitrogen content; Table 6.1, Figure 6.1; Appendix Tables D.2.6 and D.2.7). The non-significant increase in copper, selenium, and manganese concentrations in HAC-U sediment between 2022 and 2024 may be associated with continued sediment accumulation in this area. To better characterize the relationships between variability in sediment physical characteristics and sediment analyte concentrations, these relationships were explored through correlation analysis.

Concentrations of copper, manganese, and selenium in upper and lower Hazeltine Creek sediments (when considered separately from reference sediments) were positively correlated with the total sulphur, TOC, and total nitrogen content of the sediments, while iron concentrations were negatively correlated with these three sediment characteristics (Appendix Figure F.1.1, Appendix Table F.1.3). When Hazeltine Creek and Edney Creek (reference) sediments were considered together (from both upper and lower creek areas), copper, manganese, and selenium concentrations were positively correlated with clay content, total sulphur, and total nitrogen content, and manganese concentrations were positively correlated to TOC content (Appendix Figure F.1.1, Appendix Table F.1.3). Iron was negatively correlated with total nitrogen and TOC content and positively correlated with clay content (Appendix Figure F.1.1, Appendix Table F.1.3). The significant positive correlations of copper concentrations with clay content, total sulphur, total nitrogen, and TOC content were strongly leveraged by the exposed sediment results, with reference sediments showing relatively little variability in copper concentrations (Appendix Figure F.1.1). Correlations between Analyte of Interest concentrations (i.e., copper, iron, manganese, and selenium) and total sulphur were

generally the strongest relationships (Appendix Figure F.1.1, Appendix Table F.1.3). Combined, the correlation results suggest that the analyte concentrations of exposed sediments are related to the physical and chemical characteristics of these sediments, which is likely driven by a combination of opportunistic sampling methods and continued sediment accumulation in upper and lower Hazeltine Creek.

Overall, the temporal increases were observed in the concentrations of copper, selenium, and to a lesser extent manganese, in upper Hazeltine Creek sediments, relative to reference. Benthic invertebrate community and tissue quality monitoring both provide more directly applicable approaches for evaluating the potential effects of increased analyte concentrations to aquatic life in these erosional creek habitats, compared to sediment monitoring (see Section 6.1.4 for tissue quality results for creek habitats).

6.1.1.2 Lower Hazeltine Creek

Sediments collected from lower Hazeltine Creek (HAC-D) in 2024 were composed primarily of silt and clay particles (mean = 70.9% and 15.3%, respectively), and were higher in silt content than the reference sediments (EDC-D) which were composed primarily of sand and silt (mean = 48.9% and 43.0%, respectively; Table 6.2; Appendix Tables D.2.8 and D.2.9). The particle size of sediments collected at HAC-D have shown a high degree of variability from 2018 to 2024, with mean silt concentration ranging from 21.2% to 70.9% and mean sand concentration ranging from 13.8% to 73.9% (Table 6.2). Sediments collected from HAC-D in 2024 had the highest silt content, second highest clay content, and the lowest sand content since 2018 (Table 6.2). The presence of fine sediment in these erosional creek habitats has been limited in some years which has necessitated opportunistic sampling. In addition, sediment deposition in pool areas of Hazeltine Creek is thicker than in Edney Creek, reflecting sediment accumulation (as described in Section 4.1.1). As such, the observed variability in the particle size of sediments is likely related to a combination of the required opportunistic sampling methods and the continued sediment accumulation in lower Hazeltine Creek.

The mean total nitrogen content of HAC-D sediments has been lower than in reference (EDC-D) sediments in all years except 2023, and the total nitrogen content of HAC-D sediments in 2024 (mean = 0.255%) was lower than in 2023, but higher than the range observed from 2018 to 2022 (0.0218 to 0.152%, respectively; Table 6.2; Appendix Tables D.2.8 and D.2.9). The TOC content of HAC-D sediments was significantly lower than at the reference area (EDC-D) in all years except 2023, when it was similar to reference (Appendix Table F.1.4). Temporally, the relative (exposed-reference) difference in sediment TOC content in 2024 was significantly lower than 2021 and 2023 but not significantly different than all other previous years (2018 to 2020, 2022;

Table 6.2: Summary of Sediment Quality Results for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]		Reference (Lower Edney Creek) EDC-D (EDC-REF)															
						2015		2018		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Reference (EDC-D [EDC-REF]; 2018 to 2024)	Pre-Breach (Lower Hazeltine Creek)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																					
Moisture	%	-	-	72.7	-	***78.1***	7.58	40.3	12.0	59.6	15.6	34.2	3.34	48.4	10.4	53.4	7.02	51.1	2.15	61.0	10.1
pH (1:2 soil:water)	pH	-	-	6.49	-	7.70	0.246	7.93	0.241	7.18	0.330	7.67	0.154	7.50	0.203	7.41	0.556	7.52	0.316	7.14	0.471
Particle Size																					
% Gravel (>2 mm)	%	-	-	6.80	53.4	0.274	0.0283	5.48	3.58	<1.0	-	2.46	1.47	1.34	-	1.06	0.0566	2.64	0.339	1.82	1.36
% Sand (2.0 mm - 0.063 mm)	%	-	-	83.9	79.9	48.3	11.1	68.8	16.1	50.0	12.4	74.5	4.84	58.1	5.37	58.3	7.42	44.5	9.54	48.9	8.45
% Silt (0.063 mm - 4 µm)	%	-	-	57.2	31.2	44.9	10.4	21.6	11.8	41.5	11.1	19.7	3.65	35.4	5.83	34.2	6.47	45.4	8.85	43.0	8.17
% Clay (<4 µm)	%	-	-	9.70	9.80	6.59	1.18	4.12	1.26	8.20	1.67	3.64	0.336	5.60	0.660	6.72	0.593	7.90	0.742	6.62	0.740
Organic / Inorganic Carbon (<63 µm)																					
Total Organic Carbon (TOC)	%	-	-	5.29	9.03	3.73	1.70	2.85	0.806	3.14	0.642	2.29	0.398	2.42	0.884	3.63	0.970	2.95	0.699	4.76	1.11
Nutrients (Bulk sediment)																					
Total Nitrogen by LECO	%	-	-	0.285	-	0.206	0.0850	0.0854	0.0501	0.189	0.0769	0.104	0.0201	0.142	0.0372	0.170	0.0507	0.166	0.0349	0.273	0.0687
Metals, Metalloids, and Non-Metals (<63 µm)																					
Aluminum	mg/kg dw	-	-	19,000	12,550	15,900	2,000	14,200	940	15,200	358	12,120	672	16,900	2,845	13,860	573	15,700	1,107	17,000	967
Antimony	mg/kg dw	-	-	0.460	1.33	0.366	0.0321	0.430	0.0806	0.390	0.0224	0.360	0.0122	0.346	0.0385	0.340	0.0158	0.338	0.0228	0.356	0.00894
Arsenic	mg/kg dw	5.9	17	19.5	12.1	18.2	6.94	13.8	6.39	13.0	1.45	11.7	1.30	12.6	2.83	9.80	1.13	11.8	2.85	13.2	1.32
Barium	mg/kg dw	-	-	184	104	175	35.5	145	39.9	125	10.9	118	6.80	152	34.9	117	6.91	128	13.1	154	15.5
Beryllium	mg/kg dw	-	-	0.480	0.300	0.400	0.0292	0.424	0.0654	0.406	0.0152	0.350	0.0122	0.388	0.0716	0.366	0.0207	0.384	0.0297	0.392	0.0130
Bismuth	mg/kg dw	-	-	0.140	<0.20	***0.148***	0.00447	0.122	0.00837	0.134	0.00894	0.106	0.00894	0.118	0.0146	0.114	0.00548	0.104	0.00924	0.126	0.00894
Boron	mg/kg dw	-	-	6.50	2.97	***<10.0***	-	***<10.0***	-	***<10.0***	-	<5.0	-	5.68	0.571	5.00	-	5.52	0.691	6.14	0.744
Cadmium	mg/kg dw	0.6	3.5	0.361	0.235	***0.373***	0.0458	0.274	0.0606	0.303	0.0176	0.238	0.00832	0.296	0.0647	0.262	0.0289	0.263	0.0399	0.353	0.0462
Calcium	mg/kg dw	-	-	11,000	7,026	10,300	1,240	9,240	1,220	10,000	1,060	8,580	567	9,276	1,223	8,594	241	8,904	477	9,568	311
Chromium	mg/kg dw	37.3	90	60.4	33.1	45.8	4.17	42.1	2.56	48.4	3.50	44.5	1.34	55.4	8.21	43.4	1.68	46.4	1.90	47.6	1.11
Cobalt	mg/kg dw	-	-	15.5	11.0	14.9	1.96	11.6	1.12	14.0	0.744	11.9	0.370	13.6	2.41	11.7	0.462	12.7	1.13	13.8	0.110
Copper	mg/kg dw	35.7	197	43.5	42.0	35.9	4.40	34.1	5.34	35.0	1.39	26.1	1.01	32.3	4.91	28.3	2.17	30.2	2.65	39.6	5.29
Iron	mg/kg dw	21,200	43,766	33,600	35,400	31,900	2,640	27,600	4,290	31,300	1,380	29,060	1,119	31,980	4,157	27,720	1,339	30,380	3,080	31,080	482
Lead	mg/kg dw	35.0	91.3	8.37	5.61	7.74	0.591	7.51	0.663	7.85	0.476	6.30	0.228	7.20	1.08	6.81	0.296	6.81	0.239	7.43	0.331
Lithium	mg/kg dw	-	-	16.8	12.9	16.3	0.822	15.7	1.39	16.1	0.680	13.2	0.305	14.1	2.63	13.9	0.676	16.0	0.638	15.5	0.566
Magnesium	mg/kg dw	-	-	8,550	6,159	7,600	970	6,640	300	7,200	260	6,166	219	7,418	1,091	6,762	248	7,582	399	7,824	443
Manganese	mg/kg dw	460	1,100	1,410	1,116	***1,830***	1,910	600	280	959	313	806	58.4	878	445	705	229	768	182	799	214
Mercury	mg/kg dw	0.17	0.486	0.0891	0.140	0.0846	0.0161	0.0743	0.0138	0.0591	0.00383	0.0592	0.00660	0.0617	0.0101	0.0598	0.00733	0.0558	0.00408	0.0732	0.0217
Molybdenum	mg/kg dw	25	23,000	1.51	0.752	0.902	0.238	0.890	0.405	0.974	0.179	0.622	0.0661	1.14	0.326	0.584	0.0439	0.594	0.150	0.698	0.108
Nickel	mg/kg dw	16	75	39.9	24.0	33.6	3.86	30.1	2.21	34.9	2.29	28.1	0.719	34.6	6.29	27.9	0.658	30.7	2.00	33.8	1.96
Phosphorus	mg/kg dw	-	-	1,190	729	1,090	109	1,040	84.4	1,130	65.7	1,033	77.9	1,108	84.1	972.2	45.7	1,048	38.3	1,150	30.8
Potassium	mg/kg dw	-	-	1,540	909	1,390	243	1,100	158	1,210	133	978	43.8	1,260	259	1,138	61.0	1,228	166	1,474	130
Selenium	mg/kg dw	2	-	1.07	1.30	0.898	0.246	0.812	0.240	0.610	0.119	0.422	0.0701	***1.24***	1.59	0.446	0.0680	0.524	0.142	0.820	0.175
Silver	mg/kg dw	0.5	-	0.174	0.0300	0.122	0.0139	0.158	0.0761	0.130	0.00831	0.0930	0.00725	0.114	0.0231	0.105	0.00796	0.0980	0.00731	0.129	0.0139
Sodium	mg/kg dw	-	-	359	253	330	56.1	253	35.0	242	13.1	269	21.5	303	50.4	264	24.7	291	32.3	328	21.5
Strontium	mg/kg dw	-	-	105	67.1	90.5	10.6	86.0	12.5	76.4	4.70	72.0	2.39	83.1	14.8	81.3	4.83	76.6	6.89	87.7	3.06
Sulphur[c]	mg/kg dw	-	-	1,560	-	1,280	110	500	-	820	259	732	543	508	-	548	44.7	1,074	492	794	161
Thallium	mg/kg dw	-	-	0.129	0.0508	0.110	0.00568	0.113	0.0149	0.111	0.00336	0.0850	0.0043	0.102	0.0237	0.0956	0.00635	0.0916	0.00760	0.115	0.00918
Tin	mg/kg dw	-	-	0.590	1.10	0.370	0.0620	0.356	0.0503	0.540	0.172	0.376	0.0611	0.340	0.0596	0.364	0.0279	0.440	0.0903	0.422	0.0164
Titanium	mg/kg dw	-	-	900	701	644	63.7	583	68.4	679	18.4	683	40.6	766	86.7	677	83.0	820	75.4	746	32.7
Uranium	mg/kg dw	-	-	1.34	0.730	0.815	0.0994	0.977	0.331	0.971	0.0574	0.821	0.0242	1.02	0.137	1.00	0.0717	0.938	0.107	1.05	0.165
Vanadium	mg/kg dw	-	-	75.9	74.5	68.6	7.44	65.0	8.89	65.6	6.13	70.2	3.60	72.7	7.27	64.1	3.78	67.9	4.24	71.7	1.30
Zinc	mg/kg dw	123	315	82.2	60.2	70.6	8.13	59.5	5.10	69.6	2.24	57.0	1.51	71.8	10.4	63.5	2.53	67.4	2.67	75.7	4.91
Zirconium	mg/kg dw	-	-	1.90	-	-	-	-	-	-	-	1.48	0.0447	1.48	0.110	1.64	0.167	1.68	0.239	1.70	0.141

Value is > Lower BC Working Sediment Quality Guideline.
Value is > Upper BC Working Sediment Quality Guideline.

Notes: dw = dry weight. ***Bold/ Italics*** - Exposed value is > both reference and pre-breach 95th percentile values; reference value is > reference 95th percentile value (< 5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting.All summary statistics were calculated to three significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] For calculation of pre-breach 95th percentile values see Appendix Table D.2.4, for calculation of reference 95th percentile values see Appendix Table D.2.5. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table 6.2: Summary of Sediment Quality Results for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2014 to 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/Pre-Breach 95th Percentile[b]		Exposed (Lower Hazeltine Creek)													
						ST02		HAC-D (HAC-R5)											
						2014		2018		2019		2020		2021		2022		2023		2024	
		Lower	Upper	Reference (EDC-D [EDC-REF]; 2018 to 2024)	Pre-Breach (Lower Hazeltine Creek)	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Tests																			
Moisture	%	-	-	72.7	-	28.8	4.23	38.1	11.9	32.6	3.37	27.7	2.70	47.0	17.2	56.7	8.91	71.4	9.00	64.8	4.67
pH (1:2 soil:water)	pH	-	-	6.49	-	8.51	0.172	8.13	0.311	8.29	0.199	8.54	0.141	8.10	0.412	7.48	0.182	7.54	0.0841	7.56	0.125
Particle Size																			
% Gravel (>2 mm)	%	-	-	6.80	53.4	0.128	-	1.14	-	<1.0	-	<1.0	-	1.18	-	<1.0	-	<1.0	-	<1.0	-
% Sand (2.0 mm - 0.063 mm)	%	-	-	83.9	79.9	30.4	15.2	65.0	13.7	49.0	10.1	73.9	4.92	38.3	13.4	42.4	13.4	20.8	10.8	13.8	12.7
% Silt (0.063 mm - 4 µm)	%	-	-	57.2	31.2	***60.6***	12.6	26.6	12.2	41.1	8.43	21.2	4.36	44.9	10.3	48.6	11.6	***66.7***	10.2	***70.9***	12.3
% Clay (<4 µm)	%	-	-	9.70	9.80	8.91	3.66	8.02	1.92	9.74	1.71	4.52	0.993	***16.3***	6.02	8.67	2.04	***12.4***	1.25	***15.3***	1.23
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon (TOC)	%	-	-	5.29	9.03	0.116	0.0269	1.14	0.422	0.442	0.0792	0.354	0.0313	1.06	1.29	1.68	0.197	2.98	0.318	2.01	0.225
Nutrients (Bulk sediment)																			
Total Nitrogen by LECO	%	-	-	0.285	-	<0.020	-	0.0686	0.0525	0.0350	0.0108	0.0218	0.000566	0.0922	0.140	0.152	0.0434	***0.315***	0.0605	0.255	0.0634
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	19,000	12,550	16,700	2,820	15,500	1,020	15,400	614	11,960	555	***23,040***	6,385	15,150	797	17,180	968	***20,200***	2,729
Antimony	mg/kg dw	-	-	0.460	1.33	0.402	0.0589	0.546	0.0378	0.600	0.0292	0.546	0.0207	0.632	0.105	0.552	0.133	0.484	0.0114	0.566	0.0590
Arsenic	mg/kg dw	5.9	17	19.5	12.1	11.7	2.38	***25.0***	3.59	16.8	1.55	16.6	1.33	***20.3***	7.28	15.6	1.43	***23.8***	5.57	***27.7***	9.06
Barium	mg/kg dw	-	-	184	104	166	58.7	***212***	9.13	175	12.5	157	6.54	***515***	256	***238***	17.1	***269***	16.5	***235***	39.2
Beryllium	mg/kg dw	-	-	0.480	0.300	***0.492***	0.139	***0.538***	0.0303	***0.512***	0.0110	0.434	0.0297	***0.736***	0.134	***0.558***	0.0256	***0.640***	0.0187	***0.640***	0.0510
Bismuth	mg/kg dw	-	-	0.140	<0.20	0.112	0.00924	0.144	0.00548	0.152	0.00447	0.140	0.0122	0.150	0.04	0.127	0.00816	0.148	0.0164	0.192	0.00837
Boron	mg/kg dw	-	-	6.50	2.97	***10.2***	-	***10.0***	-	***10.0***	-	6.20	0.485	***18.9***	4.78	***11.6***	1.01	***13.7***	1.48	***11.1***	1.70
Cadmium	mg/kg dw	0.6	3.5	0.361	0.235	0.191	0.0335	0.313	0.0254	0.282	0.0199	0.243	0.0133	0.361	0.0394	0.302	0.0440	***0.369***	0.0298	***0.416***	0.0431
Calcium	mg/kg dw	-	-	11,000	7,026	***27,900***	2,770	***22,800***	1,740	***31,900***	1,180	***19,760***	680	***26,900***	2,481	***23,100***	938.1	***27,660***	2,526	***20,300***	1,042
Chromium	mg/kg dw	37.3	90	60.4	33.1	28.4	8.23	35.6	2.85	39.6	2.57	45.5	3.34	35.9	6.48	33.9	1.65	32.7	1.79	39.4	3.70
Cobalt	mg/kg dw	-	-	15.5	11.0	***18.4***	3.14	***17.0***	0.344	15.3	0.559	15.0	0.568	***19.1***	4.11	14.7	0.622	15.2	0.522	***17.2***	1.42
Copper	mg/kg dw	35.7	197	43.5	42.0	***449***	256	***361***	22.4	***208***	30.2	***149***	9.93	***655***	387	***336***	21.8	***340***	48.5	***302***	58.8
Iron	mg/kg dw	21,200	43,766	33,600	35,400	***66,000***	16,000	***57,400***	7,470	***35,600***	1,560	***49,920***	6,834	***48,160***	10,960	***43,533***	1,767	***41,900***	2,401	***40,640***	2,917
Lead	mg/kg dw	35.0	91.3	8.37	5.61	7.53	0.522	***9.13***	0.544	***9.46***	0.415	***8.49***	0.454	***10.3***	1.38	***10.3***	4.22	***9.72***	0.747	***11.5***	0.606
Lithium	mg/kg dw	-	-	16.8	12.9	16.3	2.98	13.1	1.44	16.3	0.773	12.3	0.896	15.4	3.86	14.4	0.451	13.9	0.942	16.8	2.24
Magnesium	mg/kg dw	-	-	8,550	6,159	***10,400***	2,100	8,080	578	***8,680***	291	6,790	405	***12,160***	4,165	8,155	375	***8,578***	341	***9,618***	939
Manganese	mg/kg dw	460	1,100	1,410	1,116	676	111	1,060	263	728	64.0	654	95.4	1,234	340	1,161	188	***1,800***	266	1,279	803
Mercury	mg/kg dw	0.17	0.486	0.0891	0.140	0.0653	0.0141	0.0883	0.0105	0.0611	0.00565	0.0688	0.00242	0.102	0.0172	0.103	0.00831	0.119	0.00665	0.110	0.0215
Molybdenum	mg/kg dw	25	23,000	1.51	0.752	***2.44***	1.09	***1.82***	0.220	***1.66***	0.124	1.00	0.0594	***2.68***	1.25	***1.70***	0.126	***1.67***	0.0259	***1.70***	0.470
Nickel	mg/kg dw	16	75	39.9	24.0	22.5	7.60	28.7	1.19	34.4	1.49	29.8	1.90	33.7	4.59	25.2	0.836	27.2	1.19	35.9	3.32
Phosphorus	mg/kg dw	-	-	1,190	729	***1,530***	256	***1,410***	95.3	1,160	50.5	***1,196***	95.6	***1,534***	353	***1,292***	158	***1,230***	101	***1,298***	131
Potassium	mg/kg dw	-	-	1,540	909	1,530	368	1,370	102	1,370	57.7	1,200	108	***1,670***	131	1,362	87.7	***1,636***	63.5	***2,072***	217
Selenium	mg/kg dw	2	-	1.07	1.30	0.886	0.252	0.994	0.151	0.556	0.0945	0.522	0.0835	1.13	0.0994	1.11	0.0712	***2.04***	0.128	***2.38***	0.742
Silver	mg/kg dw	0.5	-	0.174	0.0300	***0.244***	0.0958	***0.233***	0.0168	***0.252***	0.139	0.149	0.0182	***0.234***	0.0476	***0.222***	0.0640	***0.186***	0.00765	***0.203***	0.0206
Sodium	mg/kg dw	-	-	359	253	***718***	386	***380***	27.4	345	10.8	294	12.7	***394***	74.4	***376***	31.4	356	14.3	***370***	45.5
Strontium	mg/kg dw	-	-	105	67.1	***145***	13.8	***143***	9.54	***184***	10.3	***123***	6.27	***200***	20.5	***172***	13.8	***194***	10.7	***180***	10.4
Sulphur[c]	mg/kg dw	-	-	1,560	-	-	-	700	141	<500	-	508	-	784	400	813	156	1,518	144	1,420	182
Thallium	mg/kg dw	-	-	0.129	0.0508	0.0602	0.0135	***0.167***	0.0256	***0.152***	0.0165	0.122	0.0148	0.127	0.0692	0.112	0.00628	***0.156***	0.0272	***0.213***	0.0216
Tin	mg/kg dw	-	-	0.590	1.10	1.09	0.486	0.744	0.0586	0.686	0.0780	0.570	0.064	0.866	0.104	0.663	0.0427	0.702	0.0409	0.688	0.0694
Titanium	mg/kg dw	-	-	900	701	***1,310***	325	***1,010***	54.8	***961***	46.2	***1,019***	52.7	***1,209***	574	***950.8***	88.9	740	187	827	166
Uranium	mg/kg dw	-	-	1.34	0.730	1.05	0.163	1.05	0.0627	0.885	0.0622	0.866	0.053	1.07	0.303	0.990	0.0261	1.08	0.0862	1.18	0.0789
Vanadium	mg/kg dw	-	-	75.9	74.5	***229***	77.5	***204***	34.2	***94.1***	6.75	***160***	26.9	***152***	48.3	***135***	9.79	***114***	10.9	***106***	9.79
Zinc	mg/kg dw	123	315	82.2	60.2	68.2	4.29	79.8	3.69	69.1	4.34	63.8	2.75	***89.4***	7.91	76.8	5.12	***82.4***	2.47	***97.3***	8.12
Zirconium	mg/kg dw	-	-	1.90	-	-	-	-	-	-	-	***5.58***	0.192	***6.24***	4.16	***2.77***	0.350	***1.92***	0.249	***2.64***	0.219

Value is > Lower BC Working Sediment Quality Guideline.

Value is > Upper BC Working Sediment Quality Guideline.

Notes: dw = dry weight. ***Bold/ Italics*** - Exposed value is > both reference and pre-breach 95th percentile values; reference value is > reference 95th percentile value (< 5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. "SD" = standard deviation. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. All summary statistics were calculated to three significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] For calculation of pre-breach 95th percentile values see Appendix Table D.2.4, for calculation of reference 95th percentile values see Appendix Table D.2.5. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Figure 6.2; Appendix Table F.1.5). When considered independently from reference results, the TOC content of HAC-D sediments has been stable since 2022 (Appendix Table F.1.4).

Mean analyte concentrations in the sediments (<63 µm fraction) collected from HAC-D in 2024 exceeded both pre-breach[64] and reference 95th percentile values for 23 analytes (Table 6.2). Among these analytes, arsenic, copper, iron, and selenium were the only Analytes of Interest with mean sediment concentrations that also exceeded the BCWSQG in 2024 (Figure 6.2, Table 6.2; Appendix Table D.2.9). Specifically, mean iron and selenium concentrations were 1.9- and 1.2-times the lower BCWSQG, respectively, and mean arsenic and copper concentrations were 1.6- and 1.5-times the upper BCWSQG, respectively (Figure 6.2, Table 6.2; Appendix Table D.2.9). Sediments from the reference area (EDC-D) had mean arsenic, copper, and iron concentrations that were above the lower BCWSQG in at least two monitoring years (all years for arsenic and iron; Figure 6.2; Appendix Table D.2.5), indicating that these analytes are somewhat naturally elevated in stream habitats in the vicinity of the Mount Polley Mine.

Mean Analyte of Interest concentrations in HAC-D sediments have been significantly higher than at the reference area (EDC-D) in all monitoring years (2018 to 2024) for arsenic and copper, and in most years (except 2019) for iron (Figure 6.2, Table 6.2; Appendix Table F.1.4). The relative (exposed-reference) differences of arsenic, copper, and iron concentrations in 2024 were similar to or significantly lower than all prior years (Figure 6.2; Appendix Table F.1.5). Specifically, the relative differences in sediment concentrations of these analytes have been stable since 2018 (for arsenic), 2023 (for copper), and 2021 (for iron), with iron concentrations in 2021 to 2024 significantly lower than in 2018 (Figure 6.2; Appendix Table F.1.5).

Mean selenium concentrations in HAC-D sediments were significantly higher than at the reference area (EDC-D) from 2022 to 2024. This coincided with significantly higher and temporally stable relative differences of sediment selenium concentrations in 2022 to 2024 compared to most prior years (i.e., 2018 to 2020; Figure 6.2; Appendix Tables F.1.4 and F.1.5). Mean selenium concentrations in HAC-D sediments in 2024 also exceeded the lower BCWSQG (2 mg/kg dw) for the second consecutive year (Figure 6.2; Appendix Table D.2.9). The significantly higher relative differences of sediment selenium concentrations in 2022 to 2024, compared to 2018 to 2020, coincided with higher silt content of HAC-D sediments in 2022 to 2024.

[64] TOC and analyte concentrations reported for pre-breach sediments were based predominantly on bulk sediment, but were reported for the <63 µm fraction of sediments collected post-breach. This difference in the fraction of sediment evaluated (i.e., bulk sediments for pre-breach and <63 µm fraction for post-breach) should be considered when making comparisons of TOC and analyte concentrations between the two time periods. Formal statistical temporal comparisons were conducted using data from between 2018 to 2024 which reported TOC and analyte concentrations in the <63 µm fraction of sediments (see Sections 4.1.2 and 4.1.3.2).

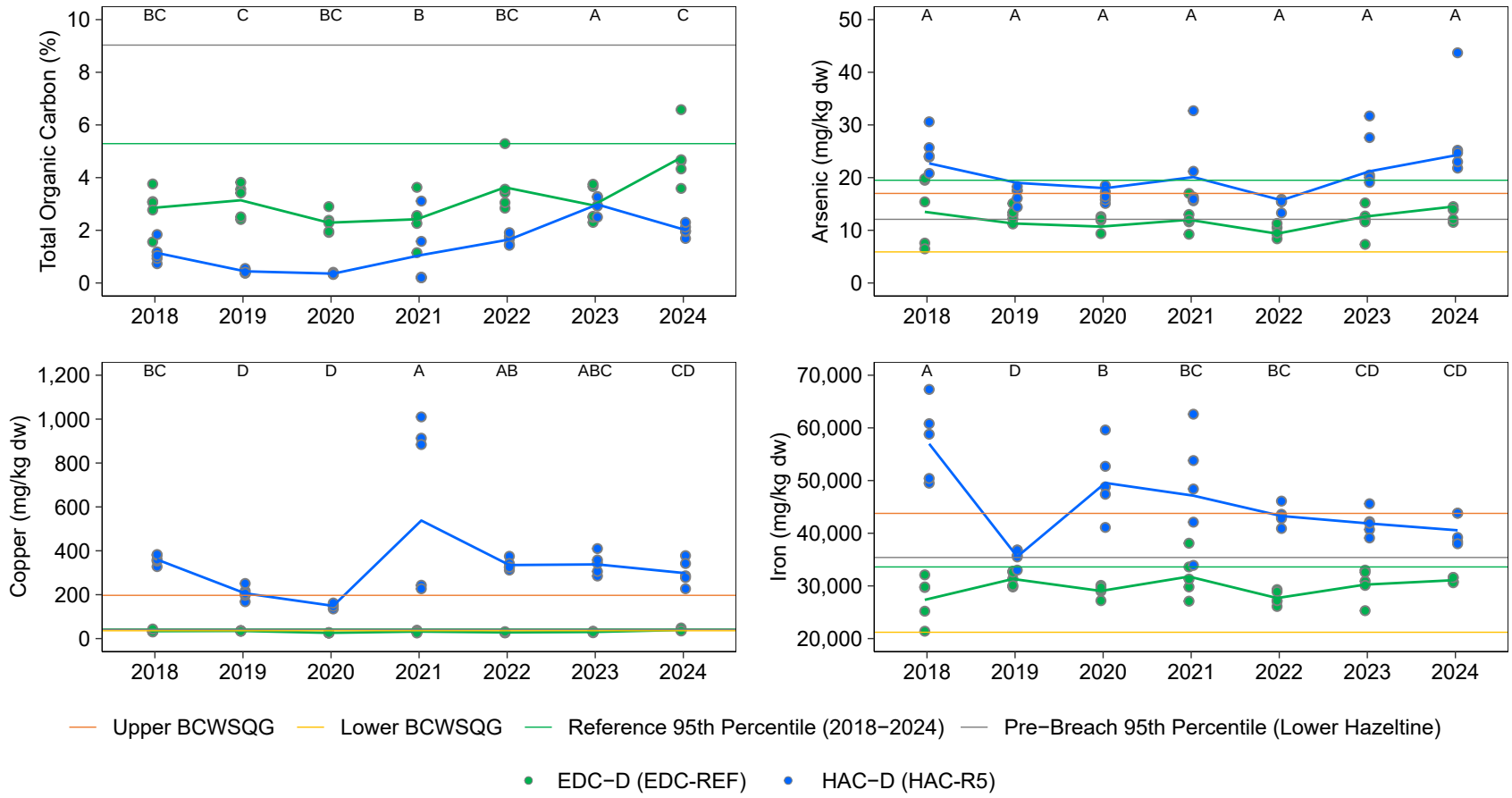

Figure 6.2: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Lower Hazeltine Creek (HAC−D [HAC-R5]; Exposed) and Lower Edney Creek (EDC−D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference).

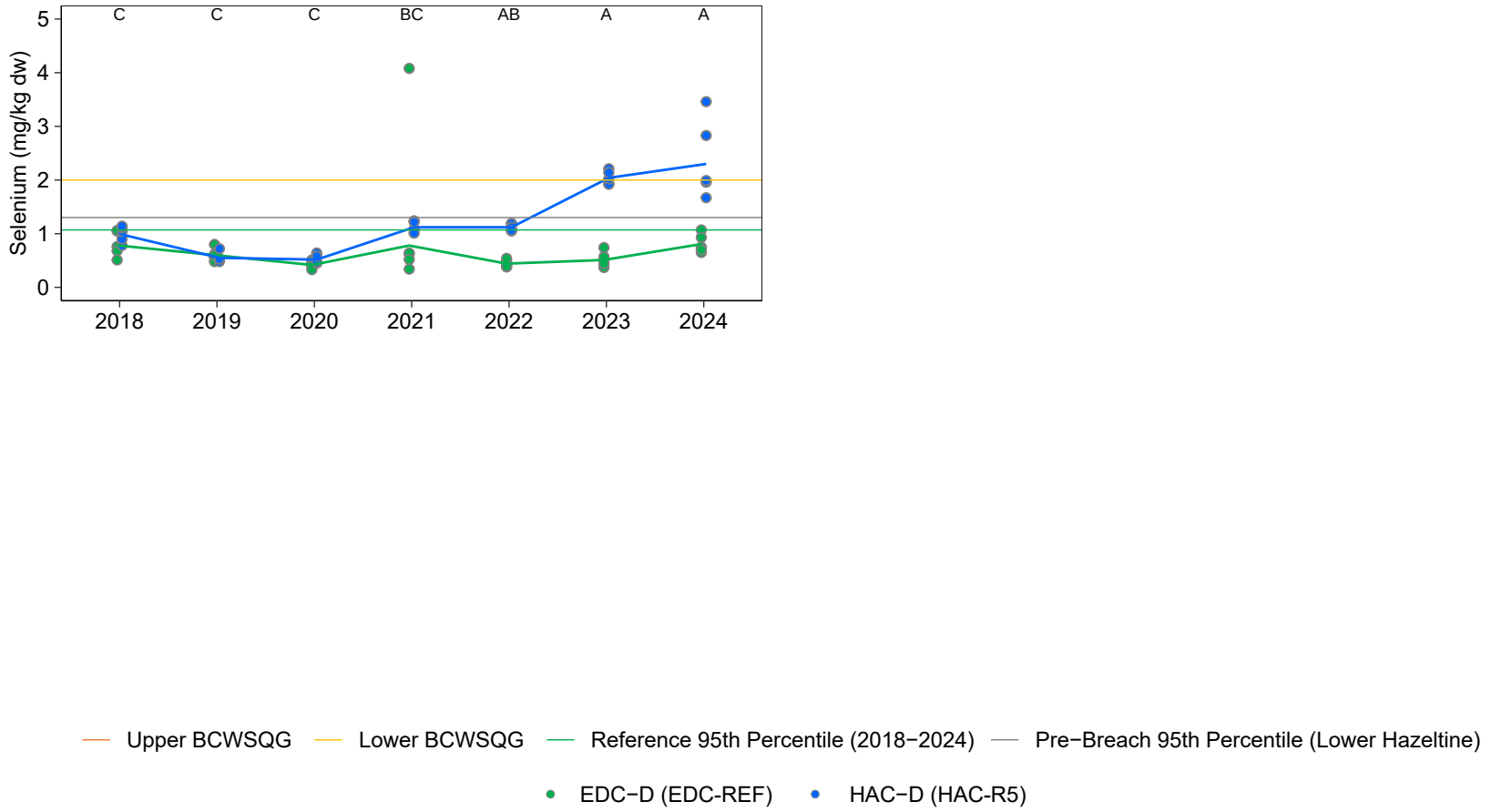

Figure 6.2: Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Lower Hazeltine Creek (HAC−D [HAC-R5]; Exposed) and Lower Edney Creek (EDC−D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. BCWSQG = British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Individual samples are plotted and lines join the least squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year and log10 transformed data for all analytes except Total Organic Carbon (TOC) (no transformation). Years that share a letter (e.g., A,B,C) have ratios (or differences − TOC) of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio (or difference) of concentrations (Exposed:Reference).

As outlined in Section 6.1.1.1, the relationships between variability in sediment physical characteristics and sediment analyte concentrations were explored through correlation analysis.

Concentrations of copper, iron, manganese, and selenium in upper and lower Hazeltine Creek sediments were significantly correlated with sediment physical and chemical characteristics (Appendix Table F.1.3). In addition, arsenic sediment concentrations were negatively correlated with sediment total sulphur, TOC, and total nitrogen content, when considering Hazeltine Creek sediments only (independent of reference) or a combination of Hazeltine Creek and Edney Creek (reference) sediments. The correlation results suggested that the analyte concentrations of exposed sediments were related to the physical and chemical characteristics of these sediments, which is likely driven by a combination of opportunistic sampling methods and continued sediment accumulation in upper and lower Hazeltine Creek.

Overall, temporal increases were observed in the selenium concentrations of lower Hazeltine Creek sediments, relative to reference. Benthic invertebrate community and tissue quality monitoring both provide more directly applicable approaches for evaluating the potential effects of increased analyte concentrations to aquatic life in these erosional creek habitats, compared to sediment monitoring (see Sections 6.1.3 and 6.1.4 for benthic invertebrate community and tissue quality results for creek habitats, respectively).

6.1.2 Periphyton Community and Productivity

Periphyton community and productivity monitoring was completed annually between 2022 and 2024, with monitoring in each year including three remediated (exposed) areas of upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2] and HAC-R3 [productivity only]) with upper Edney Creek (EDC-U) serving as a reference area for both community and productivity monitoring and Frypan Creek (FPC-R3) serving as a reference area for productivity monitoring only (Figures 4.2 and 4.3, Table 4.2). [65] Prior periphyton community and productivity monitoring within the 2022 to 2024 period included monitoring completed in 2023 at one remediated (exposed) area of lower Hazeltine Creek (HAC-D [HAC-R5]) and one remediated (exposed) area of lower Edney Creek (E1), with an unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as a reference area for both of the exposed lower creek areas (Figure 4.2, Table 4.2). The periphyton community and productivity monitoring frequency at these

[65] For HRWG reporting, HAC-R2, HAC-R5, EDC-REF, and EDC-EXP are the alternate names used for the HAC-U, HAC-D, EDC-D, and E1 sampling areas, respectively. The original area names only (i.e., HAC-U, HAC-D, EDC-D, and E1) are used throughout the remainder of this report section (Section 6.1.2).

lower creek areas (i.e., HAC-D [HAC-R5], E1 [EDC-EXP], and EDC-D [EDC-REF) is biennial (Table 4.2; MPMC 2019).

As detailed in Section 4.2, the sole purpose of the annual periphyton productivity monitoring at areas HAC-R3 and FPC-R3 is to support the evaluation of fish habitat in upper Hazeltine Creek as part of HRWG monitoring objectives (e.g., Minnow 2025). Chlorophyll-a concentrations correspond to periphyton productivity in terms of algal biomass, and benthic algae is a food source for invertebrates (Lamberti and Resh 1983) and fish, including rainbow trout (McKinney and Speas 2001), making it a proxy for algal food availability. Periphyton AFDM represents the available biomass of autotrophic (e.g., algae) and heterotrophic (e.g., fungi, bacteria, etc.) components of periphyton assemblages (Biggs and Close 1989). Previous CEMP Sediment and Aquatic Life reports (e.g., Minnow 2024a) have presented periphyton productivity data from HAC-R3 and FPC-R3 in tabular form only, but periphyton productivity results from these two areas have been incorporated in the present report throughout all data tabulation, analyses, and interpretation with the objective of improving reporting clarity and efficiency with the HRWG report (see Section 4.2).

A review of the 2024 periphyton productivity and community results (Appendix B) indicated that the data met the established DQOs. Specifically, periphyton productivity data were characterized by appropriate detectability, negligible analyte concentrations in method blank samples, and good laboratory accuracy. Laboratory precision could not be evaluated as the productivity analyses required consumption of the entire sample. The recommended hold time (28 days) for periphyton chlorophyll-a was exceeded by one day in three samples due to a delay between sample receipt at the analytical laboratory and sample analysis; however, results were comparable to prior years when hold times were met. Periphyton community data were characterized by good subsampling accuracy and taxonomic consistency. Overall, the 2024 periphyton productivity and community data can be used with a high level of confidence in the derivation of conclusions. A review of 2024 supporting water data quality indicated that these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

6.1.2.1 Area Characteristics

During sampling in upper Hazeltine Creek and the associated reference areas (i.e., Frypan Creek and Edney Creek), an attempt was made to match sampling habitats both between the exposed and reference sampling areas and from year-to-year as closely as possible (as outlined in Section 4.2.1). However, matching habitat characteristics of Hazeltine Creek to the reference areas was difficult since the supplemental pumping of water from Polley Lake to Hazeltine Creek resulted in increased average water depth and velocity in Hazeltine Creek (see Section 4.2.1 for details). This was consistent with challenges encountered in previous monitoring years due

to the supplemental pumping (2018 to 2024) which were exacerbated in some years by extreme climate events in the Cariboo Region (i.e., severe drought from August 2023 to April 2024 and moderate drought or abnormally dry conditions from May to August 2024; Agriculture and Agri-Foods Canada 2025). As such, the variability in water depth and velocity among years and between the exposed and reference areas were considered when interpreting temporal changes, and these physical habitat variables are summarized below.

Among the upper Hazeltine Creek areas (HAC-R1, HAC-U and HAC-R3; exposed), mean water depth and velocity in 2024 (controllable by sample station selection) were largely similar (varied by <34% among areas) but these habitat characteristics were more variable among years (Table 6.3). Water depth and velocity also differed between the upper Hazeltine Creek areas and the reference areas (FPC-R3 and EDC-U) in most years (Table 6.3). In 2024, mean water depth in upper Hazeltine Creek was approximately 1.9- to 4.4-times greater than the mean water depth in the Edney Creek and Frypan Creek reference areas. The mean water velocity at HAC-R1, HAC-U, and HAC-R3 was 0.210 m/s, 0.160 m/s and 0.160 m/s, respectively, whereas there was no flow (0 m/s) at FPC-R3 and EDC-U due to local drought conditions (Table 6.3; Appendix Table A.2.3). The substrate size, which was controlled to some extent during sampling, was similar among areas in 2024 (median substrate size = 4.3 to 5.8 cm in 2024; Appendix Table A.2.5) and among years (Table 6.3).

Remediation work following the breach was completed at HAC-R1 in 2016, at HAC-U in 2017, and at HAC-R3 in 2019 (Table 4.2; see Section 4.2). The regeneration of riparian vegetation at these remediated areas is a long-term process and canopy cover over the creek channel in upper Hazeltine Creek (i.e., HAC-R1, HAC-U, HAC-R3) remained absent in 2024 despite substantial regrowth of the riparian vegetation in these areas. This was consistent with all previous sampling years in upper Hazeltine Creek (2018 to 2023; Tables 6.3) and canopy coverage in 2024 remained a key difference between the remediated areas of upper Hazeltine Creek (0% canopy coverage at all areas) and the reference areas (40% and 35% canopy coverage at FPC-R3 and EDC-U, respectively; Table 6.3; Appendix Table A.2.2).

6.1.2.2 Upper Hazeltine Creek

6.1.2.2.1 Community

In 2024, the periphyton community at both exposed areas (HAC-R1 and HAC-U) had significantly lower mean densities but similar total taxon richness, Simpson's Evenness, Simpson's Diversity and Diatom richness compared to the reference area (EDC-U; Figure 6.3, Table 6.4).

The periphyton communities of the two upper Hazeltine Creek areas (HAC-R1 and HAC-U) in 2024 were similar to each other in terms of density, total taxon richness, Simpson's Evenness,

Table 6.3: Physical and Chemical Characteristics for Periphyton Sampling at the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2017 to 2024

Habitat Variables	Units	Reference								Reference						
		Frypan Creek (FPC-R3)								Upper Edney Creek (EDC-U)						
		2017	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Mean Water Depth	cm	12.0	5.8	8.0	17.5	6.2	7.6	5.2	6.6	19.3	19.4	11.4	13.6	11.0	5.2	10.6
Mean Water Velocity	m/s	0.02	0.04	0.10	0.12	0.028	0.13	0.32	0.142	0.002	0.472	0.127	0	0.212	0	0
Median Substrate Size[a]	cm	4.4	2.7	4.4	5.1	4.4	5.5	4.9	4.4	4.7	4.2	-	5.5	5.7	5.0	5.8
Dominant Substrate Type	-	Gravel	Gravel	Cobble	Cobble	Cobble	Cobble	Gravel	Gravel	Gravel	Cobble	Cobble	Cobble	Gravel	Gravel	Gravel
Canopy Cover[b]	%	50	100	-	80	100	80	80	40	60	70	70	85	80	80	35
Water Quality[c]																
Dissolved Oxygen	%	-	82.2	70.6	87.1	64.7	79.4	90.2	78.6	81.5	72.2	88.3	59.9	77.3	49.5	34.8
Temperature	°C	-	10.4	11.4	12.6	14.2	12.0	14.1	13.1	11.5	20.1	15.2	15.7	13.0	14.3	13.9
Specific Conductivity	µS/cm	-	168.7	146.0	172.0	198.0	161.0	183.0	166.7	118.5	116.0	139.0	141.0	125.4	135.4	150.9
Total Phosphorus	mg/L	-	0.0387	0.0383	0.0355	0.0452	0.0489	0.0430	0.0548	0.0107	0.0274	0.0160	0.0227	0.0107	0.0076	0.0168
Total Nitrogen	mg/L	-	0.553	0.495	0.688	0.795	0.809	0.706	0.735	0.460	0.723	0.627	0.540	0.509	0.400	0.593
Dissolved Orthophosphate	mg/L	-	0.0242	0.0209	0.0209	0.0292	0.0306	0.0209	0.0181	0.0030	<0.0010	0.0038	0.0053	0.0017	<0.0010	<0.0010
Periphyton Productivity																
Mean AFDM	g/m^2	5.43	5.88	9.15	15.8	7.11	6.87	7.82	9.74	6.66	9.60	8.05	4.89	10.6	8.04	15.0
Mean Chlorophyll-a	mg/m^2	8.50	16.6	30.4	20.1	37.6	49.2	29.5	30.8	11.5	25.0	8.46	5.44	39.5	16.1	12.8

Notes: "-" = data not available, % = percent, °C = degrees Celsius, µS/cm = microSiemens per centimetre, mg/L = milligrams per litre, AFDM = Ash Free Dry Mass, mg/m^2 = milligrams per square metre. Physical and chemical characteristic data are compiled for years when periphyton productivity and/or community monitoring was completed (2017 to 2024). *In situ* water quality results are presented for spot (single) water quality samples where routine water quality monitoring data was not available. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

[a] The displayed median substrate size represents the median (50^{th} percentile) of 100 pebble measures recorded for each sampling area. See Appendix Table A.2.5 for pebble count data.

[b] Canopy cover includes dense and partially open cover.

[c] For the Frypan Creek (FPC-R3) and Edney Creek (EDC-U) reference areas, water quality results represent a single grab water sample collected within a week of biological sampling as routine water quality data is not collected at these areas. For the Hazeltine Creek (HAC-R1, HAC-U, and HAC-R3) routine water quality monitoring areas, water quality results represent the mean of results collected during the year preceding biological sampling (i.e., from September to August). See Appendix Tables D.1.3 to D.1.5 for complete results (September 2023 to August 2024) and the reports listed in Table 4.2 for results from previous years.

Table 6.3: **Physical and Chemical Characteristics for Periphyton Sampling at the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2017 to 2024**

Habitat Variables	Units	Exposed																			
		Upper Hazeltine Creek Reach 1 (HAC-R1)								Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2])							Upper Hazeltine Creek Reach 3 (HAC-R3)				
		2017	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Mean Water Depth	cm	5.3	22.3	20.9	34.5	24.2	37.8	15.4	28.8	19.7	19.6	29.8	26.3	32.8	16.2	23.4	26.6	12.4	25.8	18.5	20.4
Mean Water Velocity	m/s	0.243	0.159	0.411	0.133	0.088	0.216	0.262	0.212	0.222	0.454	0.240	0.160	0.460	0.288	0.160	0.300	0.238	0.356	0.200	0.164
Median Substrate Size[a]	cm	6.3	4.9	5.0	4.4	5.4	5.2	5.6	4.3	5.5	4.8	4.2	4.6	5.5	5.8	4.8	4.3	4.0	4.6	4.1	5.3
Dominant Substrate Type	-	Cobble	Gravel	Cobble	Cobble	Cobble	Gravel	Gravel	Cobble	Gravel	Cobble	Cobble	Cobble	Gravel	Gravel	Gravel	Cobble	Cobble	Cobble	Gravel	Cobble
Canopy Cover[b]	%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Quality[c]																					
Dissolved Oxygen	%	104.8	86.5	89.9	91.8	94.0	90.0	91.0	92.0	91.0	97.0	96.0	100.0	92.0	95.0	96.0	92.9	93.4	92.0	95.0	93.0
Temperature	°C	6.70	6.26	8.40	8.04	8.63	7.20	8.10	8.90	5.80	6.80	6.97	8.39	6.70	7.80	7.40	11.7	13.4	12.0	13.0	8.40
Specific Conductivity	µS/cm	336.7	333.0	301.0	270.0	261.0	286.0	256.0	281.0	381.0	344.0	293.0	287.0	311.0	292.0	346.0	306.0	284.0	305.0	271.0	333.0
Total Phosphorus	mg/L	0.0393	0.0141	0.0147	0.0171	0.0130	0.0120	0.0120	0.0120	0.0158	0.0161	0.0175	0.0129	0.0120	0.0120	0.0120	0.0153	0.0127	0.0200	0.0120	0.0110
Total Nitrogen	mg/L	0.444	0.377	0.320	0.319	0.294	0.300	0.290	0.270	0.521	0.442	0.353	0.315	0.340	0.310	0.290	0.336	0.289	0.300	0.290	0.270
Dissolved Orthophosphate	mg/L	0.0106	0.0057	0.0041	0.0030	0.0050	0.0033	0.0032	0.0016	0.0062	0.0046	0.0031	0.0046	0.0036	0.0034	0.0018	0.0027	0.0041	0.0038	0.0026	0.0020
Periphyton Productivity																					
Mean AFDM	g/m^2	5.48	15.5	58.1	126.0	15.9	96.7	15.1	68.9	10.2	30.0	59.4	37.3	37.8	19.6	74.5	3.47	2.15	2.02	16.9	80.1
Mean Chlorophyll-a	mg/m^2	11.8	17.7	47.2	56.7	34.0	87.4	40.6	47.0	12.6	35.7	14.9	22.9	26.8	23.3	20.4	1.66	4.49	3.97	8.49	16.0

Notes: "-" = data not available, % = percent, °C = degrees Celsius, µS/cm = microSiemens per centimetre, mg/L = milligrams per litre, AFDM = Ash Free Dry Mass, mg/m^2 = milligrams per square metre. Physical and chemical characteristic data are compiled for years when periphyton productivity and/or community monitoring was completed (2017 to 2024). *In situ* water quality results are presented for spot (single) water quality samples where routine water quality monitoring data was not available. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

[a] The displayed median substrate size represents the median (50^{th} percentile) of 100 pebble measures recorded for each sampling area. See Appendix Table A.2.5 for pebble count data.

[b] Canopy cover includes dense and partially open cover.

[c] For the Frypan Creek (FPC-R3) and Edney Creek (EDC-U) reference areas, water quality results represent a single grab water sample collected within a week of biological sampling as routine water quality data is not collected at these areas. For the Hazeltine Creek (HAC-R1, HAC-U, and HAC-R3) routine water quality monitoring areas, water quality results represent the mean of results collected during the year preceding biological sampling (i.e., from September to August). See Appendix Tables D.1.3 to D.1.5 for complete results (September 2023 to August 2024) and the reports listed in Table 4.2 for results from previous years.

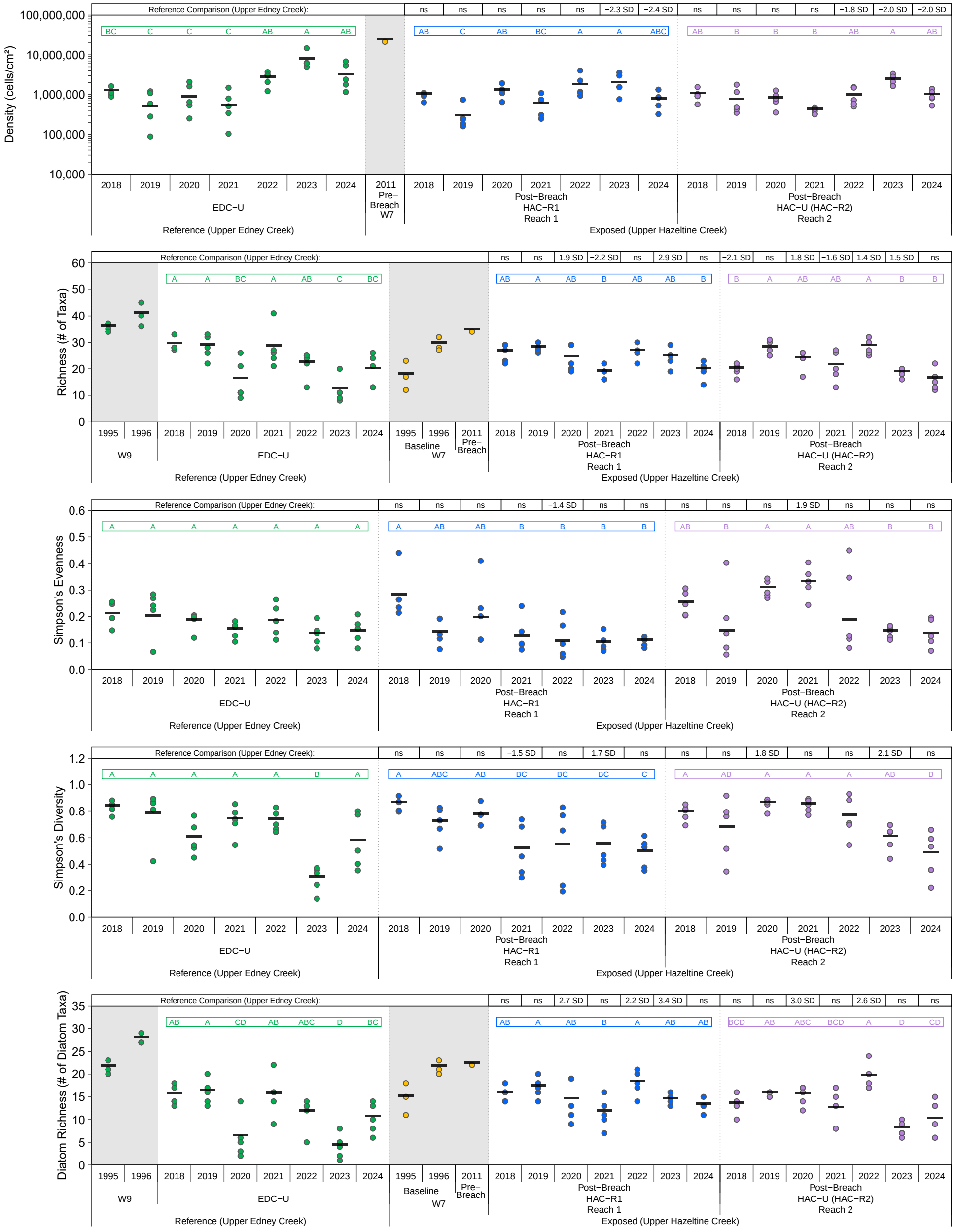

Figure 6.3: Periphyton Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) relative to reference. A 'ns' indicates a non−significant contrast. Grey shading indicates semi−quantitative data that were not included in statistical comparisons but are shown for visual comparison only.

Table 6.4: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
										Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year						2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[c]
Density (cells/cm²)	log10	-	-	0.003	EDC-U	Reference	2018	1,138,405	1,114,480	BC	C	C	C	AB	A	AB	Baseline	ns	ns	ns	ns	3.1	ns	ns	ns
							2019	650,148	453,327															ns	ns
							2020	1,025,442	782,145															ns	ns
							2021	646,922	463,190															ns	ns
							2022	2,629,813	2,450,576															ns	-1.8
							2023	7,612,582	7,014,983															-2.3	-2.0
							2024	3,511,503	2,831,897															-2.4	-2.0
					HAC-R1	Exposed	2018	928,580	913,229	AB	C	AB	BC	A	A	ABC	Baseline	-2.1	ns	ns	ns	ns	ns		ns
							2019	315,025	264,869																1.6
							2020	1,226,087	1,154,247																ns
							2021	622,251	535,936																ns
							2022	1,896,058	1,614,583																ns
							2023	2,084,045	1,811,467																ns
							2024	775,812	695,989																ns
					HAC-U (HAC-R2)[c]	Exposed	2018	995,413	946,120	AB	B	B	B	AB	A	AB	Baseline	ns	ns	ns	ns	ns	ns		
							2019	837,310	681,485																
							2020	801,041	737,791																
							2021	387,310	382,691																
							2022	969,187	866,272																
							2023	2,303,921	2,212,951																
							2024	945,223	896,114																
Total Richness (# of Taxa)	none	-	-	<0.001	EDC-U	Reference	2018	29	29	A	A	BC	A	AB	C	BC	Baseline	ns	-3.1	ns	ns	-3.9	-2.2	ns	-2.1
							2019	28	28															ns	ns
							2020	16	16															1.9	1.8
							2021	28	28															-2.2	-1.6
							2022	22	22															ns	1.4
							2023	12	12															2.9	1.5
							2024	19	19															ns	ns
					HAC-R1	Exposed	2018	26	26	AB	A	AB	B	AB	AB	B	Baseline	ns	ns	ns	ns	ns	ns		-1.5
							2019	28	28																ns
							2020	24	24																ns
							2021	18	18																ns
							2022	26	26																ns
							2023	24	24																-1.4
							2024	19	19																ns
					HAC-U (HAC-R2)[c]	Exposed	2018	20	20	B	A	AB	AB	A	B	B	Baseline	1.9	ns	ns	1.9	ns	ns		
							2019	28	28																
							2020	23	23																
							2021	21	21																
							2022	28	28																
							2023	18	18																
							2024	16	16																
Simpson's Evenness	log10	-	-	0.063	EDC-U	Reference	2018	0.208	0.204	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2019	0.217	0.194															ns	ns
							2020	0.183	0.180															ns	ns
							2021	0.148	0.145															ns	1.9
							2022	0.186	0.177															-1.4	ns
							2023	0.133	0.127															ns	ns
							2024	0.146	0.139															ns	ns
					HAC-R1	Exposed	2018	0.283	0.274	A	AB	AB	B	B	B	B	Baseline	ns	ns	-2.0	-2.4	-2.6	-2.4		ns
							2019	0.142	0.134																ns
							2020	0.213	0.189																ns
							2021	0.130	0.119																2.4
							2022	0.117	0.0998																1.4
							2023	0.0990	0.0949																ns
							2024	0.105	0.104																ns
					HAC-U (HAC-R2)[c]	Exposed	2018	0.250	0.247	AB	B	A	A	AB	B	B	Baseline	ns	ns	ns	ns	ns	ns		
							2019	0.174	0.138																
							2020	0.303	0.302																
							2021	0.330	0.326																
							2022	0.224	0.180																
							2023	0.141	0.139																
							2024	0.138	0.129																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non-significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table 6.4: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
										Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year						2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[c]
Simpson's Diversity	none	-	-	0.001	EDC-U	Reference	2018	0.824	0.824	A	A	A	A	A	B	A	Baseline	ns	ns	ns	ns	-3.7	ns	ns	ns
							2019	0.771	0.771															ns	ns
							2020	0.593	0.593															ns	1.8
							2021	0.727	0.727															-1.5	ns
							2022	0.724	0.724															ns	ns
							2023	0.289	0.289															1.7	2.1
							2024	0.567	0.567															ns	ns
					HAC-R1	Exposed	2018	0.852	0.852	A	ABC	AB	BC	BC	BC	C	Baseline	ns	ns	-2.4	-2.2	-2.1	-2.5		ns
							2019	0.710	0.710																ns
							2020	0.762	0.762																ns
							2021	0.504	0.504																2.3
							2022	0.537	0.537																1.5
							2023	0.539	0.539																ns
							2024	0.485	0.485																ns
					HAC-U (HAC-R2)[c]	Exposed	2018	0.785	0.785	A	AB	A	A	A	AB	B	Baseline	ns	ns	ns	ns	ns	-2.1		
							2019	0.667	0.667																
							2020	0.853	0.853																
							2021	0.841	0.841																
							2022	0.754	0.754																
							2023	0.595	0.595																
							2024	0.473	0.473																
Diatom Richness (# of Taxa)	none	-	-	<0.001	EDC-U	Reference	2018	15	15	AB	A	CD	AB	ABC	D	BC	Baseline	ns	-3.0	ns	ns	-3.7	ns	ns	ns
							2019	16	16															ns	ns
							2020	6	6															2.7	3.0
							2021	15	15															ns	ns
							2022	11	11															2.2	2.6
							2023	4	4															3.4	ns
							2024	10	10															ns	ns
					HAC-R1	Exposed	2018	16	16	AB	A	AB	B	A	AB	AB	Baseline	ns	ns	ns	ns	ns	ns		ns
							2019	17	17																ns
							2020	14	14																ns
							2021	11	11																ns
							2022	18	18																ns
							2023	14	14																-2.1
							2024	13	13																ns
					HAC-U (HAC-R2)[c]	Exposed	2018	13	13	BCD	AB	ABC	BCD	A	D	CD	Baseline	ns	ns	ns	2.0	ns	ns		
							2019	15	15																
							2020	15	15																
							2021	12	12																
							2022	19	19																
							2023	8	8																
							2024	10	10																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non-significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Simpson's Diversity and Diatom richness (Table 6.4). From 2018 to 2024, the periphyton communities at HAC-R1 and HAC-U have been generally similar to each other in terms of these metrics, except for higher density in 2019, lower total taxon richness in 2018 and 2023, higher Simpson's Evenness and Diversity in 2021 and 2022, and lower Diatom richness in 2023 at HAC-U compared to HAC-R1 (Figure 6.3, Table 6.4). The similarity in periphyton communities at the two upper Hazeltine Creek areas (HAC-R1 and HAC-U) for most metrics in 2024 and in prior years, indicates that recovery of the periphyton community in these two areas has been largely similar in progression.

Periphyton densities in upper Hazeltine Creek have been significantly lower than at the reference area (EDC-U) since 2022 and 2023 at HAC-U and HAC-R1, respectively. Prior to this, densities at HAC-R1 and HAC-U were similar to the reference area (Figure 6.3, Table 6.4; Appendix Tables D.3.1 and D.3.2). The significantly lower periphyton densities at HAC-R1 (in 2023 to 2024) and HAC-U (in 2022 to 2024) compared to the reference area were due to a significant increase in the densities at the reference area (EDC-U) in 2022 to 2024 compared to 2019 to 2021, rather than a decrease in densities at the upper Hazeltine Creek areas (Figure 6.3, Table 6.4). Periphyton densities at both HAC-R1 and HAC-U in 2024 were similar to all prior years within each area. Densities at HAC-R1 have varied temporally, with the highest densities occurring in 2022 and 2023 and the lowest occurring in 2019 and 2021. Densities at HAC-U were largely temporally stable, with the only temporal change over this period being densities in 2023 that were significantly higher than those in 2019 to 2021 (Figure 6.3, Table 6.4).

Total taxon richness at both exposed areas (HAC-R1 and HAC-U) has been similar to or significantly higher than at the reference area (EDC-U) in most years, except for 2021 at HAC-R1 and 2018 and 2021 at HAC-U (Figure 6.3, Table 6.4). However, total taxon richness at each of the exposed areas has shown limited temporal variability, with total taxon richness within HAC-R1 and HAC-U in 2024 similar to all prior years (2018 to 2023) except for being significantly lower than in 2019 (HAC-R1 and HAC-U) and 2022 (HAC-U; Figure 6.3, Table 6.4; Appendix Tables D.3.3 and D.3.4). Diatom richness at both exposed areas was similar to or higher than reference in all years (2018 to 2024; Figure 6.3, Table 6.4). At HAC-R1, Diatom richness was similar in 2024 to all prior years (2018 to 2023), with the only temporal change over this period being significantly lower Diatom richness in 2021 compared to 2019 and 2022. At HAC-U, Diatom richness was stable from 2018 to 2021, increased significantly between 2021 and 2022, then decreased significantly in 2023. Diatom richness at HAC-U in 2024 was similar to most prior years except for being significantly lower than in 2019 and 2022 (Figure 6.3, Table 6.4; Appendix Tables D.3.1 and D.3.2). Despite the observed temporal variability in Diatom richness at HAC-U, Diatom richness at this area remained similar to or significantly higher than at the reference area in all years (as outlined above). Total taxon richness of the periphyton community is generally

used as a relative measure for assessment of stream health in that differences in the number of taxa are interpreted as improvement (increasing taxon richness) or degradation (decreasing taxon richness; Amblard et al. 1990). Similar to taxon richness, Diatom richness is used as a metric for determining relative stream health (Barbour et al. 1999). The similar or significantly higher total taxon richness and Diatom richness at both exposed areas compared to the reference area in most years (2018 to 2024), indicated that the periphyton communities at the exposed areas recovered to reference conditions following channel remediation works in these areas, and that periphyton community health has been sustained since then.

Temporal comparisons indicated that mean Simpson's Diversity and Evenness at both exposed areas was similar to or significantly higher than at the reference area from 2018 to 2024 except for significantly lower Simpson's Diversity and Evenness at HAC-R1 in 2021 and 2022, respectively (Figure 6.3, Table 6.4). At HAC-R1 in 2024, Simpson's Diversity was significantly lower than in 2018 to 2020, and Simpson's Evenness was significantly lower than 2018, but both endpoints were similar to all remaining prior years. At HAC-U Simpson's Diversity and Evenness in 2024 were similar to most prior years but significantly lower than 2020 and 2021 (for Diversity and Evenness) and 2022 (for Diversity only; Figure 6.3, Table 6.4). The consistently similar or higher Simpson's Diversity and Evenness at both exposed areas compared to the reference area from 2018 to 2024 (with one exception each) further indicate recovery of the periphyton communities at the exposed areas to reference conditions following remediation works, and sustained periphyton community health since then.

In 2024, periphyton communities of upper Hazeltine Creek and the reference area were dominated by Cyanobacteria (blue-green algae; Figure 6.4). The remainder of the periphyton community at HAC-R1 and HAC-U in 2024 was primarily composed of Phaeophytes (brown algae), Diatoms, and Chlorophytes (green algae; Figure 6.4). The periphyton communities at HAC-R1 and HAC-U in 2024 had significantly higher relative densities (%) of Phaeophytes than at the reference area (EDC-U; Appendix Figure F.2.1, Appendix Tables D.3.1, D.3.2, and F.2.1). Rhodophytes (red algae) were not observed at either exposed area in 2024 (and all previous monitoring years) despite being present at the reference area (EDC-U). The relative densities (%) of all remaining taxa were similar between the exposed areas and the reference area in 2024. The periphyton communities of HAC-R1 and HAC-U in 2024 were similar to each other in terms of the relative densities of all dominant taxa (Appendix Figure F.2.1, Appendix Table F.2.1).

Temporal evaluation of periphyton community composition has demonstrated that Phaeophytes (%), Diatoms (%), and Chlorophytes (%) at HAC-R1 and HAC-U have been similar to or significantly higher than EDC-U from 2018 to 2024. In contrast, the relative densities of

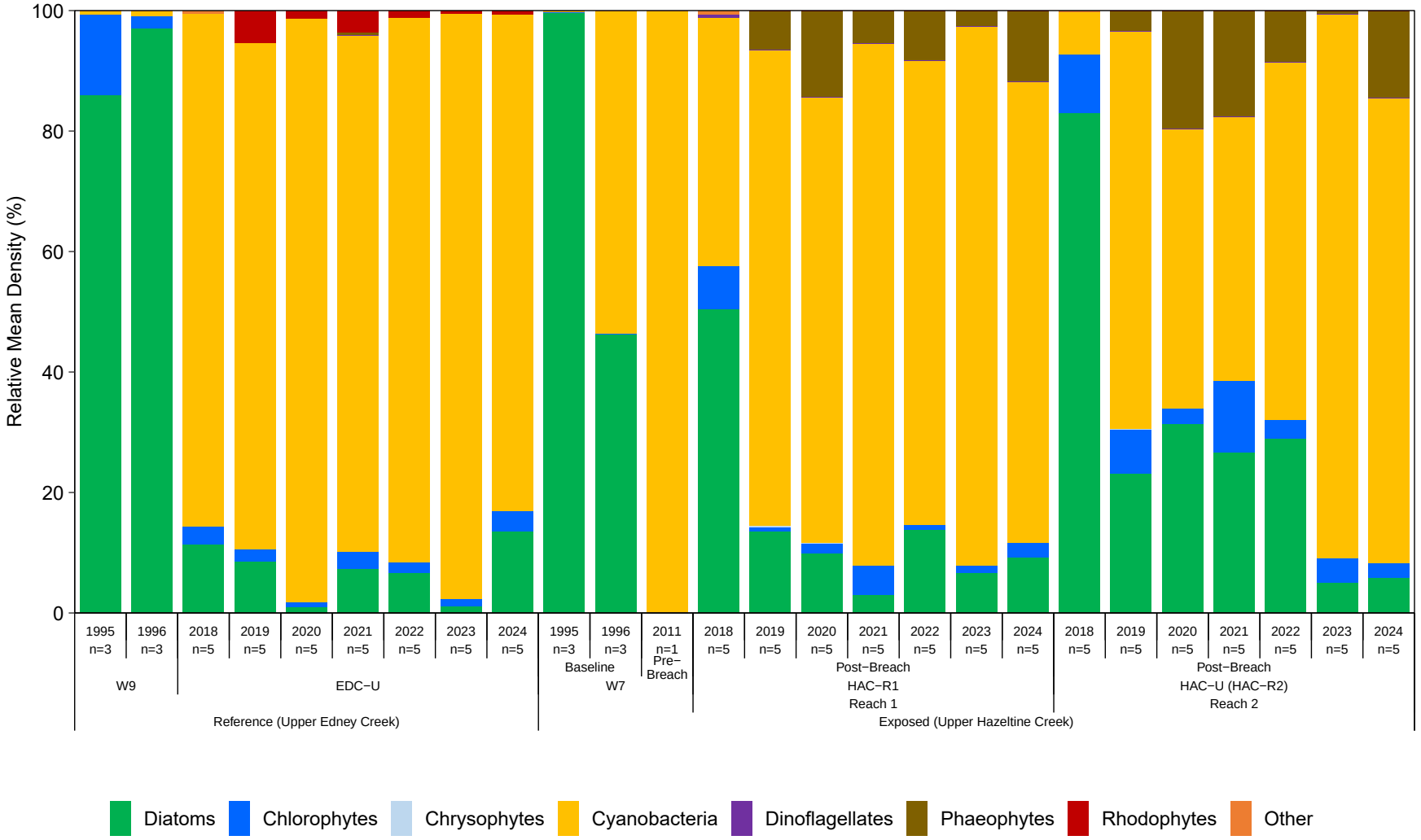

Figure 6.4: Relative Mean Densities of Major Periphyton Taxa for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. In 2018 and earlier, Chrysophytes, Phaeophytes, and Rhodophytes are grouped into the 'Other' category. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic idenification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details.

Cyanobacteria (%) at HAC-R1 and HAC-U in most (at HAC-R1) or all (at HAC-U) years from 2018 to 2022 were significantly lower than reference, and similar to reference in 2023 to 2024 (Appendix Figure F.2.1, Appendix Table F.2.1). For the two most dominant taxa (Cyanobacteria and Diatoms), the similar or significantly lower Cyanobacteria (%) and similar or significantly higher Diatoms (%) at HAC-R1 and HAC-U for most years, relative to reference, were indicative of healthy periphyton communities (Pandey et al. 2018; Xue et al. 2019).

Within HAC-R1, Cyanobacteria (%) and Diatoms (%) in 2024 were similar to those in 2019 to 2023, and these metrics have been stable since 2022 or earlier (Appendix Figure F.2.1, Appendix Table F.2.1). At HAC-U in 2024, Cyanobacteria (%) were significantly higher than 2018 but similar to all remaining prior years, while Diatoms (%) were similar to 2019 and 2023 but significantly lower than all remaining prior years (Appendix Figure F.2.1, Appendix Table F.2.1). The decrease in the relative densities (%) of Diatoms at HAC-U in 2023 and 2024 relative to most prior years was consistent with the temporal pattern observed for Diatom richness at this area (Figure 6.3, Table 6.4). Evaluation of densities of the dominant taxa indicated that the significantly lower total density at HAC-R1 and HAC-U compared to the reference in 2024 was driven primarily by significantly lower Cyanobacteria density at both exposed areas relative to reference, and to a lesser extent by significantly lower Diatom and Rhodophyte densities compared to reference (Appendix Figures F.2.1 and F.2.2, Appendix Table F.2.1). The consistently similar or lower Cyanobacteria (%), and the similar or higher Diatoms (%) in all years, compared to reference, are indicative of relatively stable and healthy periphyton communities at the upper Hazeltine Creek areas.

Overall, the periphyton community of upper Hazeltine Creek (HAC-R1 and HAC-U) had taxon richness, Diatom richness, and Simpson's Diversity and Evenness that were similar to the reference area in 2024 and were similar to or higher than reference conditions in most years since 2018. Periphyton densities at the exposed areas have been lower than reference since 2022 and 2023 at HAC-U and HAC-R1, respectively, due to a significant increase in density at the reference area. Densities at the exposed areas have remained relatively stable since 2018, and in 2024 were similar to all prior years. In 2024, the periphyton community composition at the exposed areas (HAC-R1 and HAC-U) differed from the reference area based on Phaeophytes (%) and Rhodophytes (%) but was similar to the reference area in terms of the relative densities (%) of all other taxa. In all years, the relative densities (%) of Diatoms at the exposed areas have been similar to or higher than reference, while Cyanobacteria (%) have been similar to or lower than reference; community composition characteristics that were indicative of healthy periphyton communities. Collectively, the results indicated that except for density, the periphyton communities at the exposed areas have recovered to reference conditions following channel remediation works in these areas (or to conditions that are indicative of healthy periphyton

communities) and periphyton community health has been maintained since then. The similarity between the periphyton community between the two exposed areas indicated that recovery of the periphyton community in the two areas of upper Hazeltine Creek has been largely similar in progression.

6.1.2.2.2 Productivity

In 2024, mean periphyton chlorophyll-a concentrations (mg/m²) in upper Hazeltine Creek (HAC-R1, HAC-U and HAC-R3) and in the Frypan Creek (FPC-R3) and Edney Creek (EDC-U) reference areas were below the BCWQG of 100 mg/m² (BCMOWLRS 2025) but above the threshold indicative of moderately enriched streams at HAC-R1 and FPC-R3 (21 mg/m²; Biggs 1996; Figure 6.5; Appendix Tables D.3.1 and D.3.2). Periphyton chlorophyll-a concentrations in upper Hazeltine Creek areas in 2024 were similar to both reference areas with two exceptions: HAC-R1 had significantly higher results than EDC-U, and HAC-R3 had significantly lower results than FPC-R3 (Figure 6.5; Appendix Table F.2.2). The higher chlorophyll-a at HAC-R1 in 2024 compared to the Edney Creek reference area (EDC-U) may be related, at least in part, to elevated water temperatures and increased exposure to sunlight due to the lack of canopy cover in upper Hazeltine Creek (Table 6.3; Schnurr and Allen 2015).

In 2024, HAC-R1 had significantly higher chlorophyll-a concentrations than both downstream areas (HAC-U and HAC-R3). This was consistent with results observed since 2020, except for in 2021 and 2023 when HAC-U had chlorophyll-a concentrations that were similar to HAC-R1. Similarly, HAC-U has also consistently had higher chlorophyll-a concentrations than the downstream area (HAC-R3) since 2020, except for 2024 (Figure 6.5; Appendix Table F.2.2). The decreasing periphyton chlorophyll-a concentrations with increasing distance downstream in upper Hazeltine Creek is likely primarily influenced by the different completion dates for the remediation works in these areas (i.e., 2016, 2017, and 2019 at HAC-R1, HAC-U, and HAC-R3, respectively; Table 4.2), but may also be influenced by proximity to Polley Lake. Additionally, HAC-R3 has a higher proportion of riffle habitat (i.e., a higher proportion of habitat with higher water velocity; Minnow 2022b) than HAC-R1 and HAC-R2; therefore, habitat differences among the areas may also have influenced the chlorophyll-a concentrations (due to differences in water temperature, depth, and velocity).

From 2019 to 2024, chlorophyll-a concentrations at HAC-R1 were significantly higher than EDC-U, except in 2022 when the concentrations similar between the two areas. In contrast chlorophyll-a concentrations at HAC-R1 were similar to FPC-R3 in all years (i.e., 2017 to 2024), except 2020, when the results at HAC-R1 were significantly higher (Figure 6.5; Appendix Table F.2.2). At HAC-U, chlorophyll-a concentrations were similar to both reference areas from 2018 to 2024, except for being significantly higher than EDC-U in 2021

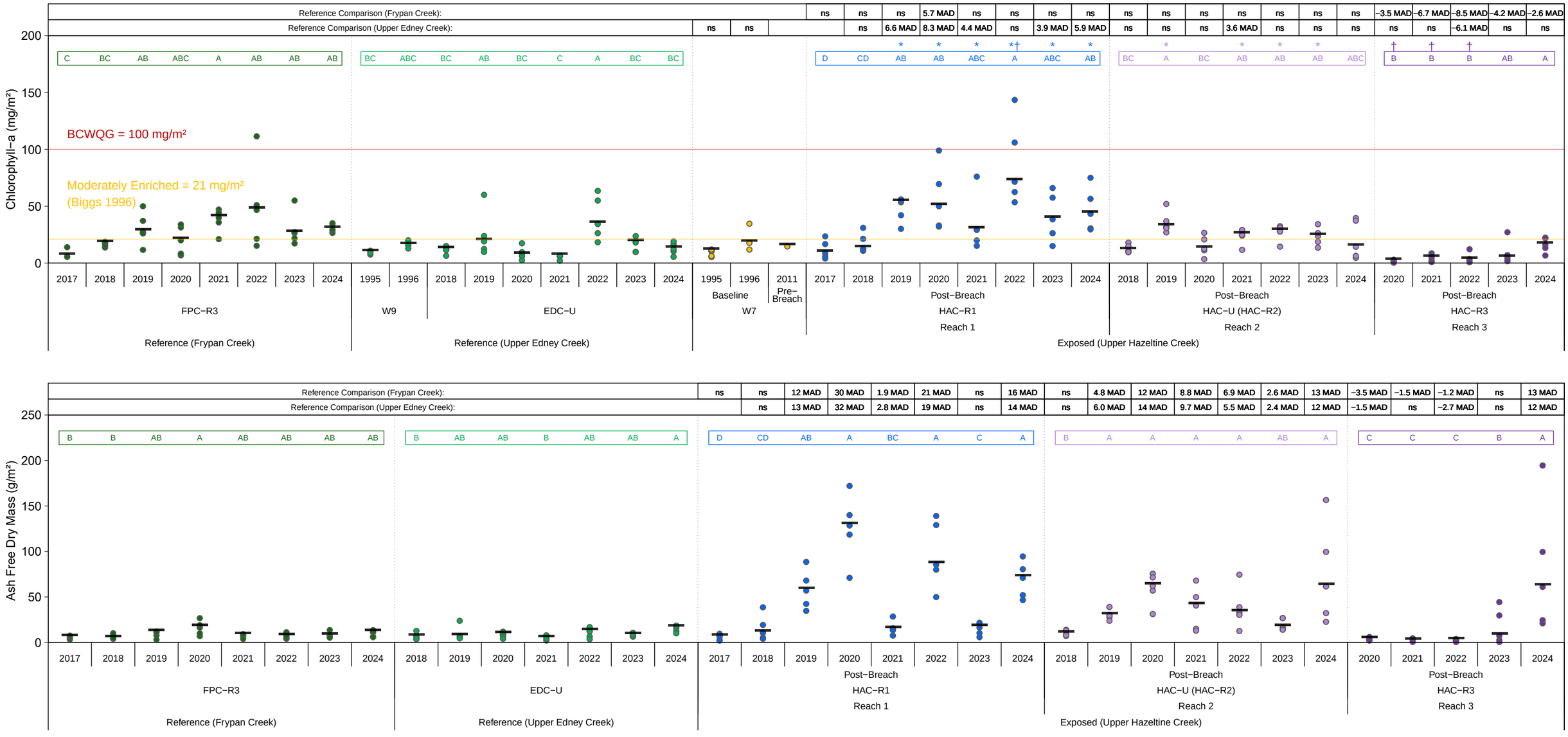

Figure 6.5: Periphyton Productivity Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1, HAC−U, and HAC−R3 (2017 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Coloured letters represent significant (p−value <0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. For statistical contrasts of chlorophyll−a in post−breach years compared to baseline and pre−breach years, an * indicates significant differences to W7 in 1995, a † indicates significant differences to W7 in 1996, and a ‡ indicates significant differences to W7 in 2011. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank-transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast.

(when chlorophyll-a concentrations at EDC-U were lowest). Chlorophyll-a concentrations at HAC-R3 were significantly lower than FPC-R3 from 2020 to 2024 and lower than EDC-U in 2022 but were otherwise similar to both reference areas in all other monitoring years (Figure 6.5; Appendix Table F.2.2). Periphyton chlorophyll-a concentrations in upper Hazeltine Creek (particularly at HAC-R1) have generally followed similar relative temporal patterns as the reference areas (Figure 6.5), suggesting that temporal changes may be related to natural variability in physical and chemical factors (e.g., light exposure, water temperature, nutrient availability). Chlorophyll-a concentrations at all three areas in upper Hazeltine Creek (i.e., HAC-R1, HAC-U, and HAC-R3) in 2024 were similar to baseline (1995 and 1996) and pre-breach (2011) results, except for results at HAC-R1 in 2024, which was significantly higher than in 1995 (Figure 6.5; Appendix Table F.2.2). This indicated that periphyton productivity (in terms of chlorophyll-a concentrations) in upper Hazeltine Creek has recovered to conditions similar to, but generally not higher than, pre-breach conditions.

Periphyton productivity measured as AFDM in 2024 in each of the three upper Hazeltine Creek areas was significantly higher than both reference areas (FPC-R3 and EDC-U), which was dissimilar to the chlorophyll-a results (except HAC-R1 compared to EDC-U; Figure 6.5; Appendix Tables D.3.1, D.3.2, and F.2.2). Mean AFDM at HAC-R1 has been similar to or significantly higher than both reference areas in all years (2018 to 2024), while AFDM at HAC-U has been consistently higher than both reference areas since 2018. At HAC-R3, AFDM was similar to or significantly lower than both reference areas until 2024 (when AFDM at HAC-R3 was significantly higher than reference; Figure 6.5; Appendix Table F.2.2).

In 2024, AFDM at HAC-R1 was similar to 2019 to 2020 and 2022 but overall has shown temporal variability since 2017, while AFDM at HAC-U has been temporally stable from 2019 onward. At HAC-R3, AFDM significantly increased year-over-year in 2023 and 2024 after remaining unchanged from 2020 to 2022 (Figure 6.5; Appendix Table F.2.2). The significantly higher periphyton AFDM in upper Hazeltine Creek, compared to reference, in most years may be related to the elevated water temperature and increased exposure to sunlight from lack of canopy cover in these exposed areas (Table 6.3; Schnurr and Allen 2015). In 2024, periphyton AFDM within upper Hazeltine Creek (i.e., HAC-R1, HAC-U and HAC-R3) was similar among areas, which differed from the periphyton chlorophyll-a results for these areas that showed a spatial gradient (i.e., chlorophyll-a concentrations decreased significantly with increasing distance downstream; Appendix Table F.2.2).

In situ measures of dissolved oxygen recorded in upper Hazeltine Creek in 2024 during periphyton sampling were consistently higher than the acute and chronic BCWQG (Appendix Tables D.1.2 to D.1.5) indicating no potential adverse effects to aquatic life from dissolved oxygen depletion

related to periphyton growth at these exposed areas. *In situ* dissolved oxygen concentrations were below the chronic BCWQG at the Edney Creek reference area (EDC-U), which was likely related to the absence of flow at this area (Table 6.3; Appendix Table A.2.3). Metrics of periphyton biomass (i.e., AFDM) in upper Hazeltine Creek were either similar to or higher than at the reference areas (Frypan Creek and Edney Creek), indicating that the availability of nutrition for grazers (benthic invertebrates and fish) was higher in these exposed areas when compared reference conditions. No baseline or pre-breach results exist for AFDM in Hazeltine Creek (Figure 6.5; Appendix Table F.2.2).

Overall, monitoring indicated that periphyton chlorophyll-a concentrations in the remediated (exposed) areas upper Hazeltine Creek in 2024 were similar to reference and baseline/pre-breach conditions with few exceptions and remained well below the BCWQG. Periphyton chlorophyll-a concentrations in upper Hazeltine Creek decreased with increasing distance downstream and this spatial gradient was likely primarily related to the amount of time since completion of remediation in these areas. Periphyton productivity as measured by AFDM in 2024 was higher in upper Hazeltine Creek than reference conditions, which was the first time this occurred at HAC-R3. The greater periphyton productivity in upper Hazeltine Creek (as measured by AFDM and chlorophyll-a at HAC-R1 and AFDM at HAC-U) in most years from 2018 to 2024, relative to one or both references, was likely related in part to greater exposure to sunlight due to the absence of canopy cover at these exposed areas. The lack of cover in the exposed areas also drives higher water temperatures, which although mitigated to some extent by supplemental pumping from below the thermocline in Polley Lake (see Section 6.1.2), could contribute to higher productivity. Overall, periphyton productivity in upper Hazeltine Creek increased following remediation efforts and has largely remained greater than or similar to the reference area and baseline/pre-breach productivity levels. *In situ* measures of dissolved oxygen in upper Hazeltine Creek in 2024 were consistently higher than BCWQG indicating no potential adverse effects to aquatic life from dissolved oxygen depletion related to periphyton growth.

6.1.2.3 Lower Hazeltine Creek

Periphyton community and productivity monitoring was conducted at a remediated (exposed) area of lower Hazeltine Creek (HAC-D) in 2023, with an unimpacted area of lower Edney Creek (EDC-D) serving as reference (Minnow 2024a). The results of this monitoring are summarized briefly herein with detailed methods and results presented in Minnow (2024a).

6.1.2.3.1 Community

In 2023, the periphyton community at the exposed area in lower Hazeltine Creek (HAC-D) had significantly higher density, and similar total taxon richness, Diatom richness, and Simpson's

Diversity and Evenness compared to the reference area in lower Edney Creek (EDC-D). Density was higher than in previous years at both the exposed and reference areas. Total taxon and Diatom richness at the exposed area also increased in 2023 compared to 2021, increasing from significantly lower than reference in 2021 to similar to reference in 2023 for both endpoints. Simpson's Evenness and Diversity remained similar compared to reference over sampling years (2019, 2021, and 2023). Overall, the similarity or improvement over time of the periphyton community metrics, relative to the reference area, indicated recovery of the lower Hazeltine Creek periphyton community following completion of final remediation works in the lower Hazeltine Creek area in 2021.

The community composition (%) of lower Hazeltine Creek was dominated by Cyanobacteria, with smaller contributions of Diatoms, Chlorophytes and Phaeophytes, and had lower relative densities (%) of Diatoms and Chlorophytes but higher relative densities (%) of Cyanobacteria than at the reference area. Chlorophytes have been consistently lower in lower Hazeltine Creek compared to the reference are, but Diatoms and Cyanobacteria have displayed temporal variation likely related to natural variation in physical and chemical factors (e.g., light exposure, water temperature and flow, nutrient availability).

Increased density, total taxon richness, and Diatom richness between 2021 and 2023 in lower Hazeltine Creek, and the similarity in taxon richness, Diatom richness, and Simpson's Diversity and Evenness compared to the reference area in 2023, indicated substantial recovery of the periphyton community following the remediation works in lower Hazeltine Creek in 2021. Remaining differences in community composition at HAC-D compared to reference (i.e., higher Cyanobacteria [%] and lower Diatoms and Chlorophytes [%]) suggested that complete recovery of community composition was ongoing.

6.1.2.3.2 Productivity

Mean periphyton chlorophyll-a concentrations (mg/m²) in lower Hazeltine Creek in 2023 were well below the BCWQG of 100 mg/m² (BCMOWLRS 2025) and below the threshold indicative of moderately enriched streams (21 mg/m²; Biggs 1996). Periphyton productivity (both chlorophyll-a and AFDM) in lower Hazeltine Creek was higher in 2023 relative to 2017. Chlorophyll-a concentrations at HAC-D in 2023 remained lower than reference conditions but were more similar to the reference area than in prior years (although not significantly so). The AFDM at HAC-D increased between 2021 and 2023 and was similar to reference in both years. The greater similarity of lower Hazeltine chlorophyll-a concentrations to reference in 2023 (although not significant), along with AFDM at HAC-D in 2023 that was similar to reference, were evidence of ongoing periphyton productivity recovery in lower Hazeltine Creek (i.e., becoming more similar to reference) following remediation works in 2021.

6.1.3 Benthic Invertebrate Community and Productivity

Benthic invertebrate community and productivity monitoring was completed annually between 2022 and 2024, with monitoring in each year including three remediated (exposed) areas of upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3) with areas of Frypan Creek (FPC-R3) and upper Edney Creek (EDC-U)[66] serving as reference (Figures 4.2 and 4.3, Table 4.3).[67] Prior benthic invertebrate community and productivity monitoring within the 2022 to 2024 period included monitoring completed in 2023 at one remediated (exposed) area of lower Hazeltine Creek (HAC-D [HAC-R5]) and one remediated (exposed) area of lower Edney Creek (E1 [EDC-EXP]), with an unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as a reference area for both of the exposed lower creek areas (Figure 4.2, Table 4.3). The benthic invertebrate community and productivity monitoring frequency at these lower creek areas (i.e., HAC-D [HAC-R5], E1 [EDC-EXP], and EDC-D [EDC-REF) is biennial (Table 4.3; MPMC 2019).

As detailed in Section 4.3, the sole purpose of the annual benthic invertebrate community and productivity monitoring at areas HAC-R3 and FPC-R3 is to support the evaluation of fish habitat in upper Hazeltine Creek as part of HRWG monitoring objectives (e.g., Minnow 2025). Previous CEMP Sediment and Aquatic Life reports (e.g., Minnow 2024a) have presented benthic invertebrate community and productivity data from HAC-R3 and FPC-R3 in tabular form only, but the benthic invertebrate community and productivity results from these two areas have been incorporated in the present report throughout all data tabulation, analyses, and interpretation with the objective of improving reporting clarity and efficiency with the HRWG report (see Section 4.3).

A review of the 2024 benthic invertebrate community results (Appendix B) indicated these data were of acceptable quality and can be used with a high degree of confidence (see Section 5.1.5 for details). A review of 2024 supporting water quality results indicated these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

6.1.3.1 Area Characteristics

During sampling in upper Hazeltine Creek and the associated reference areas (i.e., Frypan Creek and Edney Creek), an attempt was made to match sampling habitats both between the paired exposed and reference sampling areas and year-to-year as closely as possible (as outlined in Section 4.2.1). The similarities and differences in habitat between the paired exposed and

[66] Upper Edney Creek (EDC-U; reference) was not sampled in 2020 due to habitat differences relative to upper Hazeltine Creek (Minnow 2021a). As such, temporal data comparisons to reference results exclude 2020.

[67] For HRWG reporting, HAC-R2, HAC-R5, EDC-EXP, and EDC-REF are the alternate names used for the HAC-U, HAC-D, E1, and EDC-D sampling areas. The original area names only (i.e., HAC-U, HAC-D, E1, and EDC-D) are used throughout the remainder of this report section (Section 6.1.3).

reference areas in 2024 and among years are detailed in Section 6.1.2.1 (Table 6.5; Appendix Tables A.2.2 to A.2.5), with canopy coverage in 2024 remaining a key difference between the remediated areas of Hazeltine Creek (0% canopy coverage at all areas) and the reference areas (40% and 35% canopy coverage at FPC-R3 and EDC-U, respectively; Table 6.5; Appendix Table A.2.2).

Evaluation of water quality collected routinely in upper Hazeltine Creek (at HAC-13, HAC-05a, and HAC-14; Figure 4.2) indicated that analyte concentrations were below the chronic BCWQGs except for dissolved copper and total selenium (Appendix Figures D.1.1 to D.1.3, Appendix Tables D.1.3 and D.1.5) in the year preceding sampling (i.e., September 2023 to August 2024). Dissolved copper concentrations at HAC-13 (near HAC-R1), HAC-05a (near HAC-U), and HAC-14 (near HAC-R3) exceeded the chronic BCWQG in 92%, 75%, and 100% of samples, respectively, with 8.3% of samples at HAC-13 that also exceeded the acute BCWQG. Total selenium concentrations at HAC-13, HAC-05a, and HAC-14 exceeded the chronic BCWQG in 8.3%, 33%, and 15% of samples, respectively (Appendix Figures D.1.1 to D.1.3, Appendix Tables D.1.3 and D.1.5). Temporal analysis of routine water quality data from HAC-13, HAC-05a, and HAC-14 from 2015 to 2024 indicated that concentrations of total vanadium at HAC-13 and dissolved vanadium at all three stations (HAC-13, HAC-05a, and HAC-14) have increased since 2015, and all remaining analyte concentrations were either unchanged or decreased significantly over this period (Appendix Figures D.1.1 to D.1.3, Appendix Table D.1.9). Water quality is not routinely monitored at the Frypan Creek (FPC-R3) nor the upper Edney Creek (EDC-U) reference areas, but the spot (single) water quality samples collected with biological monitoring (in August 2024) demonstrated analyte concentrations that were below the BCWQG (Appendix Table D.1.2). *In situ* dissolved oxygen measured at EDC-U (3.77 mg/L) was below the chronic BCWQG (Appendix Table D.1.2), which was likely related to the absence of water flow at this area (Table 6.5; Appendix A.2.3).

6.1.3.2 Upper Hazeltine Creek

6.1.3.2.1 Community

The benthic invertebrate communities at exposed areas of upper Hazeltine Creek (HAC-R1, HAC-U, HAC-R3) in 2024 were similar to both reference areas (FPC-R3 and EDC-U) in terms of density, taxon richness, and Simpson's Evenness and Diversity, with one exception. The exception was that Simpson's Evenness and Diversity at HAC-R1 were significantly higher than FPC-R3 (but similar to EDC-U; Figure 6.6, Table 6.6; Appendix Tables D.4.1 and D.4.2). Density and taxon richness at the upper Hazeltine Creek areas in 2024 were significantly lower compared to pre-breach conditions except for density at HAC-U in 2024 (similar to pre-breach). Conversely, Simpson's Evenness and Diversity at the upper Hazeltine Creek areas in 2024 were

Table 6.5: Physical and Chemical Characteristics for Benthic Invertebrate Community Sampling at the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Habitat Variables	Units	Reference													
		Frypan Creek (FPC-R3)							Upper Edney Creek (EDC-U)						
		2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Mean Water Depth	cm	5.1	11.3	14.2	5.8	6.5	4.3	4.9	19.3	19.4	-	10.3	12.0	8.3	9.5
Mean Water Velocity	m/s	0.050	0.100	0.146	0.054	0.229	0.278	0.160	0.002	0.472	-	0	0.339	0	0
Median Substrate Size[a]	cm	2.7	4.4	5.1	4.4	5.5	4.9	4.4	4.7	4.2	-	5.5	5.7	5.0	5.8
Dominant Substrate Type	-	Gravel	Cobble	Cobble	Cobble	Cobble	Gravel	Gravel	Gravel	Cobble	Cobble	Cobble	Gravel	Gravel	Gravel
Canopy Cover[b]	%	100	-	80	100	80	80	40	60	70	70	85	80	80	35
Water Quality[c]															
Dissolved Oxygen	%	82.2	70.6	87.1	64.7	79.4	90.2	78.6	81.5	72.2	88.3	59.9	77.3	49.5	34.8
Temperature	°C	10.4	11.4	12.6	14.2	12.0	14.1	13.1	11.5	20.1	15.2	15.7	13.0	14.3	13.9
Specific Conductivity	µS/cm	168.7	146.0	172.0	198.0	161.0	183.0	166.7	118.5	116.0	139.0	141.0	125.4	135.4	150.9
Total Phosphorus	mg/L	0.0387	0.0383	0.0355	0.0452	0.0489	0.0430	0.0548	0.0107	0.0274	0.0160	0.0227	0.0107	0.0076	0.0168
Total Nitrogen	mg/L	0.553	0.495	0.688	0.795	0.809	0.706	0.735	0.460	0.723	0.627	0.540	0.509	0.400	0.593
Dissolved Orthophosphate	mg/L	0.0242	0.0209	0.0209	0.0292	0.0306	0.0209	0.0181	0.0030	<0.0010	0.0038	0.0053	0.0017	<0.0010	<0.0010
Benthic Invertebrate Productivity															
Benthic Organism Density	#/m^2	11,710	7,132	12,978	13,262	19,022	25,909	18,399	6,458	15,432	-	4,529	22,389	10,262	11,243
Mean Biomass	g/m^2 DW	1.53	1.60	2.27	1.22	2.90	4.89	7.30	1.39	1.09	-	0.537	5.09	0.410	2.09

Notes: % = percent. °C = degrees Celsius. µS/cm = microSiemens per centimetre. mg/L = milligrams per litre. DW = dry weight. mg/m^2 = milligrams per square metre. Physical and chemical characteristic data are compiled for years when benthic invertebrate community monitoring was completed (2018 to 2024). *In situ water* quality results are presented for spot (single) water quality samples where routine water quality monitoring data was not available . HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). See Section 4.3 for details.

[a] The displayed median substrate size represents the median (50th percentile) of 100 pebble measures recorded for each sampling area. See Appendix Table A.2.5 for pebble count data.

[b] Canopy cover includes dense and partially open cover.

[c] For the Frypan Creek (FPC-R3) and Edney Creek (EDC-U) reference areas, water quality results represent a single grab water sample collected within a week of biological sampling as routine water quality data is not collected at these areas. For the Hazeltine Creek (HAC-R1, HAC-U, and HAC-R3) routine water quality monitoring areas, water quality results represent the mean of results collected during the year preceding biological sampling (i.e., from September to August). See Appendix Tables D.1.3 to D.1.5 for complete results (September 2023 to August 2024) and the reports listed in Table 4.2 for results from previous years.

Table 6.5: **Physical and Chemical Characteristics for Benthic Invertebrate Community Sampling at the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024**

Habitat Variables	Exposed																		
	Upper Hazeltine Creek Reach 1 (HAC-R1)							Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2])							Upper Hazeltine Creek Reach 3 (HAC-R3)				
	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Mean Water Depth	22.3	20.9	23.7	20.0	28.8	32.5	30.0	19.7	19.6	22.3	19.1	28.9	31.6	30.0	21.2	19.6	23.9	25.7	21.3
Mean Water Velocity	0.159	0.411	0.242	0.183	0.371	0.275	0.203	0.222	0.454	0.459	0.363	0.448	0.330	0.190	0.426	0.372	0.477	0.328	0.180
Median Substrate Size[a]	4.9	5.0	4.5	5.4	5.2	5.6	4.3	5.5	4.8	4.2	4.6	5.5	5.8	4.8	4.3	4.0	4.6	4.1	5.3
Dominant Substrate Type	Gravel	Cobble	Cobble	Cobble	Cobble	Gravel	Cobble	Gravel	Cobble	Cobble	Cobble	Cobble	Gravel	Gravel	Cobble	Cobble	Cobble	Gravel	Cobble
Canopy Cover[b]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Quality[c]																			
Dissolved Oxygen	86.5	89.9	91.8	94.0	90.0	91.0	92.0	91.0	97.0	96.0	100.0	92.0	95.0	96.0	92.9	93.4	92.0	95.0	93.0
Temperature	6.26	8.40	8.04	8.63	7.20	8.10	8.90	5.80	6.80	6.97	8.39	6.70	7.80	7.40	11.7	13.4	12.0	13.0	8.40
Specific Conductivity	333.0	301.0	270.0	261.0	286.0	256.0	281.0	381.0	344.0	293.0	287.0	311.0	292.0	346.0	306.0	284.0	305.0	271.0	333.0
Total Phosphorus	0.0141	0.0147	0.0171	0.0130	0.0120	0.0120	0.0120	0.0158	0.0161	0.0175	0.0129	0.0120	0.0120	0.0120	0.0153	0.0127	0.0200	0.0120	0.0110
Total Nitrogen	0.377	0.320	0.319	0.294	0.300	0.290	0.270	0.521	0.442	0.353	0.315	0.340	0.310	0.290	0.336	0.289	0.300	0.290	0.270
Dissolved Orthophosphate	0.0057	0.0041	0.0030	0.0050	0.0033	0.0032	0.0016	0.0062	0.0046	0.0031	0.0046	0.0036	0.0034	0.0018	0.0027	0.0041	0.0038	0.0026	0.0020
Benthic Invertebrate Productivity																			
Benthic Organism Density	19,750	35,493	36,987	10,103	44,467	20,369	11,614	39,326	47,280	45,996	16,198	33,747	32,453	23,665	14,521	22,411	18,280	13,515	9,869
Mean Biomass	0.804	3.59	3.97	2.86	2.13	2.34	1.84	1.24	5.31	5.33	2.73	4.57	4.32	1.98	0.951	2.64	1.55	3.23	1.14

Notes: % = percent. °C = degrees Celsius. µS/cm = microSiemens per centimetre. mg/L = milligrams per litre. DW = dry weight. mg/m^2 = milligrams per square metre. Physical and chemical characteristic data are compiled for years when benthic invertebrate community monitoring was completed (2018 to 2024). *In situ water* quality results are presented for spot (single) water quality samples where routine water quality monitoring data was not available . HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). See Section 4.3 for details.

[a] The displayed median substrate size represents the median (50^{th} percentile) of 100 pebble measures recorded for each sampling area. See Appendix Table A.2.5 for pebble count data.

[b] Canopy cover includes dense and partially open cover.

[c] For the Frypan Creek (FPC-R3) and Edney Creek (EDC-U) reference areas, water quality results represent a single grab water sample collected within a week of biological sampling as routine water quality data is not collected at these areas. For the Hazeltine Creek (HAC-R1, HAC-U, and HAC-R3) routine water quality monitoring areas, water quality results represent the mean of results collected during the year preceding biological sampling (i.e., from September to August). See Appendix Tables D.1.3 to D.1.5 for complete results (September 2023 to August 2024) and the reports listed in Table 4.2 for results from previous years.

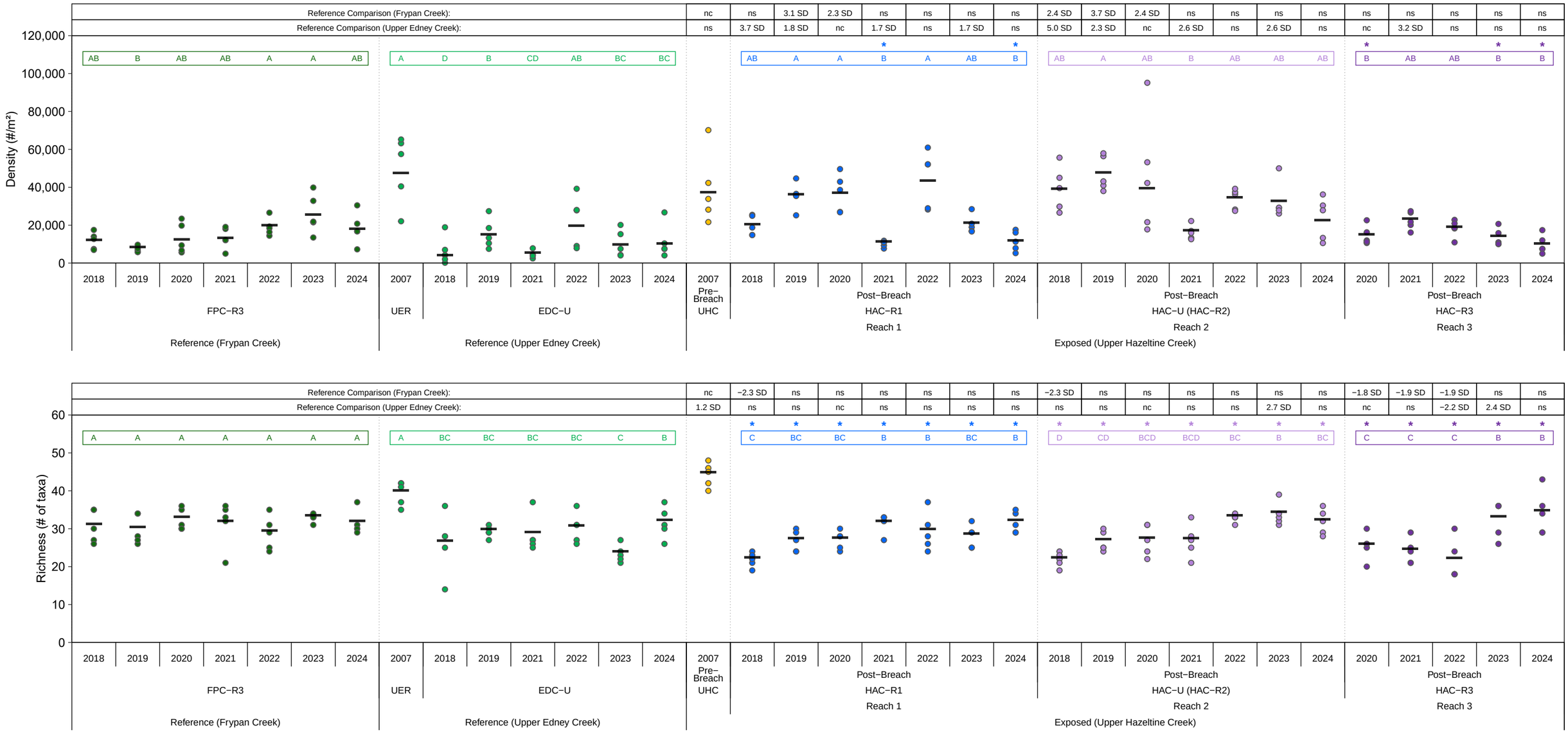

Figure 6.6: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: #/m² = number per square metre. The EDC−U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre-breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference.
A 'nc' indicates no comparisons were possible, and a 'ns' indicates a non−significant contrast.

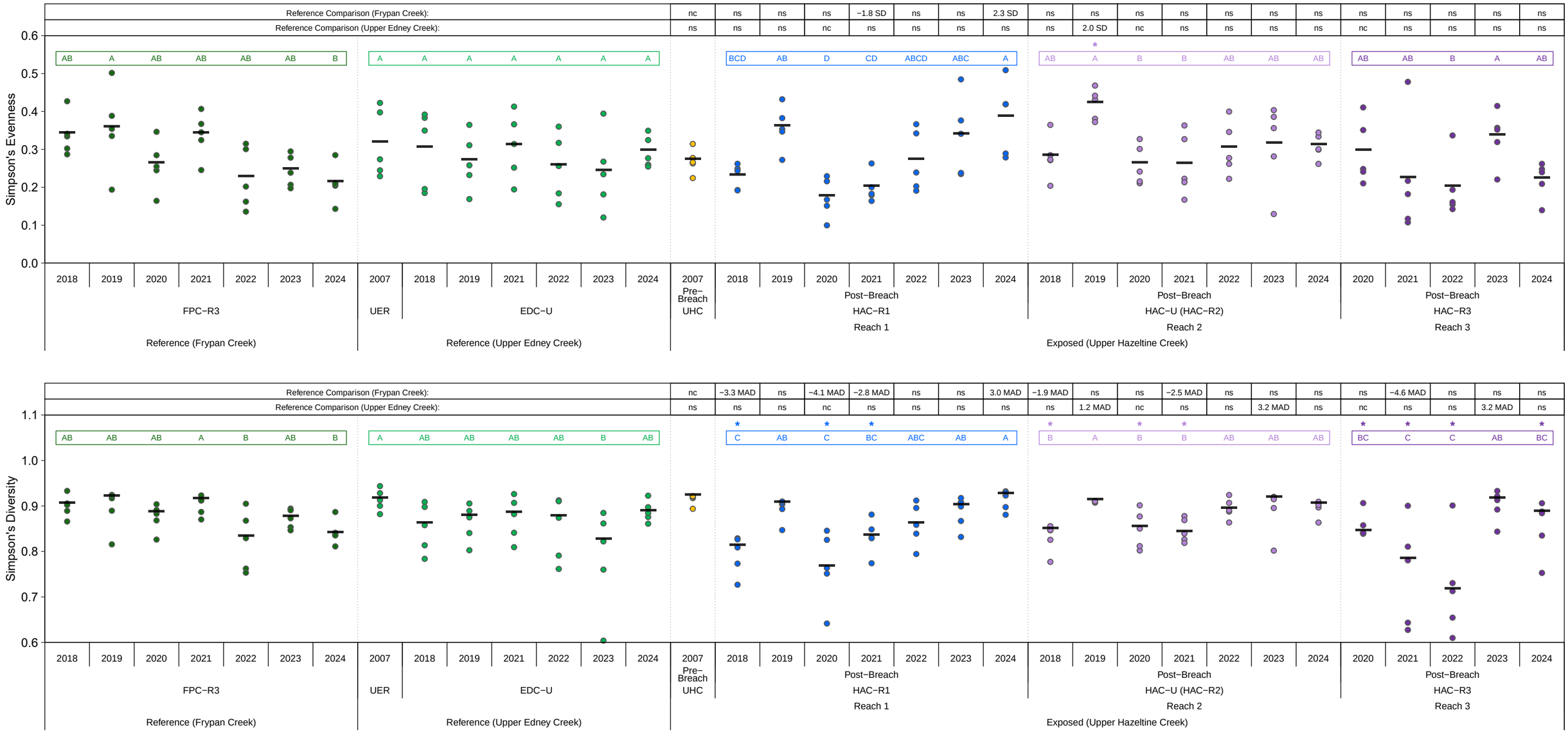

Figure 6.6: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: #/m² = number per square metre. The EDC−U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre-breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference.
A 'nc' indicates no comparisons were possible, and a 'ns' indicates a non−significant contrast.

Table 6.6: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
										Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year						2007 (pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Density (#/m²)	log10	-	-	<0.001	FPC-R3	Reference	2018	11,710	10,989	-	AB	B	AB	AB	A	A	AB	-	Baseline	ns	ns	ns	ns	ns	ns	ns	2.4	nc
							2019	7,132	7,001																	3.1	3.7	nc
							2020	12,978	11,032																	2.3	2.4	ns
							2021	13,262	12,027																	ns	ns	ns
							2022	19,022	18,612																	ns	ns	ns
							2023	25,909	24,198																	ns	ns	ns
							2024	18,399	16,671																	ns	ns	ns
					EDC-U	Reference	2007	49,703	46,264	A	D	B	nc	CD	AB	BC	BC	Baseline	-5.4	-2.3	nc	-4.6	ns	-3.3	-3.1	ns		nc
							2018	6,458	2,889																	3.7	5.0	nc
							2019	15,432	13,953																	1.8	2.3	nc
							2020	-	-																	nc	nc	nc
							2021	4,529	4,220																	1.7	2.6	3.2
							2022	22,389	18,505																	ns	ns	ns
							2023	10,262	8,343																	1.7	2.6	ns
							2024	11,243	9,133																	ns	ns	ns
					HAC-R1	Exposed	2007	39,228	36,099	A	AB	A	A	B	A	AB	B	Baseline	ns	ns	ns	-2.5	ns	ns	-2.4			nc
							2018	19,750	19,199																			nc
							2019	35,493	34,919																			ns
							2020	36,987	35,882																			ns
							2021	10,103	9,988																			-1.8
							2022	44,467	42,290																			ns
							2023	20,369	19,965																			-1.7
							2024	11,614	10,569																			ns
					HAC-U (HAC-R2)[f]	Exposed	2007	39,228	36,099	AB	AB	A	AB	B	AB	AB	AB	Baseline	ns	ns	ns	ns	ns	ns	ns			nc
							2018	39,326	37,938																			nc
							2019	47,280	46,578																			nc
							2020	45,996	38,275																			-2.0
							2021	16,198	15,864																			ns
							2022	33,747	33,383																			ns
							2023	32,453	31,477																			-1.7
							2024	23,665	21,224																			-1.7
					HAC-R3	Exposed	2007	39,228	36,099	A	-	-	B	AB	AB	B	B	Baseline	nc	nc	-1.8	ns	ns	-2.0	-2.7			
							2020	14,521	13,914																			
							2021	22,411	22,002																			
							2022	18,280	17,748																			
							2023	13,515	12,942																			
							2024	9,869	8,976																			

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. SD = Standard Deviation. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1 and HAC-U (HAC-R2) against pre-breach (2007) data from UHC are indicated with an * in Figure 6.6.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table 6.6: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
										Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year						2007 (pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Richness (# of taxa)	none	-	-	<0.001	FPC-R3	Reference	2018	30.6	30.6	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-2.3	-2.3	nc
							2019	29.8	29.8																	ns	ns	nc
							2020	32.4	32.4																	ns	ns	-1.8
							2021	31.4	31.4																	ns	ns	-1.9
							2022	28.8	28.8																	ns	ns	-1.9
							2023	32.8	32.8																	ns	ns	ns
							2024	31.4	31.4																	ns	ns	ns
					EDC-U	Reference	2007	39.4	39.4	A	BC	BC	nc	BC	BC	C	B	Baseline	-3.4	-2.7	nc	-2.9	-2.4	-4.2	-2.0	nm		nc
							2018	26.2	26.2																	ns	ns	nc
							2019	29.2	29.2																	ns	ns	nc
							2020	-	-																	nc	ns	nc
							2021	28.4	28.4																	ns	ns	ns
							2022	30.2	30.2																	ns	ns	-2.2
							2023	23.4	23.4																	ns	2.7	2.4
							2024	31.6	31.6																	ns	ns	ns
					HAC-R1	Exposed	2007	44.2	44.2	A	C	BC	BC	B	B	BC	B	Baseline	-5.8	-4.5	-4.5	-3.3	-3.9	-4.2	-3.3			ns	nc
							2018	21.8	21.8																			ns	nc
							2019	26.8	26.8																			ns	nc
							2020	27.0	27.0																			ns	ns
							2021	31.4	31.4																			ns	-1.9
							2022	29.2	29.2																			ns	-2.0
							2023	28.0	28.0																			ns	ns
							2024	31.6	31.6																			ns	ns
					HAC-U (HAC-R2)[f]	Exposed	2007	44.2	44.2	A	D	CD	BCD	BCD	BC	B	BC	Baseline	-5.8	-4.6	-4.5	-4.5	-3.0	-2.7	-3.2				nc
							2018	21.8	21.8																				nc
							2019	26.6	26.6																				nc
							2020	27.0	27.0																				ns
							2021	26.8	26.8																				ns
							2022	32.8	32.8																				-2.9
							2023	33.8	33.8																				ns
							2024	31.8	31.8																				ns
					HAC-R3	Exposed	2007	44.2	44.2	A	-	-	C	C	C	B	B	Baseline	nc	nc	-4.9	-5.3	-5.9	-3.0	-2.6				
							2020	25.4	25.4																				
							2021	24.0	24.0																				
							2022	21.6	21.6																				
							2023	32.6	32.6																				
							2024	34.2	34.2																				

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. SD = Standard Deviation. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1 and HAC-U (HAC-R2) against pre-breach (2007) data from UHC are indicated with an * in Figure 6.6.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table 6.6: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
										Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year						2007 (pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Simpson's Evenness	none	-	-	<0.001	FPC-R3	Reference	2018	0.338	0.338	-	AB	A	AB	AB	AB	AB	B	-	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	nc
							2019	0.355	0.355																	ns	ns	nc
							2020	0.259	0.259																	ns	ns	ns
							2021	0.338	0.338																	-1.8	ns	ns
							2022	0.223	0.223																	ns	ns	ns
							2023	0.243	0.243																	ns	ns	ns
							2024	0.210	0.210																	2.3	ns	ns
					EDC-U	Reference	2007	0.314	0.314	A	A	A	nc	A	A	A	A	Baseline	ns	ns	nc	ns	ns	ns	ns	ns		nc
							2018	0.301	0.301																	ns	ns	nc
							2019	0.267	0.267																	ns	2.0	nc
							2020	-	-																	nc	nc	nc
							2021	0.308	0.308																	ns	ns	ns
							2022	0.254	0.254																	ns	ns	ns
							2023	0.240	0.240																	ns	ns	ns
							2024	0.293	0.293																	ns	ns	ns
					HAC-R1	Exposed	2007	0.269	0.269	ABCD	BCD	AB	D	CD	ABCD	ABC	A	Baseline	ns	ns	ns	ns	ns	ns	ns		nc	nc
							2018	0.228	0.228																		ns	nc
							2019	0.357	0.357																		ns	nc
							2020	0.173	0.173																		ns	1.6
							2021	0.198	0.198																		ns	ns
							2022	0.268	0.268																		ns	ns
							2023	0.335	0.335																		ns	ns
							2024	0.383	0.383																		ns	-2.1
					HAC-U (HAC-R2)[f]	Exposed	2007	0.269	0.269	B	AB	A	B	B	AB	AB	AB	Baseline	ns	2.0	ns	ns	ns	ns	ns			nc
							2018	0.280	0.280																			nc
							2019	0.419	0.419																			nc
							2020	0.259	0.259																			ns
							2021	0.259	0.259																			ns
							2022	0.301	0.301																			ns
							2023	0.311	0.311																			ns
							2024	0.308	0.308																			ns
					HAC-R3	Exposed	2007	0.269	0.269	AB	-	-	AB	AB	B	A	AB	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	0.292	0.292																			
							2021	0.220	0.220																			
							2022	0.198	0.198																			
							2023	0.333	0.333																			
							2024	0.220	0.220																			

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. SD = Standard Deviation. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1 and HAC-U (HAC-R2) against pre-breach (2007) data from UHC are indicated with an * in Figure 6.6.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table 6.6: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year[a]	Mean	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
										Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year						2007 (pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Simpson's Diversity	rank	-	-	<0.001	FPC-R3	Reference	2018	0.899	0.902	-	AB	AB	AB	A	B	AB	B	-	Baseline	ns	ns	ns	ns	ns	ns	-3.3	-1.9	nc
							2019	0.894	0.917																	ns	ns	nc
							2020	0.874	0.883																	-4.1	ns	ns
							2021	0.901	0.912																	-2.8	-2.5	-4.6
							2022	0.823	0.829																	ns	ns	ns
							2023	0.871	0.873																	ns	ns	ns
							2024	0.842	0.837																	3.0	ns	ns
					EDC-U	Reference	2007	0.913	0.913	A	AB	AB	nc	AB	AB	B	AB	Baseline	ns	ns	nc	ns	ns	-3.2	ns	ns		nc
							2018	0.852	0.858																	ns	ns	nc
							2019	0.863	0.875																	ns	1.2	nc
							2020	-	-																	nc	nc	nc
							2021	0.873	0.882																	ns	ns	ns
							2022	0.850	0.874																	ns	ns	ns
							2023	0.786	0.822																	ns	3.2	3.2
							2024	0.888	0.884																	ns	ns	ns
					HAC-R1	Exposed	2007	0.915	0.920	A	C	AB	C	BC	ABC	AB	A	Baseline	-3.9	ns	-5.4	-3.1	ns	ns	ns			nc
							2018	0.793	0.809																			nc
							2019	0.892	0.904																			nc
							2020	0.766	0.764																			ns
							2021	0.833	0.831																			ns
							2022	0.860	0.858																			ns
							2023	0.885	0.899																			ns
							2024	0.913	0.923																			ns
					HAC-U (HAC-R2)[f]	Exposed	2007	0.915	0.920	A	B	A	B	B	AB	AB	AB	Baseline	-2.6	ns	-2.4	-2.8	ns	ns	ns			nc
							2018	0.830	0.846																			nc
							2019	0.910	0.909																			nc
							2020	0.849	0.850																			ns
							2021	0.846	0.839																			ns
							2022	0.895	0.891																			-6.2
							2023	0.890	0.915																			ns
							2024	0.896	0.902																			ns
					HAC-R3	Exposed	2007	0.915	0.920	A	-	-	BC	C	C	AB	BC	Baseline	nc	nc	-2.7	-4.9	-7.2	ns	-1.2			
							2020	0.857	0.841																			
							2021	0.752	0.780																			
							2022	0.722	0.713																			
							2023	0.901	0.913																			
							2024	0.853	0.884																			

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. SD = Standard Deviation. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. The EDC-U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1 and HAC-U (HAC-R2) against pre-breach (2007) data from UHC are indicated with an * in Figure 6.6.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

similar to pre-breach conditions, except for Simpson's Diversity at HAC-R3 which was significantly lower than pre-breach (Figure 6.6, Table 6.6). These results indicate that the benthic invertebrate community in upper Hazeltine Creek in 2024 was similar to reference conditions in terms of density and taxon richness, and similar to reference and pre-breach conditions in terms of Simpson's Evenness and Diversity (except for Simpson's Diversity at HAC-R3).

Mean benthic invertebrate densities at HAC-R1, HAC-U, and HAC-R3 were either similar to or significantly higher than those at FPC-R3 and EDC-U reference areas from 2018 to 2024 (Figure 6.6, Table 6.6). In addition, mean benthic invertebrate densities at the three upper Hazeltine monitoring areas have been similar to pre-breach densities except for HAC-R1 in 2021 and 2024, and HAC-R3 in 2020, 2023, and 2024, when densities were significantly lower than pre-breach conditions (Figure 6.6, Table 6.6). Lower mean densities at HAC-R1 in 2021 and 2024, relative to pre-breach, were primarily driven by significantly lower Chironomidae and Ephemeroptera densities, respectively, compared to most post-breach years. At HAC-R3, the lower total densities observed compared to pre-breach were the result of a relatively even decrease among several taxa (Appendix Figures F.3.1 and F.3.2, Appendix Table F.3.1). Taxon richness at HAC-R1 and HAC-U was similar to both reference areas from 2019 to 2024, except for richness at HAC-U being significantly higher than EDC-U in 2023; Figure 6.6, Table 6.6). Taxon richness at HAC-R3 in 2023 and 2024 was significantly higher than all prior years and similar to or significantly higher than both reference areas in these two years. In contrast, richness at HAC-R3 from 2020 to 2022 was significantly lower than one or both reference areas in each year (MOD = -2.2 to -1.8 SD; Figure 6.6, Table 6.6). Taxon richness at each of the three upper Hazeltine monitoring areas was significantly lower than pre-breach from 2018 to 2024 (Figure 6.6, Table 6.6). Mean Simpson's Evenness and Diversity at the three upper Hazeltine Creek areas were similar to one or both reference areas from 2018 to 2024 (no data were collected from EDC-U in 2020). Simpson's Evenness at the three exposed areas has been similar or significantly higher than pre-breach conditions over the post-breach period (i.e., 2018 to 2024). Simpson's Diversity was significantly lower than pre-breach conditions in 2018 and 2020 to 2021 at HAC-R1 and HAC-U, and in all years except 2023 at HAC-R3 (Figure 6.6, Table 6.6). Collectively, these results indicated the benthic invertebrate communities of upper Hazeltine Creek have been similar to one or both reference area in terms of all primary metrics (i.e., density, richness, and Simpson's Evenness and Diversity) since 2020 in Reaches 1 and 2 (HAC-R1 and HAC-U), and since 2023 in Reach 3 (HAC-R3). The benthic invertebrate communities of upper Hazeltine Creek in 2024 have recovered to pre-breach conditions in terms of density (at HAC-U), Simpson's Evenness (all three areas), and Simpson's Diversity (HAC-R1 and HAC-U).

The benthic invertebrate communities of the HAC-R1 and HAC-U in 2024 were similar to each other in terms of density, taxon richness, and Simpson's Evenness and Diversity, which was consistent with all prior post-breach years (i.e., 2018 to 2023; Figure 6.6, Table 6.6). The benthic community at HAC-R3 in 2024 had similar taxon richness to both HAC-R1 and HAC-U but had significantly lower density (relative to HAC-U) and Simpson's Evenness and Diversity (relative to HAC-R1) although differences were small (MOD = -2.1 to -1.4 SD; Figure 6.6, Table 6.6). The benthic invertebrate community at HAC-R3 has differed from HAC-R1 and/or HAC-U based on density, taxon richness, and Simpson's Evenness and Diversity for one or more years since 2020 (i.e., the initiation of monitoring at HAC-R3; Figure 6.6, Table 6.6). The similarity in these benthic invertebrate community metrics at the two upper Hazeltine Creek areas (HAC-R1 and HAC-U) in 2024 and prior years indicates that recovery of the benthic invertebrate community in these two areas has been largely similar over the post-breach period. The greater frequency and magnitude of the differences in the benthic invertebrate community of HAC-R3 compared HAC-R1 and HAC-U suggests that the recovery at HAC-R3 has differed from the two upstream areas. This is consistent with the more recent completion of remediation works in Reach 3 of Hazeltine Creek (HAC-R3; 2019) compared to Reaches 1 and 2 (2016 and 2017, respectively; Table 4.3) and with the higher proportion of riffle habitat in Reach 3 compared to Reaches 1 and 2 (Minnow 2022b).

Chironomidae (non-biting midges) was the most abundant taxon present at HAC-R1 and HAC-U (mean = 50.7% and 41.2%) while Elmidae (riffle beetle) was the most abundant taxon present at HAC-R3 (mean = 34.9%) in 2024 (Figure 6.7; Appendix Tables D.4.1 and D.4.2). The remaining benthic community was predominantly comprised of Elmidae and Oligochaeta (aquatic worms) at HAC-R1 (mean = 8.67 and 8.26%, respectively), Elmidae at HAC-U (mean = 25.3%), and Ephemeroptera and Chironomidae at HAC-R3 (mean = 21.6% and 17.5%, respectively; Figure 6.7; Appendix Tables D.4.1 and D.4.2).

Chironomidae (%) at HAC-R1 and HAC-U in 2024 were significantly higher than pre-breach and FPC-R3 but similar to the EDC-U reference area. Conversely, Chironomidae (%) at HAC-R3 in 2024 were similar to pre-breach and FPC-R3 but was significantly lower than the EDC-U reference area (Figure 6.7; Appendix Figure F.3.1, Appendix Table F.3.1). Chironomidae (%) at HAC-R1 and HAC-U were temporally stable from 2022 to 2024 and have been significantly higher than pre-breach conditions since 2022 and 2023 at HAC-R1 and HAC-U, respectively. These results contrasted with those from 2021 when Chironomidae (%) at both exposed areas were similar to pre-breach and significantly lower than one or both reference areas. The significantly higher Chironomidae (%) in 2022 and 2024, compared to 2020 and 2021 at HAC-R1 and 2021 at HAC-U, reflected a return to conditions similar to 2018 (at HAC-R1 and HAC-U) and 2019 (at HAC-U only), when Chironomidae (%) were significantly

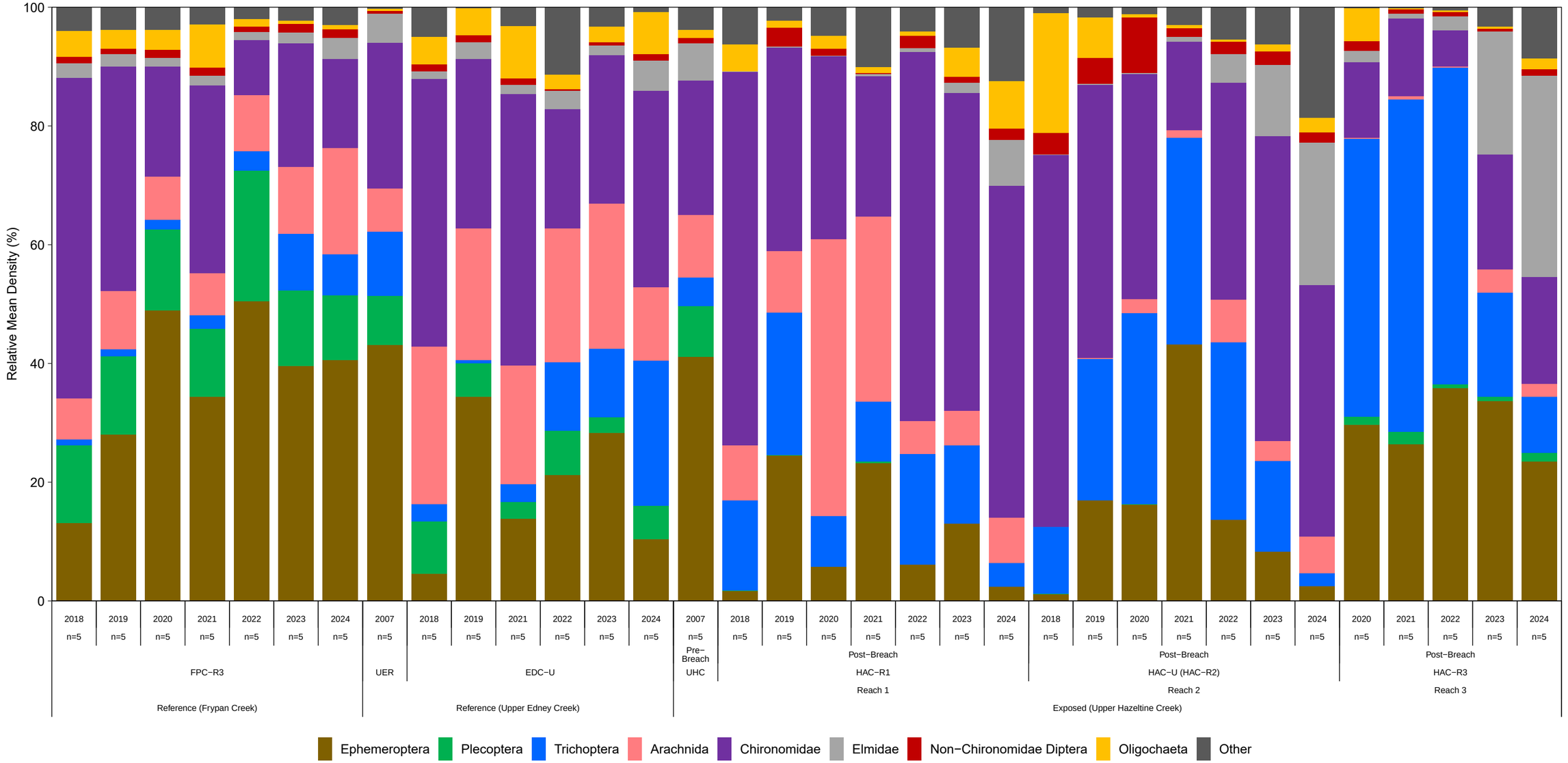

Figure 6.7: Relative Mean Densities of Major Benthic Invertebrate Taxa for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: The sampling area UHC (2007) is the pre−breach equivalent of the post−breach sampling areas HAC−R1, HAC−U (HAC−R2), and HAC−R3 (2018 to 2024). The sampling area UER (2007) is the pre−breach equivalent of the post−breach sampling area EDC−U (2018 to 2024). The EDC−U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting.

higher than pre-breach and similar to or significantly higher than at least one reference (Appendix Figure F.3.1, Appendix Table F.3.1). Chironomidae (%) at HAC-R3 have been similar to pre-breach and similar to or significantly lower than both reference areas since the start of monitoring in 2020. Chironomidae are tolerant of environmental stress (Mandaville 2002) and are generally expected to be present in greater proportion with increasing environmental disturbance (Barbour et al. 1999). The occurrence of Chironomidae (%) at HAC-R1 and HAC-U that were significantly higher than pre-breach conditions and higher than at least one reference area over at least the last two years (i.e., 2023 to 2024) suggests that benthic invertebrate communities at HAC-R1 and HAC-U communities have not yet fully recovered to pre-breach and reference conditions. Comparisons between the upper Hazeltine Creek monitoring areas in 2024 indicated that Chironomidae (%) at HAC-R1 were similar to HAC-U, while Chironomidae (%) at HAC-R3 were significantly lower than both HAC-R1 and HAC-U (Appendix Figure F.3.1, Appendix Table F.3.1). This was consistent with all post-breach years, except for 2022 when Chironomidae (%) at HAC-R1 were significantly higher than at HAC-U, and 2021 when HAC-R3 was similar to both HAC-R1 and HAC-U (Appendix Table F.3.1).

Elmidae (%) at the three upper Hazeltine Creek areas in 2024 were similar to pre-breach, which marked the first year that Elmidae (%) at HAC-R1 were similar to pre-breach. Elmidae (%) at HAC-R1 in 2024 were also similar to both reference areas, while Elmidae (%) at HAC-U and HAC-R3 were similar to the EDC-U area but significantly higher than the FPC-R3 area (Figure 6.7; Appendix Figure F.3.1, Appendix Table F.3.1). Elmidae (%) at the three upper Hazeltine Creek monitoring areas have been similar to pre-breach since 2024 at HAC-R1, since 2022 at HAC-U, and since 2023 at HAC-R3. The similarity to pre-breach conditions in these years at the exposed areas corresponded with Elmidae (%) that were significantly higher than all prior years at each of the three exposed areas; years in which Elmidae (%) were significantly lower than pre-breach conditions. Elmidae (%) at the exposed areas were also similar to or significantly higher than one or both reference areas since 2020 at HAC-U and HAC-R3, and since 2023 at HAC-R1, which differed from most prior years when Elmidae (%) were significantly lower than one or both reference areas (Appendix Figure F.3.1, Appendix Table F.3.1). Elmidae are relatively intolerant of environmental stress (Mandaville 2002), so are generally expected to decrease in prevalence with increasing environmental disturbance. Therefore, the temporal increase in Elmidae (%) at each of the three upper Hazeltine Creek areas to values in 2024 that were similar to pre-breach conditions, and similar to or significantly higher than reference conditions, suggests benthic invertebrate community recovery.

The mean relative densities (%) of EPT at HAC-R1, HAC-U, and HAC-R3 in 2024 (6.51%, 5.08%, and 35.0%, respectively) were significantly lower than pre-breach (54%), and both the FPC-R3 and EDC-U reference areas (65.2% and 37.7%, respectively; Appendix Table D.4.2),

with one exception. The one exception was EPT (%) at HAC-R3 in 2024, which was similar to EDC-U (Appendix Figure F.3.1, Appendix Tables F.3.1). Mean EPT (%) at HAC-R1 was significantly lower than pre-breach for most post-breach monitoring years except for 2019 (similar to pre-breach) while EPT (%) at HAC-U was similar to pre-breach for most post-breach monitoring years (i.e., 2019 to 2022) but has steadily decreased since 2021 to results in 2023 and 2024 that were significantly lower than pre-breach conditions. The relative densities (%) of EPT at HAC-R1 and HAC-U were significantly lower than one reference area (FPC-R3) in 2022 and 2023, and significantly lower than both reference areas in 2024. For HAC-U, this contrasted with 2021 when EPT (%) at HAC-U was significantly higher than both reference areas (Appendix Figure F.3.1, Appendix Table F.3.1). At HAC-R3, mean EPT (%) in 2024 was similar to 2023, but results for both of these years were significantly lower than all prior years. This significant decrease in EPT (%) at HAC-R3 in 2023 and 2024 corresponded with results that were similar to significantly lower than pre-breach and reference conditions, compared to EPT (%) at HAC-R3 that were similar to or significantly higher than pre-breach and reference conditions from in all prior years (i.e., 2020 to 2022; Appendix Figure F.3.1, Appendix Table F.3.1). The temporal decreases in EPT (%) at HAC-U and HAC-R3 described above corresponded with a significant decrease in EPT (density) in 2024 (compared to all prior years at HAC-U and compared to 2021 to 2022 at HAC-R3) and with a significant increase in Elmidae (density) in 2023 to 2024 compared to most prior years (excluding 2021). Therefore, the temporal decreases in EPT (%) observed at HAC-U and HAC-R3 were likely driven by a combination of the two factors; decreased EPT density and a change in community composition whereby Elmidae (% and density) increased and a concurrent decrease in EPT (%) occurred (Appendix Figure F.3.1, Appendix Table F.3.1). As indicated above, Elmidae are relatively intolerant of environmental stress (Mandaville 2002). Temporal changes in the individual EPT taxa that contributed to the observed decrease in EPT density are discussed in more detail below. The mean EPT (%) in 2024 was similar between HAC-R1 and HAC-U, which was consistent with results all post-breach years except 2020 and 2021, when EPT (%) at HAC-U was significantly higher than at HAC-R1. For HAC-R3, EPT (%) has been significantly higher relative to both HAC-R1 and HAC-U since monitoring at HAC-R3 began in 2020, except in 2021 when EPT (%) at HAC-R3 was significantly higher than HAC-R1 only (Appendix Figure F.3.1, Appendix Table F.3.1).

Within the EPT group, there were significant differences between areas and among years in the relative densities (%) and densities of Ephemeroptera, Plecoptera, and Trichoptera. Most notably, Plecoptera (stoneflies), which were present pre-breach and at the reference areas (FPC-R3 and EDC-U) were absent or near-absent from the three upper Hazeltine Creek areas for all post-breach monitoring years, including 2024 (Figure 6.7; Appendix Figures F.3.1 and

F.3.2, Appendix Table F.3.1). Plecoptera have narrow ecological requirements and are vulnerable to water pollution, habitat fragmentation, and alteration of water courses and their banks (Mandaville 2002). The absence or near-absence of Plecoptera from the upper Hazeltine Creek areas since initiation of post-breach monitoring suggested that habitat conditions in these remediated areas are currently better suited to the colonization taxa other than Plecoptera.

The relative densities (%) of Ephemeroptera (mayflies) at the three upper Hazeltine Creek areas in 2024 were significantly lower than pre-breach as well as both reference areas (FPC-R3 and EDC-U), except for Ephemeroptera (%) at HAC-R3 which were similar to the EDC-U reference area (Figure 6.7; Appendix Figure F.3.1, Appendix Table F.3.1). The lower Ephemeroptera (%) at HAC-R1 and HAC-U in 2024 (compared to reference and pre-breach) is consistent with 2023 results but contrasts with 2021 when Ephemeroptera (%) was similar to or higher than reference (HAC-U compared to EDC-U) for both areas and similar to pre-breach (Appendix Figure F.3.1, Appendix Table F. 3.1). Ephemeroptera (%) in 2024 at HAC-U were significantly lower than all prior years except 2018 and 2023, but at HAC-R1 were significantly lower than 2019 and 2021 only. Ephemeroptera (%) at HAC-R3 in 2024 was significantly lower than pre-breach and reference conditions (albeit FPC-R3 only) for the first time despite temporal stability in this metric since the start of monitoring (Appendix Figure F.3.1, Appendix Table F. 3.1). Ephemeroptera densities (organisms/m^2) at both HAC-R1 and HAC-U in 2024 were significantly lower than in all prior years except for the first year of monitoring (2018), which was consistent with the significantly lower Ephemeroptera (%) in 2024 compared to 2021 (but not in 2022 or 2023 compared to 2021). The Ephemeroptera densities at HAC-R3 have remained temporally stable, consistent with the relative density (%) results for this taxa (Appendix Figures F.3.1 and F.3.2, Appendix Table F.3.1).

The relative densities (%) of Trichoptera (caddisflies) at the three areas of upper Hazeltine Creek in 2024 were similar to pre-breach as well as the FPC-R3 reference area. Trichoptera (%) at HAC-R3 in 2024 were also similar to the EDC-U reference area, but at HAC-R1 and HAC-U were significantly lower than EDC-U although the difference was slight (-1.5 to -1.2 SD; Appendix Figure F.3.1, Appendix Table F.3.1). This represented a change from all previous years when Trichoptera (%) at these three areas were similar to or significantly higher than pre-breach and/or reference conditions. A similar temporal pattern was observed in Trichoptera densities at the upper Hazeltine Creek areas, with the results in 2024 being similar to pre-breach and reference conditions at each of the areas, representing a change from previous years when Trichoptera densities were significantly higher than one or both reference areas (Appendix Figure F.3.1, Appendix Table F.3.1). At HAC-U and HAC-R3, this temporal change in 2024 was accompanied by Trichoptera densities that were significantly lower than most (HAC-R3) or all (HAC-U)

prior years, whereas the density at HAC-R1 in 2024 was similar to most prior years. Collectively, these results indicated Trichoptera (% and density) at all upper Hazeltine Creek in 2024 were more similar to pre-breach and reference conditions than in prior post-breach years.

Given the observed temporal decreases in Ephemeroptera and Trichoptera (% and density) in 2024 compared to some or all prior years, the pollution tolerance of the observed taxa in upper Hazeltine Creek were investigated. This evaluation showed that the most abundant family of Ephemeroptera (Leptophlebiidae) at all of the upper Hazeltine Creek and reference areas are relatively intolerant to water pollution (Mandaville 2002; Appendix G). In addition, two of the Ephemeroptera families present at HAC-R3 are very intolerant of water pollution (i.e., Ameletidae and Ephemerellidae) and were present at higher densities at this exposed area than at the FPC-R3 reference area (Mandaville 2002; Appendix G). Several of the Trichoptera families present at one or more of the exposed areas were also considered very intolerant of water pollution (i.e., Lepidostomatidae, Rhyacophilidae, Glossosomatidae), some of which were more prevalent at the exposed areas compared to the reference areas (Mandaville 2002; Appendix G). The occurrence of sensitive Ephemeroptera and Trichoptera families at the upper Hazeltine Creek exposed areas, sometimes at higher densities than at the reference areas, suggests that the temporal decreases and/or significantly lower relative densities (%) of Ephemeroptera and Trichoptera at the exposed areas compared to reference and pre-breach conditions were likely primarily related to physical habitat conditions rather than chemical conditions (i.e., water quality).

Among the remaining taxa evaluated for upper Hazeltine Creek (Arachnida, non-Chironomidae Diptera, and Oligochaeta), only Arachnida (%) at HAC-R3 differed from pre-breach and reference conditions in 2024, while Oligochaeta (%) differed from reference (FPC-R3 only) but not pre-breach (Appendix Figure F.3.1, Appendix Table F.3.1). Arachnida (%) at HAC-R3 have been similar to or significantly lower than one or both reference areas and pre-breach conditions since the start of monitoring in 2020. The relative densities (%) of Arachnida in 2024 were similar between HAC-R1 and HAC-U but were significantly lower at HAC-R3 relative to HAC-R1 and HAC-U in 2024 Appendix Figure F.3.1, Appendix Table F.3.1). Reach 3 of Hazeltine Creek (where HAC-R3 is located) has a higher proportion of riffle habitat (i.e., a higher proportion of habitat with higher water velocity; Minnow 2022b). Arachnida mainly inhabit aquatic vegetation (Schatz and Behan-Pelletier 2008) which is more prevalent in creek areas with lower water velocity (i.e., pool habitat), therefore the lower Arachnida (%) at HAC-R3 in 2024 compared to pre-breach and reference conditions and HAC-R1, was likely reflective of the more limited recovery of aquatic vegetation in Reach 3 of Hazeltine Creek. This is also consistent with the more limited amount of time since completion of remediation works in Reach 3 of Hazeltine Creek compared to the upstream reaches (Table 4.3). Non-Chironomidae Diptera (%)

and Oligochaeta (%) at the upper Hazeltine Creek areas in 2024 were similar to pre-breach and reference conditions with one exception (Oligochaeta [%] at HAC-R1 were significantly higher than FPC-R3), therefore were not considered further (Appendix Figure F.3.1, Appendix Table F.3.1).

Multivariate analysis (CA) was used to further evaluate temporal changes in community composition from 2018 to 2024 for all three areas of upper Hazeltine Creek and the two reference areas. The first two axes of the CA explained a total of 39.4% of the benthic invertebrate community variation among the areas (29.0% and 10.4% for CA Axis 1 and 2, respectively; Appendix Figures F.3.1 and F.3.3, Appendix Tables D.4.1, D.4.2, F.3.1, and F.3.2). The community composition at HAC-R1, HAC-U, and HAC-R3 primarily differed from reference (both FPC-R3 and EDC-U) and pre-breach conditions along CA Axis 1 (from 2018 to 2024). In 2024, all three upper Hazeltine Creek monitoring areas differed from FPC-R3 reference area and pre-breach conditions along CA Axes 2 and 3 (except for HAC-R3 compared to FPC-R3 along CA Axis 2) but were similar to the EDC-U reference area (Appendix Figures F.3.1 and F.3.3; Appendix Tables F.3.1 and F.3.2). Evaluation of benthic invertebrate taxa with the greatest weightings on CA Axis 1 indicated lower relative densities of Sphaerridae (Pisidiidae; pea clams), Chironomidae (*Rheocricotopus*), Plecoptera (*Sweltsa,* Capniidae, and *Zapada*) and higher relative densities of Trichoptera (*Hydroptila* and *Cheumatopsyche*), and Gastropoda (Planorbidae and Lymnaeidae [snails]) at the exposed areas relative to reference and pre-breach conditions (Appendix Figure F.3.3, Appendix Tables F.3.1 and F.3.2). Some of the greatest differences observed along CA Axis 1 between the exposed and reference/pre-breach results were related to the absence of Sphaeriiidae from the exposed areas (taxa which prefer fine substrates and low velocity; Kubíková et al. 2011) and the absence of Lymnaeidae the from reference (a difference which was likely due to the presence of aquatic vegetation in Hazeltine Creek; Trondstad and Trondstad 2022). The absence or near-absence of Plecoptera at upper Hazeltine Creek areas in all post-breach years (discussed above) was corroborated by the lower prevalence of Plecoptera at the exposed areas compared to the reference/pre-breach along CA Axis 1.

The CA Axis 1 scores for HAC-R1 and HAC-U were similar from 2019 to 2024, whereas the CA Axis 1 score for HAC-R3 was lower relative to both HAC-R1 and HAC-U in most years from 2020 to 2024 (i.e., more similar to reference and pre-breach conditions), due to differences in community composition (e.g., significantly lower Chironomidae [%] and Arachnida [%] and significantly higher EPT [%] at HAC-R3 compared to HAC-R1 and HAC-U; Appendix Figure F.3.3, Appendix Table F.3.1). The axis scores for upper Hazeltine Creek along CA Axis 1 were temporally stable from at least 2021 to 2024 and were consistently higher at each exposed area compared to reference and pre-breach conditions throughout the post-breach period (i.e., from

2018 to 2024; Appendix Figure F.3.1, Appendix Table F.3.1). In contrast, temporal differences from 2021 to 2024 were observed for HAC-R1, HAC-U, and HAC-R3 along CA Axis 2 and 3 (which showed fewer and smaller differences to reference and pre-breach conditions than CA Axis 1), suggesting that the observed temporal changes in community composition within the exposed areas have been smaller in magnitude than the differences in community composition relative to reference and pre-breach conditions (Appendix Figure F.3.1, Appendix Table F.3.1).

Correlation analyses between benthic invertebrate community metrics and supporting physical and chemical measures for upper Hazeltine Creek and the reference areas indicated positive correlations of total density, and the density and/or relative densities (%) of several taxa (Ephemeroptera, Trichoptera, EPT, Chironomidae, and non-Chironomidae Diptera), wet and dry weight biomass, and CA Axis 1 scores with one or more of mean water depth, velocity, temperature, dissolved oxygen, pH, and specific conductivity (Appendix Figure F.3.4, Appendix Tables D.4.3, F.3.3). The positive correlations for Ephemeroptera and EPT were limited to water velocity only (Appendix Table F.3.3). Higher water velocity, dissolved oxygen (mg/L and % saturation), pH, and specific conductivity are characteristics of the upper Hazeltine Creek areas compared to the reference areas (FPC-R3 and EDC-U), with the higher water velocity specifically attributed to supplemental pumping from Polley Lake. Dissolved oxygen and water velocity at the EDC-U have been particularly low (<60% and 0 m/s from 2021 to 2024; Table 6.5; Appendix Figure F.3.4, Appendix Table F.3.3). The positive relationships observed for these benthic community metrics, with the positive direction of the correlations being largely represented by the exposed areas, suggested that the chemical and physical conditions at the exposed areas were not limiting the recovery of total density, Trichoptera, Chironomidae, and non-Chironomidae Diptera.

Correlation analysis also indicated negative correlations of taxon richness, and Plecoptera (density and %), Arachnida, EPT (% only), Ephemeroptera (% only), and Oligochaeta (% only) with one or more of mean water depth, velocity, temperature, dissolved oxygen, pH, and specific conductivity (Appendix Figure F.3.4, Appendix Tables D.4.3, F.3.3). For the correlations involving Plecoptera and Arachnida, these relationships were leveraged by the absence or near-absence of these taxa at all exposed areas for Plecoptera, and at HAC-R3 for Arachnida (Appendix Figure F.3.4). Negative correlations with specific conductivity occurred with Plecoptera (density and %) and Arachnida (density and %) and Ephemeroptera (%), but all other significant correlations with specific conductivity were positive (including with total density). This, along with the occurrence of Ephemeroptera families at the exposed areas that are of similar pollution tolerance to those at the reference area suggested the chemical conditions (i.e., water quality) of the exposed areas may not be a key limiting factor for the recovery of most taxa at the exposed areas. Water quality could be an influencing factor on Plecoptera recovery; however,

this cannot be separated from the other key habitat differences that exist between the exposed and reference areas that would also likely be influencing factors (i.e., water depth, velocity, temperature, and complete lack of canopy cover at the exposed areas). Collectively, these results suggest that physical correlates were the primary influencing factors on benthic invertebrate community condition in upper Hazeltine Creek.

Overall, the benthic invertebrate communities at the three areas of Upper Hazeltine Creek (HAC-R1, HAC-U, and HAC-R3) in 2024 were similar to reference conditions (i.e., one or both reference areas) in terms of density and taxon richness, and similar to reference and/or pre-breach conditions in terms of Simpson's Evenness and Diversity. The benthic invertebrate communities of HAC-R1 and HAC-U have been similar in terms of these four metrics in all post-breach years, while the community at HAC-R3 in 2024 had significantly lower density and Simpson's Evenness and Diversity than the upstream areas (although differences were small). The differences in the benthic invertebrate community at HAC-R3 compared to the upstream areas was consistent with the more recent completion of remediation works and habitat differences (i.e., greater proportion of riffles) at this area compared to upstream. The most abundant taxa in 2024 were Chironomidae at HAC-R1 and HAC-U and Elmidae at HAC-R3. Elmidae (%) at the three exposed areas in 2024 were similar to or significantly higher than pre-breach and reference conditions. Chironomidae (%) at the three exposed areas in 2024 were similar to reference and significantly higher than pre-breach at HAC-R1 and HAC-U (but not at HAC-R3). The sensitive EPT taxa (% and density) at the three exposed areas in 2024 were significantly lower than pre-breach. In addition, EPT taxa two of these exposed areas (HAC-R1 [% and density] and HAC-U [%]) were also significantly lower than both reference areas. Notable differences in EPT at all three Hazeltine Creek areas in 2024 relative to reference and pre-breach included a lack of Plecoptera and lower Ephemeroptera (%), while Trichoptera (%) were similar to reference and pre-breach. The occurrence of Ephemeroptera and Trichoptera families at the exposed areas that were of similar pollution tolerance to those at the reference areas suggested that chemical conditions (i.e., water quality) were not limiting the recovery of these taxa at the exposed areas. Multivariate analysis indicated community composition of the two upper Hazeltine Creek areas did not differ in 2024 or most years, suggesting similar recovery of the benthic invertebrate community in these areas. Correlation analysis indicated that physical characteristics of the upper Hazeltine Creek areas (mean water depth, velocity, temperature) were the primary influencing factors on benthic invertebrate community condition and composition in these exposed areas. Collectively, results indicated that the benthic invertebrate communities at the three areas of upper Hazeltine Creek have recovered since remediation efforts to a condition that was similar to at least one reference area based on density, taxon richness, and Simpson's Evenness and Diversity, and largely similar to pre-breach conditions for Simpson's

Evenness and Diversity. However, there were some key remaining differences in the community composition of upper Hazeltine Creek compared to reference and/or pre-breach (particularly for the sensitive EPT taxa) that suggested ongoing recovery.

6.1.3.2.2 Productivity

Mean wet and dry weight biomass of benthic invertebrates in 2024 at HAC-R1, HAC-U, and HAC-R3 were similar to those at the two reference areas (FPC-R3 and EDC-U) except for significantly lower mean biomass (wet and dry) at HAC-R3 compared to FPC-R3. In previous years, mean benthic biomass at all three upper Hazeltine Creek areas has been similar to or significantly higher than both reference areas (Figure 6.8; Appendix Table F.3.1). Despite significantly lower mean biomass (wet and dry) at HAC-R3 compared to FPC-R3 in 2024, biomass (wet and dry) at HAC-R3 not decrease significantly in 2024. Dry weight biomass at HAC-R1, HAC-U, and HAC-R3 in 2024 was similar to all prior years, while wet weight biomass at each area in 2024 was similar to most prior years but significantly higher in 2024 relative to 2022 (Figure 6.8; Appendix Table D.4.2, F.3.1). The similarity in mean biomass at HAC-R1 and HAC-U relative to both reference areas, and in mean biomass at HAC-R3 relative to EDC-U, were consistent with the similarity in total density between the exposed and reference areas (Figure 6.6, Table 6.6). Mean biomass (wet and dry) for HAC-R1, HAC-U, and HAC-R3 in 2024 was similar between areas, which was consistent with prior years except 2020, when HAC-R3 had significantly lower biomass (wet and dry) relative to HAC-R1 and HAC-U; Figure 6.8; Appendix Table F.3.1, Appendix Tables D.4.1 and D.4.2). The consistently higher benthic invertebrate wet and dry biomass at the exposed areas of upper Hazeltine Creek, relative to at least one reference area, indicated benthic invertebrate productivity has recovered to or exceeded reference conditions.

6.1.3.3 Lower Hazeltine Creek

Benthic invertebrate community and productivity monitoring was conducted at a remediated (exposed) area of lower Hazeltine Creek (HAC-D) in 2023, with an unimpacted area of lower Edney Creek (EDC-D) serving as reference (Minnow 2024a). The results of this monitoring are summarized briefly herein with detailed methods and results presented in Minnow (2024a).

6.1.3.3.1 Community

In 2023, the benthic invertebrate community in lower Hazeltine Creek (HAC-D) was similar to reference (EDC-D) and pre-breach (2007) in terms of density, taxon richness, and Simpson's Evenness and Diversity. The similarity of density, taxon richness, and Simpson's Diversity at HAC-D in 2023 relative to reference and pre-breach reflected substantial improvement compared to 2021, when these metrics were significantly lower than reference and pre-breach. The benthic

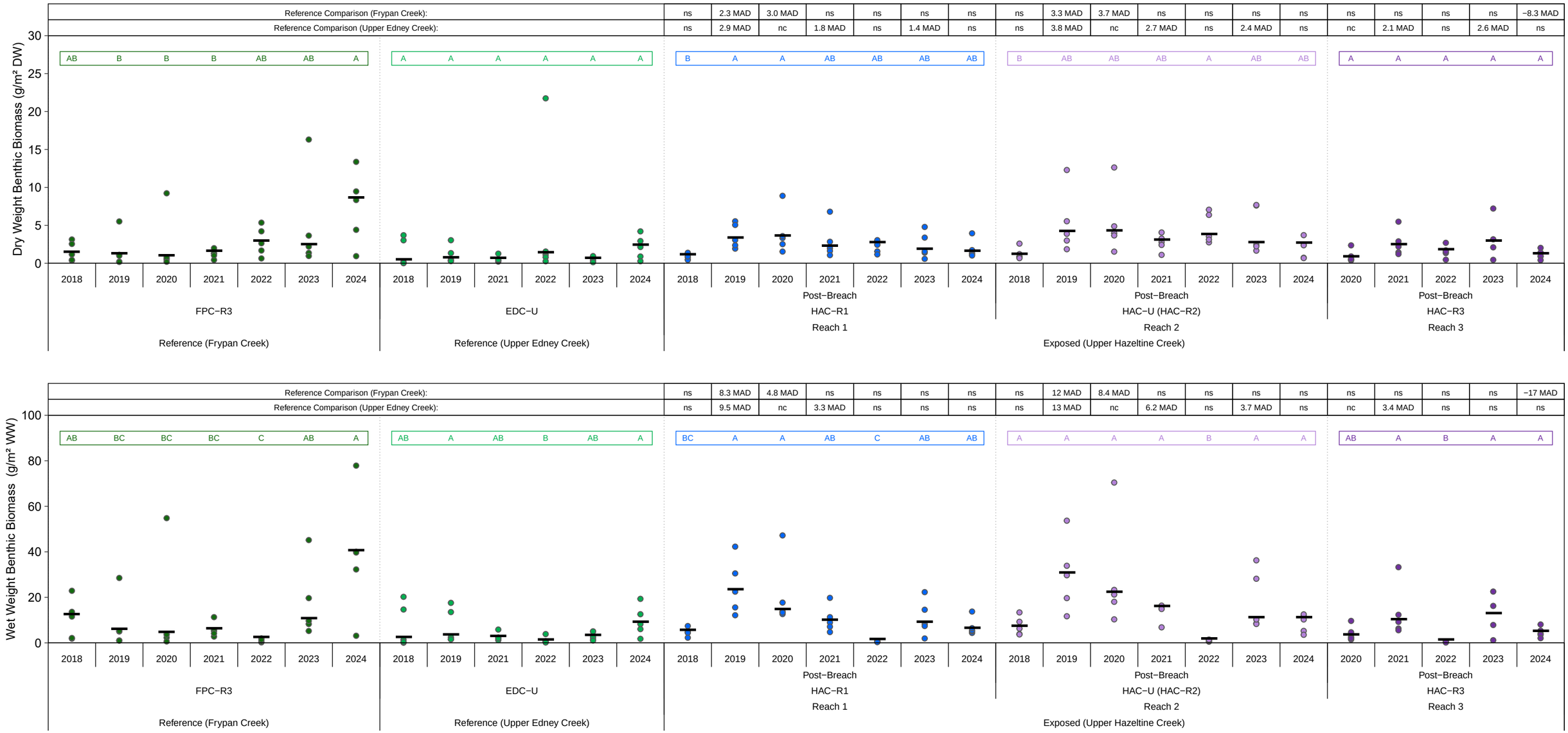

Figure 6.8: Benthic Invertebrate Biomass for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: DW = dry weight. WW = wet weight. g/m² = grams per square metre. The EDC−U reference area was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time. Letter colours and boxes indicate the area contrasted. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The Magnitude of Difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank− transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast.

invertebrate community at HAC-D in 2021 represented the community weeks after completion of final remediation works in this area. For taxon richness and Simpson's Diversity, the similarity to reference and pre-breach in 2023 represented a return to conditions observed in 2017. For density, the similarity to reference and pre-breach in 2023 represented an improvement relative to all prior years. Simpson's Evenness was temporally stable and similar to reference and pre-breach from 2017 to 2023.

The community composition (%) of lower Hazeltine Creek was dominated by Chironomidae (%) and to a lesser extent EPT (%), which were significantly more and less prevalent, respectively, than reference. Within EPT, Ephemeroptera (%) and Plecoptera (%) at HAC-D were significantly lower, and Trichoptera (%) at HAC-D were significantly higher, than reference and pre-breach from 2017 to 2023 with few exceptions. Although EPT (%) in lower Hazeltine Creek in 2023 remained lower than reference, the difference from reference was smaller in 2023 than in 2021 (immediately following the remediation works), owing to a significant increase in Ephemeroptera and Trichoptera (% and density) from 2021 to 2023. The differences in dominant benthic invertebrate taxa between HAC-D and the reference area in 2023 were consistent with the ongoing recovery of community composition following habitat remediation efforts in lower Hazeltine Creek in 2021. Correlation analysis indicated that physical characteristics of the exposed lower Hazeltine Creek area (water depth, velocity, temperature, and substrate size) were the most likely influencing factors on benthic invertebrate community condition and composition rather than water quality parameters.

Collectively, the results indicated substantial recovery of benthic invertebrate community in lower Hazeltine Creek since 2021 (after final remediation works), with density, taxon richness, and Simpson's Diversity and Evenness having recovered to a condition similar to reference and pre-breach. However, the differences in community composition that remained in lower Hazeltine Creek compared to reference and pre-breach conditions suggested that recovery of the community in this remediated area was still ongoing.

6.1.3.3.2 Productivity

Mean total dry biomass of benthic invertebrates at lower Hazeltine Creek (HAC-D) in 2023 was significantly higher than reference (EDC-D), which differed from results in 2017 to 2021 when mean biomass at HAC-D was significantly lower than reference. Compared to previous monitoring years, mean dry and wet biomass at HAC-D did not change significantly over time. Mean wet benthic invertebrate biomass at HAC-D was similar to reference in 2023 and 2019, but significantly lower in than reference in 2017 and 2021. The similar (wet) or higher (dry) benthic invertebrate biomass at E1 relative to reference in 2023, indicated benthic invertebrate productivity at this area had recovered to reference conditions.

6.1.4 Periphyton and Benthic Invertebrate Tissue Quality

Periphyton and benthic invertebrate tissue quality monitoring was completed annually between 2022 and 2024, with monitoring in each year including two exposed areas of upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]) with upper Edney Creek (EDC-U) serving as reference, and one exposed area of lower Hazeltine Creek (HAC-D [HAC-R5]) with an unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as reference (Figure 4.2; Table 4.4).[68]

A review of the 2024 periphyton and benthic invertebrate tissue quality results (Appendix B) indicated that the data largely met the established DQOs. Specifically, the data were characterized by appropriate detectability, negligible analyte concentrations in MB samples, and excellent laboratory accuracy. Laboratory duplicate samples failed the DQO in 6.90% of results. Periphyton and benthic invertebrate tissue field duplicate samples generally had low agreement, and the recommended DQO for field precision was exceeded in 87% of field duplicate pairs. Reanalysis was requested for several duplicate pairs and the results generally confirmed poor agreement between the parent and duplicate samples. Low precision between field duplicate samples was a result of sample heterogeneity (e.g., taxonomic variability in composite-taxa samples or natural variability within a single taxon); however, the collection of replicated samples (n = 8 per area in accordance with the CEMP; MPMC 2019) helped to characterize this variability. Overall, the tissue quality data can be used with a high level of confidence for interpretation, although the occurrence of some natural heterogeneity in analyte results were considered during data interpretation. A review of 2024 supporting water data quality indicated these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

Data interpretation was focused on primary and secondary analytes (Table 2.4) with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 (if the analysis *Area*×*Year* interaction was significant) or in all monitoring years (if the *Area*×*Year* interaction was not significant[69]) for at least one tissue type (periphyton, caddisfly, or composite-taxa benthic invertebrate) in at least one area.

Data interpretations were further focused by integrating the results of water quality monitoring (i.e., bioconcentration) and TTFs of benthic invertebrate tissue analyte concentrations.

[68] For HRWG reporting, HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas. The original area names only (i.e., HAC-U, HAC-D, and EDC-D) are used throughout the remainder of this report section (Section 6.1.4).

[69] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from all available years were combined for the analyses.

Specifically, water quality data (and BCFs) for the analytes selected for data interpretation were examined to determine whether the significantly higher analyte concentrations in exposed tissues (relative to reference) were related to water quality. The TTFs for the analytes selected for data interpretation were also evaluated to determine if these analytes were bioaccumulating in the aquatic biota in Hazeltine Creek. Combined, these approaches were used to identify analytes for which concentrations in biota and TTFs at the exposed areas have increased at a rate that differs from reference and that may represent a potential risk to aquatic biota. This interpretive approach was completed separately for upper and lower Hazeltine Creek areas because the results for these areas differed slightly. Results for composite-taxa benthic invertebrate tissue samples are referred to as composite-taxa for the remainder of this section.

6.1.4.1 Upper Hazeltine Creek

For most analytes evaluated, there was no increase in concentrations in periphyton and/or benthic invertebrate tissues at the exposed areas of upper Hazeltine Creek (HAC-R1 and HAC-U) relative to the reference area (EDC-U) over time (Appendix Figures F.4.1 to F.4.6, Appendix Tables D.5.1 to D.5.3, F.4.1 to F.4.10). Three primary analytes (arsenic, copper, and selenium) and seven secondary analytes (barium, calcium, manganese, molybdenum, strontium, titanium, and vanadium) met the criteria for inclusion in data interpretation outlined above (i.e., had concentrations in at least one tissue type from at least one area of the exposed upper Hazeltine Creek areas that were significantly higher than reference in 2024 or in all years; Figures 6.9 and 6.10, Table 6.7). Of these analytes, copper and titanium did not show a significant *Area×Year* interaction for at least one tissue type from upper Hazeltine Creek.

MPMC implements routine water quality monitoring in upper Hazeltine Creek at HAC-13 (a station within the sampling area of HAC-R1) and at HAC-05a (a station downstream of HAC-U; Figure 4.2). Results from these routine water quality monitoring stations indicated that only aqueous concentrations of dissolved copper and total selenium exceeded the chronic BCWQG during the preceding year (i.e., September 2023 to August 2024), while the remaining analytes remained below the applicable BCWQG. Specifically, the chronic BCWQG for dissolved copper, which is based on the BLM (BCMOWLRS 2025) was exceeded in 92% and 75% of the samples collected from station HAC-13 (HAC-R1) and station HAC-05a (HAC-U), respectively. Further, the chronic BCWQG for total selenium was exceeded in 8.3% and 33% of the samples collected from station HAC-13 and station HAC-05a, respectively (Appendix Tables D.1.3 and D.1.4). Temporal analysis of routine water quality data from HAC-13, and HAC-05a from 2015 to 2024 indicated that, of the primary and secondary analytes identified for data interpretation (above), only concentrations of total vanadium (at HAC-13 only) and dissolved vanadium (at both HAC-13 and HAC-05a) increased significantly

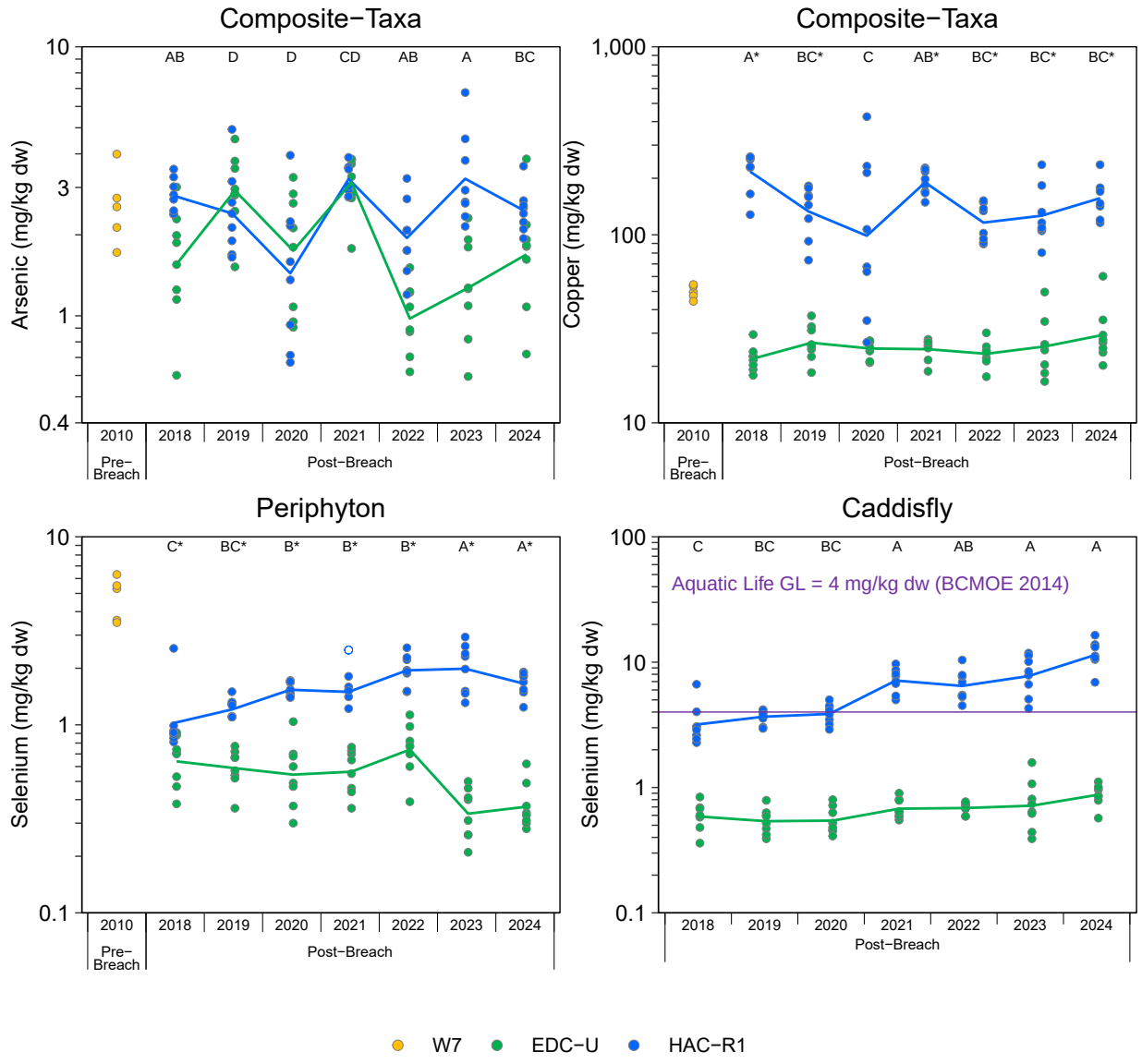

Figure 6.9: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log −normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre −breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

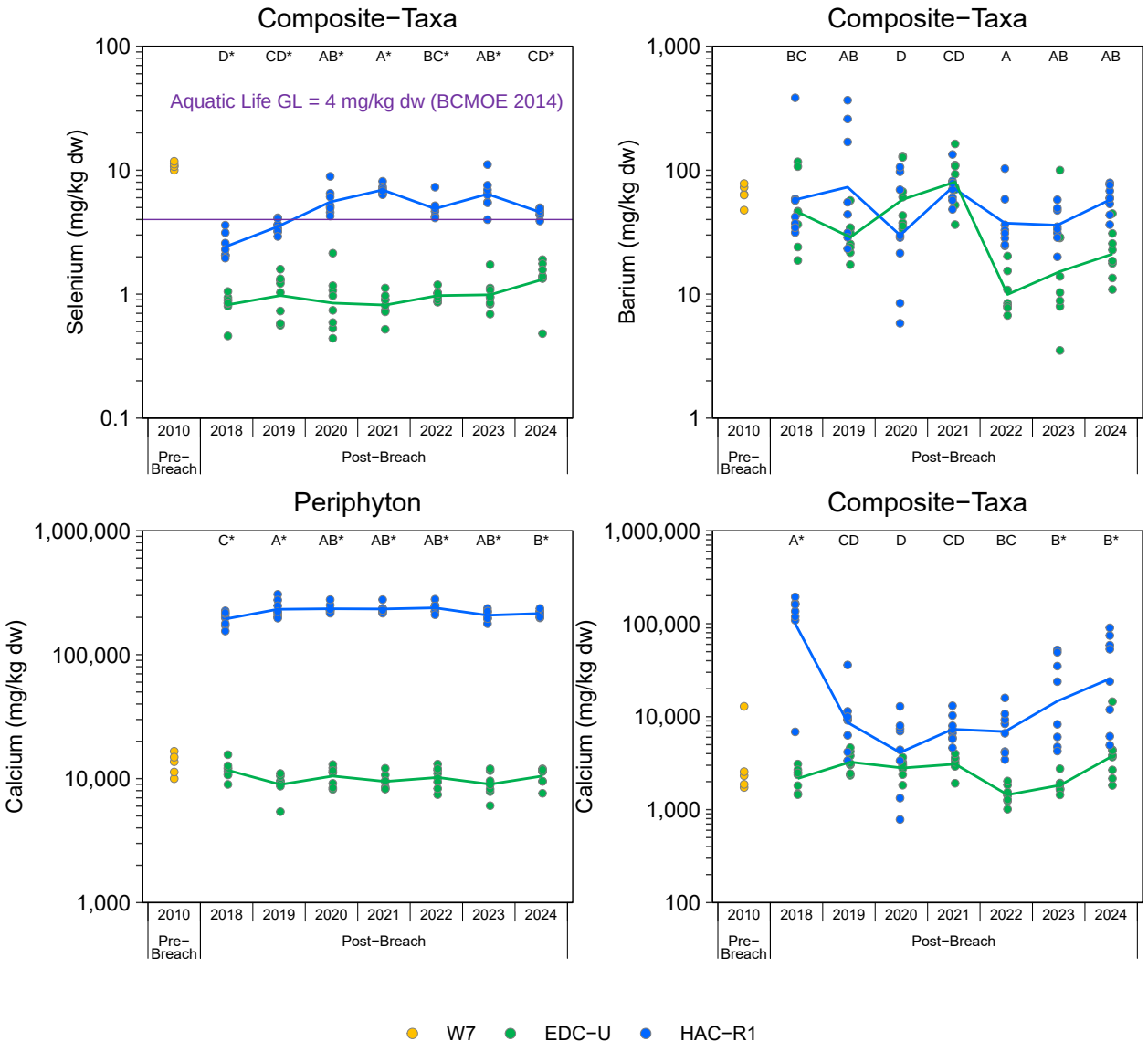

Figure 6.9: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log −normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre −breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

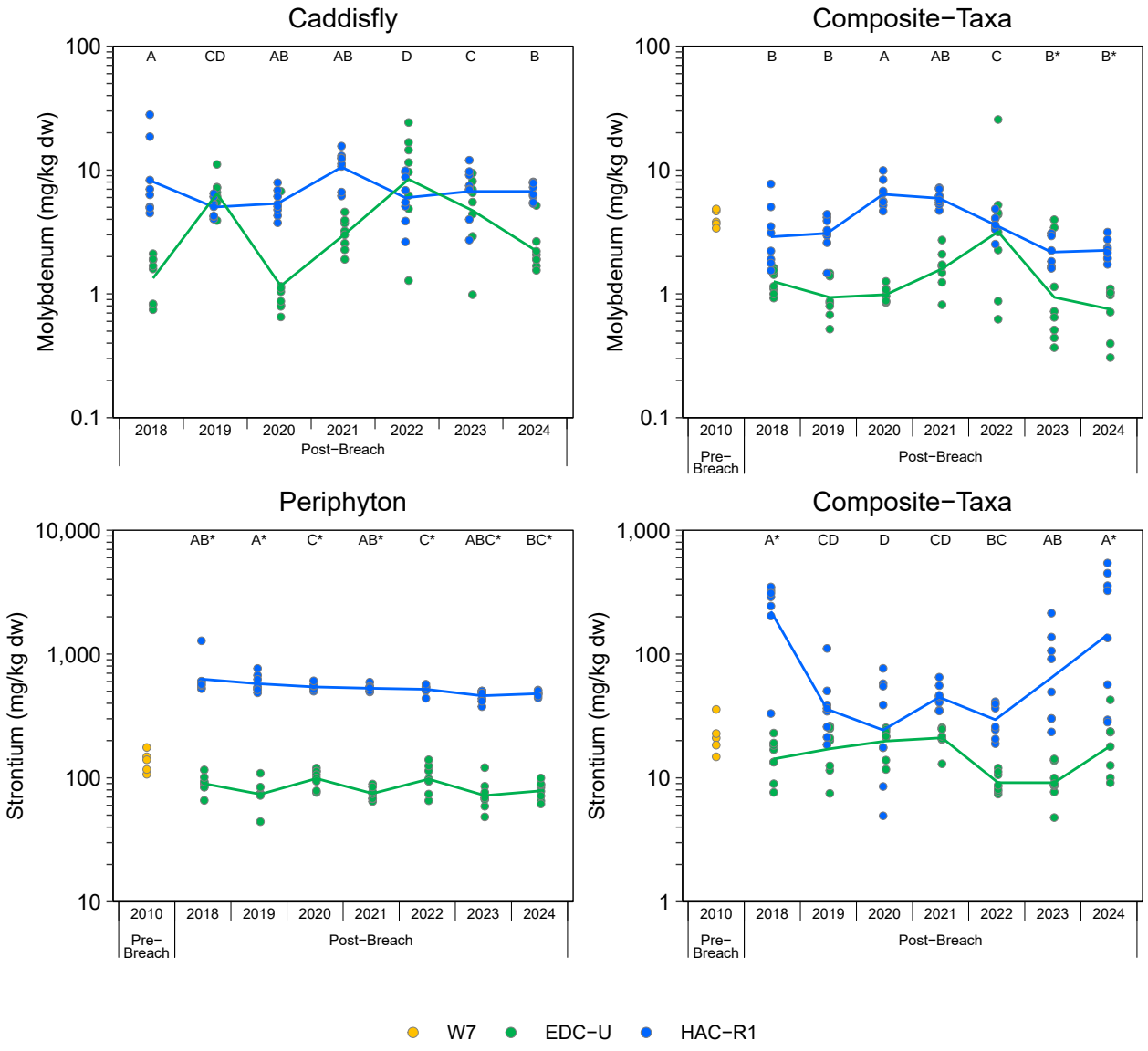

Figure 6.9: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

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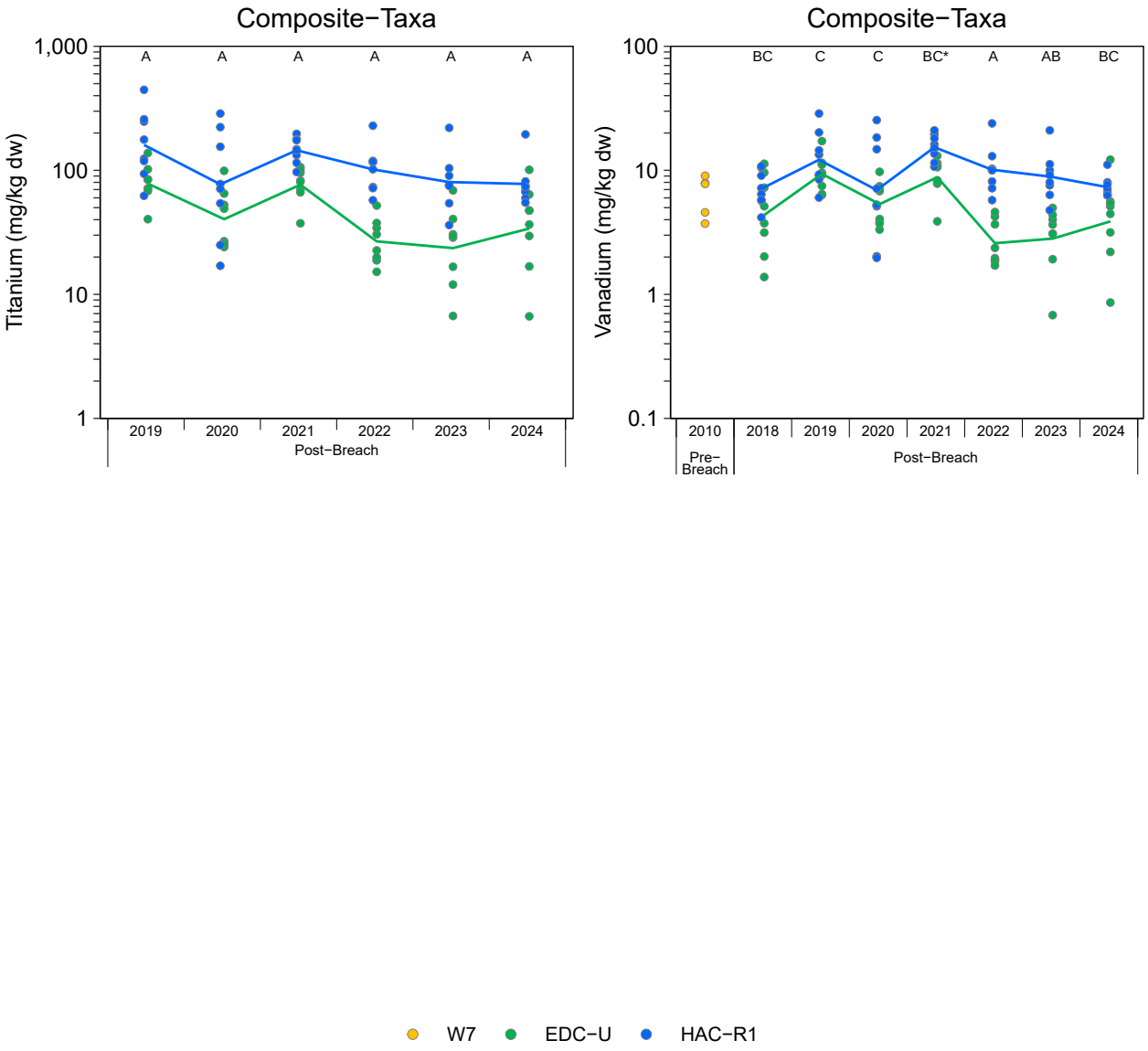

Figure 6.9: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

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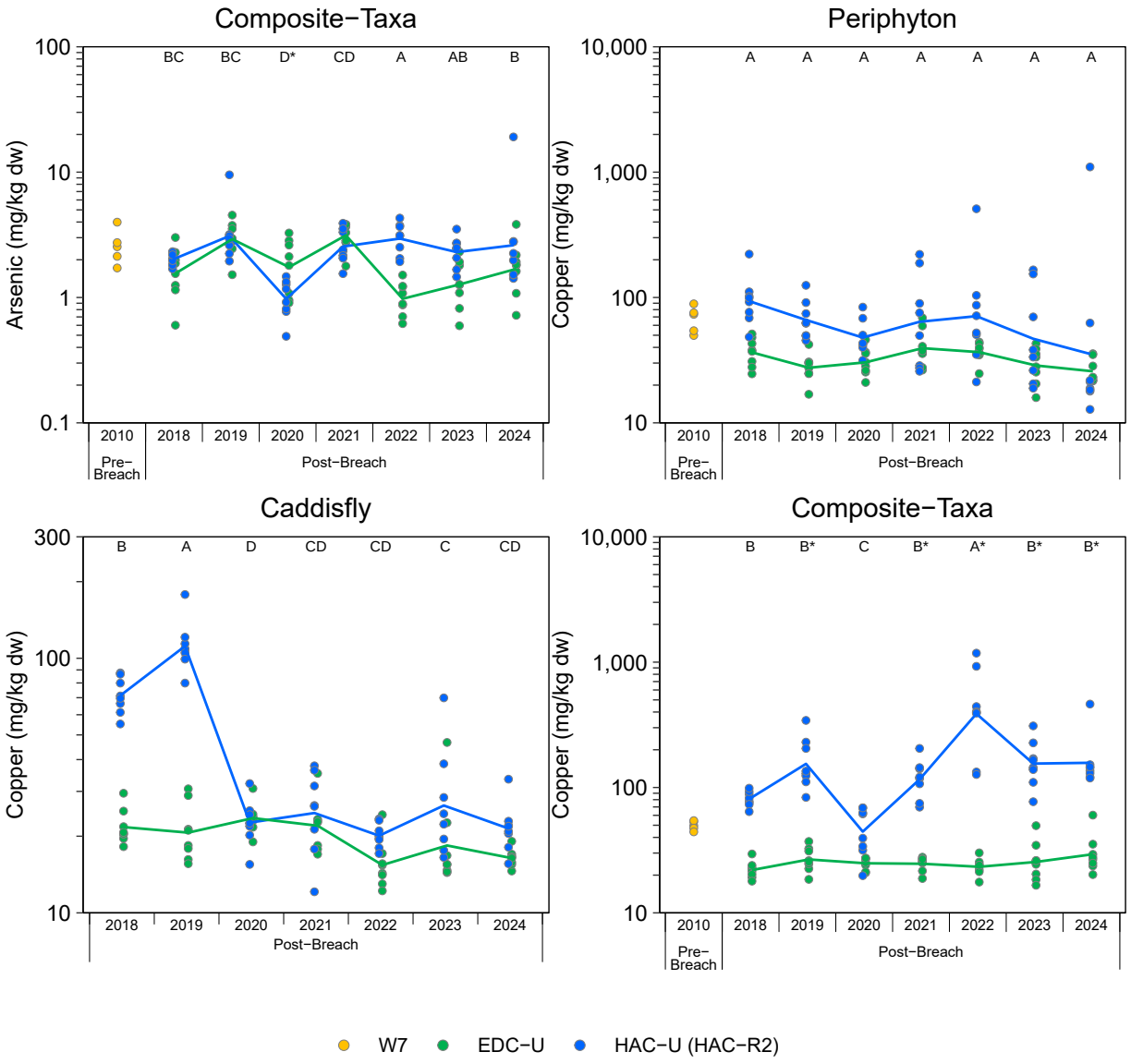


Figure 6.10: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). HAC−R2 is the alternate name used for the HAC−U sampling area for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre−breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

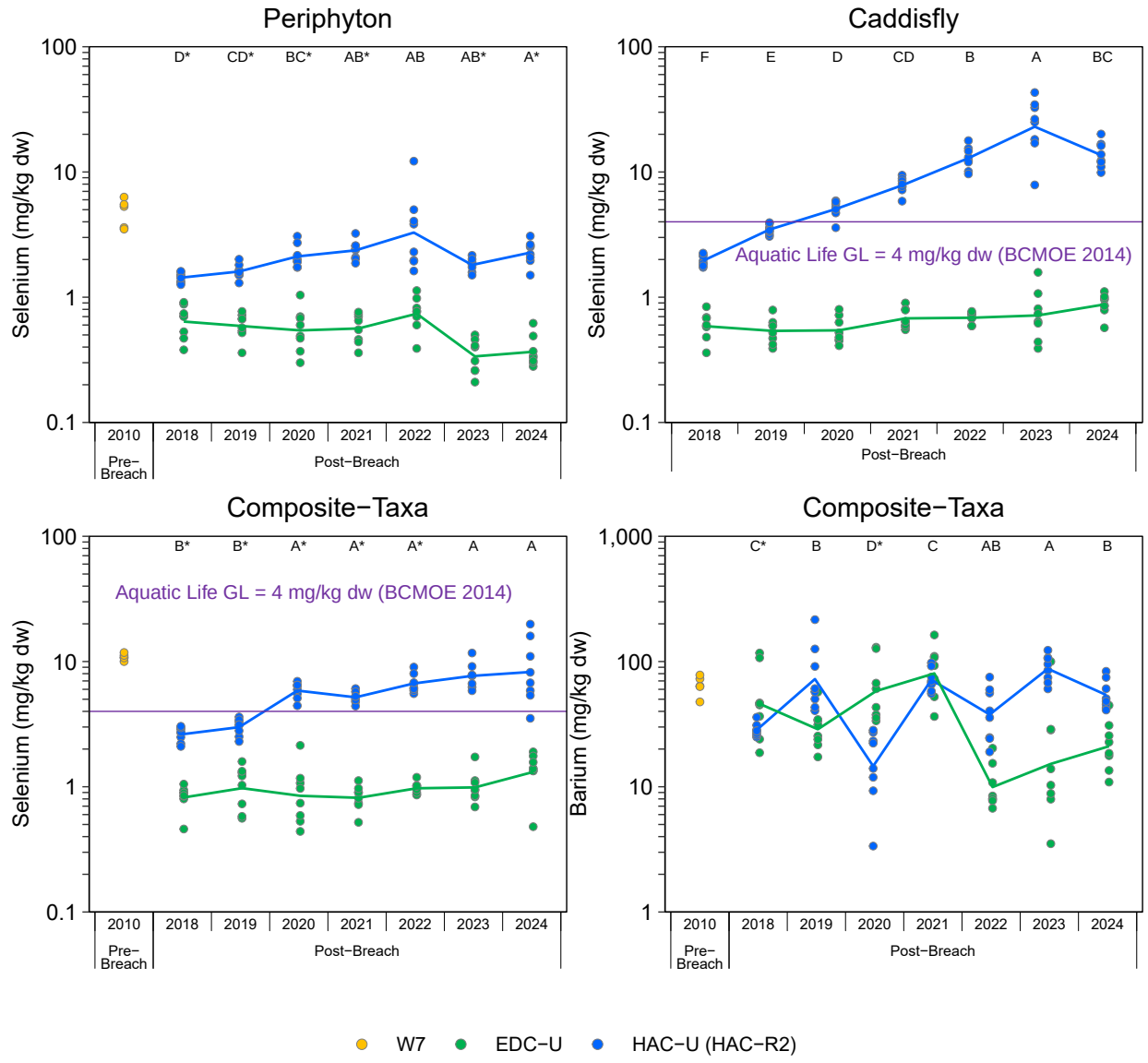


Figure 6.10: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). HAC−R2 is the alternate name used for the HAC−U sampling area for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre−breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

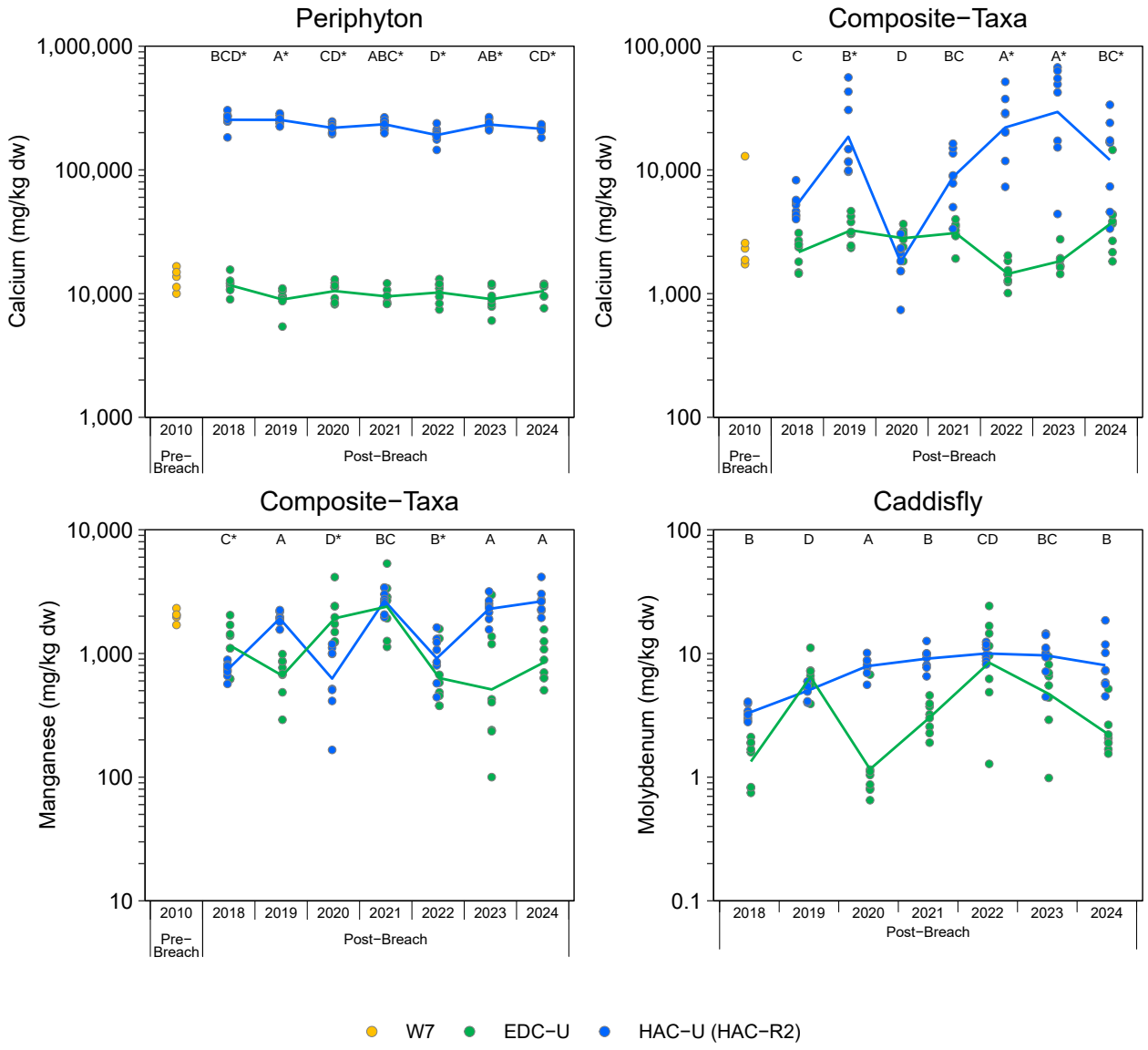


Figure 6.10: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). HAC−R2 is the alternate name used for the HAC−U sampling area for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre−breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

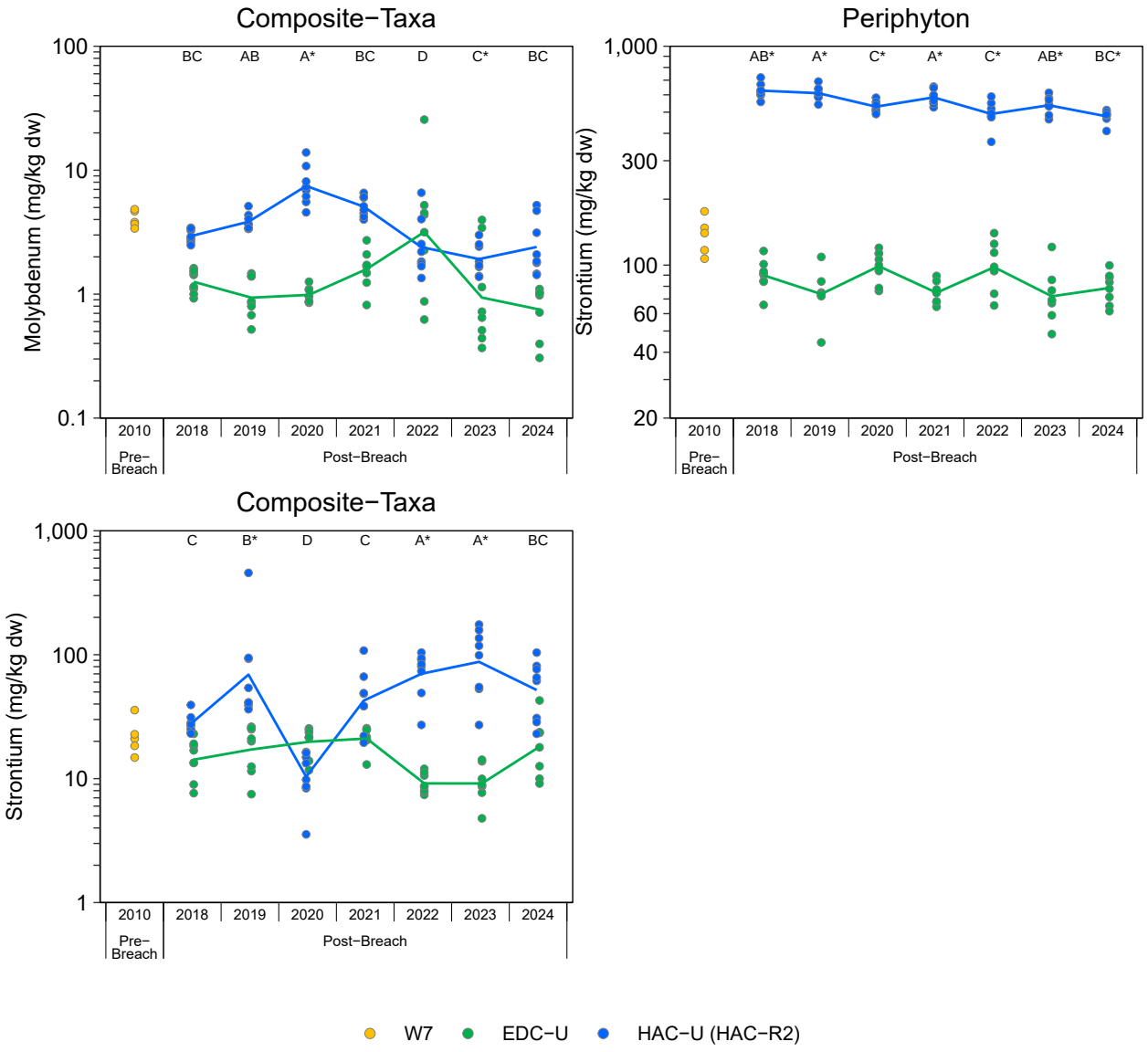


Figure 6.10: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). HAC−R2 is the alternate name used for the HAC−U sampling area for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre−breach conditions, as determined using a one−way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.

Table 6.7: Summary of Statistical Contrasts for Periphyton, Caddisfly, and Composite-Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed - Reference Relative Difference for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2015 to 2024[a]

| Analytes | | Upper Hazeltine Creek Reach 1 (HAC-R1; Exposed) — Upper Edney Creek (EDC-U; Reference) | | |

Table 6.7: Summary of Statistical Contrasts for Periphyton, Caddisfly, and Composite-Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed - Reference Relative Difference for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2015 to 2024[a]

	Analytes	Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5]; Exposed) / Lower Edney Creek (EDC-D [EDC-REF]; Reference)																																					
		Periphyton															Caddisfly							Composite-Taxa Benthic Invertebrate																
		2017		2018		2019		2020		2021		2022		2023		2024		2018	2019	2020	2021	2022	2023	2024	2015		2018		2019		2020		2021		2022		2023		2024	
Primary Analytes	Arsenic	A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(ns)	C	A	AB	AB	B	AB	B	A	(ns)	C	(↓)	AB	(ns)	AB	(ns)	B	(ns)	AB	(ns)	AB	(ns)	A	(ns)
	Copper	A	(↑)	AB	(↑)	C	(↑)	C	(↑)	A	(↑)	BC	(↑)	BC	(↑)	BC	(↑)	E	CD	BC	A	DE	DE	AB	A	(↑)	D	(ns)	D	(↑)	D	(↑)	C	(↑)	D	(↑)	B	(↑)	BC	(↑)
	Iron	A	(ns)	A	(ns)	BC	(ns)	BC	(ns)	AB	(ns)	C	(ns)	C	(ns)	C	(↓)	B	A	B	A	B	A	A	A	-	E	-	CD	-	DE	-	BCD	-	DE	-	B	-	BC	-
	Selenium	DE	(ns)	F	(ns)	EF	(↓)	BC	(ns)	DE	(ns)	B	(ns)	CD	(↑)	A	(↑)	E	DE	CD	C	C	A	B	BCD	(ns)	D	(ns)	CD	(↓)	BC	(ns)	BCD	(ns)	B	(↑)	B	(↑)	A	(↑)
Secondary Analytes	Barium	B	(ns)	A	(ns)	B	(ns)	A	(ns)	A	(ns)	AB	(ns)	A	(ns)	A	(ns)	D	AB	BC	A	BC	C	ABC	A	(ns)	D	(↓)	C	(ns)	BC	(ns)	BC	(ns)	C	(ns)	AB	(ns)	BC	(ns)
	Cadmium	ABC	(↑)	BC	(ns)	BC	(ns)	AB	(↑)	C	(ns)	BC	(ns)	C	(ns)	A	(↑)	D	BC	B	A	BC	C	B	A	(ns)	B	(ns)	B	(ns)	B	(↑)	B	(ns)	B	(↑)	B	(↑)	A	(↑)
	Calcium	F	(ns)	D	(↑)	B	(↑)	AB	(↑)	E	(ns)	A	(↑)	CD	(↑)	BC	(↑)	C	B	B	A	B	B	A	ABC	(ns)	E	(ns)	E	(ns)	DE	(ns)	BC	(ns)	CD	(ns)	A	(↑)	AB	(↑)
	Cobalt	A	(ns)	A	(ns)	BC	(ns)	BC	(ns)	AB	(ns)	C	(ns)	BC	(ns)	AB	(ns)	C	AB	B	A	B	AB	AB	A	(ns)	D	(↓)	C	(ns)	C	(ns)	C	(ns)	C	(ns)	BC	(ns)	B	(ns)
	Manganese	BC	(ns)	BC	(ns)	CD	(ns)	BC	(ns)	D	(↓)	BC	(ns)	B	(ns)	A	(ns)	C	AB	B	A	AB	B	AB	ABC	(↓)	E	(↓)	CD	(↓)	BC	(ns)	D	(ns)	AB	(ns)	A	(ns)	A	(ns)
	Mercury	AB	(↑)	BC	(↑)	D	(↑)	D	(ns)	A	(↑)	CD	(↑)	BCD	(↑)	CD	(ns)	D	D	BC	AB	C	A	ABC	-		B	(ns)	AB	(ns)	B	(ns)	B	(ns)	B	(↑)	B	(↑)	A	(↑)
	Molybdenum	A	(↑)	B	(ns)	B	(ns)	B	(ns)	B	(ns)	B	(ns)	B	(ns)	B	(ns)	A	B	C	D	BC	B	BC	C	(↓)	B	(ns)	A	(ns)	B	(ns)	B	(↓)	B	(↓)	B	(↓)	B	(↓)
	Strontium	F	(ns)	DE	(↑)	BC	(↑)	AB	(↑)	E	(ns)	A	(↑)	CD	(↑)	CD	(↑)	D	BC	C	AB	C	BC	A	AB	(ns)	C	(ns)	C	(ns)	C	(ns)	AB	(ns)	B	(ns)	A	(ns)	AB	(ns)
	Titanium	-	-	-		A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(ns)	A	(↓)	-	A	B	A	B	A	A	A	-	-		BC	-	C	-	AB	-	C	-	AB	-	AB	-
	Uranium	A	(ns)	AB	(ns)	C	(ns)	BC	(ns)	ABC	(ns)	BC	(ns)	BC	(↓)	ABC	(ns)	C	B	B	A	B	B	AB	A	(ns)	D	(↓)	C	(ns)	C	(ns)	BC	(ns)	C	(ns)	B	(ns)	B	(ns)
	Vanadium	A	(ns)	A	(ns)	BC	(ns)	BC	(ns)	AB	(ns)	C	(ns)	C	(ns)	BC	(ns)	B	A	B	A	B	A	A	A	(↑)	D	(ns)	CD	(ns)	CD	(ns)	BC	(ns)	CD	(ns)	B	(ns)	B	(ns)

Indicates significantly higher tissue concentration at exposed compared to reference area, and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

(↑) = Indicates significantly higher tissue concentration relative to pre-breach in 2010 (α = 0.05).

(↓) = Indicates significantly lower tissue concentration relative to pre-breach in 2010 (α = 0.05).

(ns) = no significant different in analyte concentration relative to pre-breach in 2010 (α = 0.05).

Notes: "-" = no statistical comparison could be made because data were not available or all results below Laboratory Reporting Limit (LRL), refer to Appendix Tables F.4.1 to F.4.10 and F.4.17 to F.4.21 for statistical analyses results and magnitude of difference calculations. Data were analysed in units of mg/kg dry weight. <LRL = greater than 50% LRL data for both stations so the time period was omitted from the analysis. HAC-R2, EDC-REF, and HAC-R5 are the alternate names for the HAC-U, EDC-D, and HAC-D sampling areas, respectively, for HRWG reporting.

[a] This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant) for one or more tissue types (periphyton, caddi or composite benthic invertebrate) in at least one area. Years that share a letter (e.g., A,B,C) had ratios of analyte concentrations (Exposed:Reference) that did not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

(Appendix Figures D.1.1 to D.1.3, Appendix Table D.1.9). Evaluation of aqueous selenium speciation parameters was initiated in 2024 (see Section 4.6 for details) to investigate possible causes of the temporal increases of selenium concentrations in periphyton and benthic invertebrate tissues from Hazeltine Creek (Minnow 2024a). This monitoring indicated that mean concentrations of selenate at HAC-13 and HAC-05a were 2.2- and 13-times those reported at the reference area (EDC-U), respectively, which was generally consistent with the aqueous total selenium concentrations discussed below. Mean concentrations of selenite at HAC-13 and HAC-05a were 1.7- and 2.5-times those reported at the reference area, respectively, and concentrations of the remaining measured selenium species (selenocyanate and unknown selenium species) were below the LRL at all sampling stations (Appendix Tables D.1.2 to D.1.4, Appendix Figure D.1.4).

Of the three primary and seven secondary analytes identified for inclusion in data interpretation, mean dissolved aqueous concentrations of copper and selenium were elevated (greater than 2-times reference) at HAC-R1 and HAC-U in 2024 relative to reference, as were the secondary analytes calcium, molybdenum, strontium, uranium (Table 6.8, Appendix Tables D.1.3 and 1.4).[70] Specifically, mean aqueous dissolved concentrations of copper at HAC-R1 and HAC-U were higher than reference by 4.1- and 4.4-times, respectively, while dissolved selenium concentrations were more elevated compared to reference (5.6- and 13.2-times, respectively; Table 6.8). Despite dissolved aqueous concentrations of copper and selenium being elevated relative to reference, BCFs for primary analytes in tissues from upper Hazeltine Creek were lower than reference or only slightly elevated (< 2-times) relative to reference in most cases in 2024, as expected[71], with few exceptions. These exceptions were for the BCFs for arsenic in composite-taxa tissues from HAC-R1 and HAC-U (2.1- and 3.1-times reference, respectively) and for the BCF for selenium from HAC-R1 (2.4-times reference; Table 6.8). For the secondary analytes identified, the BCFs were between 2- and 10-times greater than reference for barium, calcium, manganese, and strontium, in at least one tissue type for at least one area of upper Hazeltine Creek, while the composite-taxa BCF for manganese were also 17.6-times higher than reference at HAC-U (Table 6.8).

Mean copper concentrations in most tissue types from upper Hazeltine Creek were consistently elevated relative to the reference area (EDC-U) from 2018 to 2024, with the exception of caddisfly tissues at HAC-R1 (in 2022 and 2024) and HAC-U (in 2020 and 2021), and periphyton tissues

[70] Elevated analytes were identified as those with mean concentrations at the exposed station that were at least twice the mean concentration at the reference station.

[71] Both BCFs and trophic TTFs are generally expected to decrease with increasing concentration. Increased BCFs and TTFs with increasing concentrations can be suggestive of enhanced bioavailability or reduced ability of organisms to regulate analytes.

Table 6.8: Summary of Primary and Secondary Analyte Concentrations in Water, Periphyton, Caddisfly, and Composite-Taxa Tissues, BCFs, and TTFs for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes	Component	Metric	Units	n	Area				
					Reference		Exposed		
					Upper Edney Creek	Lower Edney Creek	Upper Hazeltine Creek		Lower Hazeltine Creek
					EDC-U	EDC-D (EDC-REF)	HAC-R1	HAC-U (HAC-R2)	HAC-D (HAC-R5)
Arsenic	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000720	0.000730	0.000458	0.000510	0.000654
	Periphyton	Tissue Mean	mg/kg	8	10.2	12.5	1.86	1.82	7.08
		BCF[e]	unitless	-	14,156	17,178	4,057	3,566	10,820
	Caddisfly	Tissue Mean	mg/kg	8	0.509	7.62	0.359	0.452	2.08
		BCF[e]	unitless	-	707	10,440	784	886	3,185
		TTF[f]	unitless	-	0.0521	0.692	0.216	0.275	0.342
	Composite	Tissue Mean	mg/kg	8	1.87	4.16	2.50	4.17	5.03
		BCF[e]	unitless	-	2,603	5,693	5,475	8,176	7,690
		TTF[f]	unitless	-	0.188	0.392	1.50	2.75	0.953
Copper	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.00194	***0.00363***	***0.00803***	***0.00844***	***0.00989***
	Periphyton	Tissue Mean	mg/kg	8	26.3	16.0	28.4	159	100
		BCF[e]	unitless	-	13,563	4,401	3,534	18,867	10,125
	Caddisfly	Tissue Mean	mg/kg	8	16.4	18.5	17.8	21.9	63.5
		BCF[e]	unitless	-	8,479	5,090	2,214	2,599	6,425
		TTF[f]	unitless	-	0.651	1.21	0.653	0.990	0.784
	Composite	Tissue Mean	mg/kg	8	31.0	36.9	160	176	228
		BCF[e]	unitless	-	15,979	10,169	19,988	20,904	23,061
		TTF[f]	unitless	-	1.18	2.42	5.76	8.32	3.85
Iron	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.202	0.192	0.0444	0.0384	0.0569
	Periphyton	Tissue Mean	mg/kg	8	14,944	11,242	1,229	828	6,501
		BCF[e]	unitless	-	73,979	58,555	27,699	21,573	114,280
	Caddisfly	Tissue Mean	mg/kg	8	406	1,415	166	148	1,928
		BCF[e]	unitless	-	2,012	7,368	3,744	3,845	33,895
		TTF[f]	unitless	-	0.0276	0.129	0.164	0.300	0.408
	Composite	Tissue Mean	mg/kg	8	2,290	1,048	2,184	1,325	3,669
		BCF[e]	unitless	-	11,336	5,460	49,211	34,524	64,490
		TTF[f]	unitless	-	0.174	0.113	2.12	2.16	0.828
Selenium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000159	0.000157	0.000884	0.00207	0.00152
	Periphyton	Tissue Mean	mg/kg	8	0.380	0.959	1.67	2.32	3.98
		BCF[e]	unitless	-	2,390	6,107	1,893	1,117	2,611
	Caddisfly	Tissue Mean	mg/kg	8	0.891	1.55	**11.7**	**14.0**	**9.12**
		BCF[e]	unitless	-	5,605	9,849	13,255	6,747	5,987
		TTF[f]	unitless	-	2.47	1.68	7.04	6.24	2.66
	Composite	Tissue Mean	mg/kg	8	1.40	1.60	**4.61**	**9.58**	**6.46**
		BCF[e]	unitless	-	8,789	10,159	5,212	4,616	4,236
		TTF[f]	unitless	-	3.93	1.66	2.81	4.61	1.77
Barium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.0144	0.0107	0.0137	0.0168	0.0201
	Periphyton	Tissue Mean	mg/kg	8	226	91.4	77.6	195	234
		BCF[e]	unitless	-	15,668	8,541	5,678	11,617	11,627
	Caddisfly	Tissue Mean	mg/kg	8	8.67	60.6	1.67	5.04	43.2
		BCF[e]	unitless	-	602	5,666	122	300	2,148
		TTF[f]	unitless	-	0.0396	0.662	0.0236	0.0483	0.187
	Composite	Tissue Mean	mg/kg	8	23.1	20.4	59.4	55.9	57.1
		BCF[e]	unitless	-	1,602	1,907	4,350	3,323	2,840
		TTF[f]	unitless	-	0.113	0.253	0.842	0.517	0.298
Cadmium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.0000156	0.00000830	0.00000564	0.00000589	0.00000549
	Periphyton	Tissue Mean	mg/kg	8	0.718	0.233	0.114	0.154	0.600
		BCF[e]	unitless	-	46,034	28,042	20,203	26,250	109,380
	Caddisfly	Tissue Mean	mg/kg	8	0.0554	0.158	0.0104	0.0365	0.360
		BCF[e]	unitless	-	3,550	19,021	1,839	6,201	65,678
		TTF[f]	unitless	-	0.0784	0.756	0.0946	0.288	0.615
	Composite	Tissue Mean	mg/kg	8	3.01	0.485	1.72	2.00	3.68
		BCF[e]	unitless	-	193,005	58,464	304,367	340,655	670,445
		TTF[f]	unitless	-	4.13	2.08	15.3	13.8	6.30
Calcium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	19.6	17.2	42.1	52.5	45.5
	Periphyton	Tissue Mean	mg/kg	8	10,606	20,038	215,000	215,375	201,375
		BCF[e]	unitless	-	541	1,165	5,111	4,101	4,422
	Caddisfly	Tissue Mean	mg/kg	8	721	1,619	596	1,142	3,382
		BCF[e]	unitless	-	36.8	94.1	14.2	21.8	74.2
		TTF[f]	unitless	-	0.0685	0.0822	0.00278	0.00527	0.0170
	Composite	Tissue Mean	mg/kg	8	4,674	2,448	40,435	15,445	12,762
		BCF[e]	unitless	-	238	142	961	294	280
		TTF[f]	unitless	-	0.452	0.138	0.187	0.0726	0.0623
Cobalt	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000230	<0.0001	<0.0001	<0.0001	<0.0001
	Periphyton	Tissue Mean	mg/kg	8	16.1	5.79	1.09	1.20	5.91
		BCF[e]	unitless	-	70,109	57,938	10,900	11,968	59,138
	Caddisfly	Tissue Mean	mg/kg	8	0.992	1.66	0.0939	0.153	1.72
		BCF[e]	unitless	-	4,312	16,620	939	1,529	17,165
		TTF[f]	unitless	-	0.0639	0.300	0.0959	0.208	0.343
	Composite	Tissue Mean	mg/kg	8	2.92	0.918	2.19	1.82	3.27
		BCF[e]	unitless	-	12,701	9,181	21,925	18,155	32,675
		TTF[f]	unitless	-	0.178	0.187	2.19	2.03	0.726

Dissolved concentration at exposed area exceeded reference area by less than 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 5-times.
Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05).
Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05).
BCF for exposed area exceeded reference area by less than 2-times.
BCF for exposed area exceeded reference area by at least 2-times.
BCF for exposed area exceeded reference area by at least 10-times.
Mean TTF exceeds 1.
Mean TTF at exposed area exceeds 1 and the corresponding reference area TTF for a given year.
Mean TTF at exposed area exceeds 1, the corresponding reference area TTF for a given year, and mean TTFs for all previous years (pre-breach and 2017 when applicable).

BOLD = mean tissue selenium value exceeds long-term benthic invertebrate tissue guideline for selenium (4 mg/kg dw; BCMOE 2014).

BOLD/ITALICS = Indicates dissolved water value greater than the long-term average British Columbia Water Quality Guideline (BCMOWRLS 2024, 2025).

Notes: Results are shown for primary and secondary analytes that are presented in Table 6.7 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). "-" = no data for dissolved water concentration/ BCF was not calculated for analytes due to no data for dissolved water concentration. "na" = not applicable. Summary statistics reported to 3 significant figures for display purposes. HAC-R2, HAC-R5, and EDC-REF are the alternate names for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Monitoring stations included W10, HAC-13, HAC-05a, and HAC-08 for corresponding tissue sampling stations EDC-D, HAC-R1, HAC-U, and HAC-D, respectively (refer to Appendix Tables D.1.3, D.1.4, D.1.6, and D.1.7). For EDC-U routine water quality data were not available, so BCFs were calculated using spot water quality samples taken during tissue collection.

[b] Sample sizes for water quality monitoring for EDC-U (EDC-U spot water quality monitoring), EDC-D (W10), HAC-R1 (HAC-13), HAC-U (HAC-05a), and HAC-D (HAC-08) were 1, 1, 8, 8, and 9, respectively.

[c] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table D.1.1.

[d] Means were calculated for routine water quality stations using data collected between January 1, 2024 and the time of sampling in August 2024 in order to be consistent with means calculated during previous years (Minnow 2016d, 2017c, 2018c, 2019, 2020a, 2021a, 2022a, 2023a).

[e] Bioconcentration Factor (BCF) = Mean Tissue Concentration (mg/kg dw) / Mean Dissolved Water Concentration (mg/L), if the dissolved water concentration was reported as below the Laboratory Reporting Limit (LRL), then the LRL was substituted for the BCF calculation.

[f] Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated.

Table 6.8: Summary of Primary and Secondary Analyte Concentrations in Water, Periphyton, Caddisfly, and Composite-Taxa Tissues, BCFs, and TTFs for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes	Component	Metric	Units	n	Area				
					Reference		Exposed		
					Upper Edney Creek	Lower Edney Creek	Upper Hazeltine Creek		Lower Hazeltine Creek
					EDC-U	EDC-D (EDC-REF)	HAC-R1	HAC-U (HAC-R2)	HAC-D (HAC-R5)
Manganese	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.187	0.00383	0.0442	0.0316	0.00580
	Periphyton	Tissue Mean	mg/kg	8	6,711	1,258	1,100	3,529	7,298
		BCF[e]	unitless	-	35,889	328,329	24,895	111,581	1,257,837
	Caddisfly	Tissue Mean	mg/kg	8	558	634	85.2	335	1,256
		BCF[e]	unitless	-	2,983	165,516	1,926	10,586	216,426
		TTF[f]	unitless	-	0.0907	0.555	0.0814	0.115	0.249
	Composite	Tissue Mean	mg/kg	8	906	381	1,224	2,700	2,112
		BCF[e]	unitless	-	4,846	99,445	27,695	85,375	364,042
		TTF[f]	unitless	-	0.144	0.349	1.16	0.847	0.707
Mercury	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	-	-	-	-	-
	Periphyton	Tissue Mean	mg/kg	8	0.0600	0.0460	0.00604	0.00585	0.0263
		BCF[e]	unitless	-	-	-	-	-	-
	Caddisfly	Tissue Mean	mg/kg	8	0.0559	0.0543	0.0589	0.0554	0.0594
		BCF[e]	unitless	-	-	-	-	-	-
		TTF[f]	unitless	-	0.960	1.20	9.01	9.50	2.88
	Composite	Tissue Mean	mg/kg	8	0.0956	0.0594	0.0660	0.0901	0.0994
		BCF[e]	unitless	-	-	-	-	-	-
		TTF[f]	unitless	-	1.62	1.27	11.1	10.5	5.20
Molybdenum	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000330	0.000420	0.00654	0.00671	0.00580
	Periphyton	Tissue Mean	mg/kg	8	2.45	1.19	1.04	0.712	1.20
		BCF[e]	unitless	-	7,432	2,840	159	106	206
	Caddisfly	Tissue Mean	mg/kg	8	2.39	4.68	6.80	8.86	5.69
		BCF[e]	unitless	-	7,246	11,134	1,040	1,321	981
		TTF[f]	unitless	-	1.05	4.32	6.79	13.0	5.84
	Composite	Tissue Mean	mg/kg	8	0.822	0.722	2.29	2.71	2.26
		BCF[e]	unitless	-	2,490	1,719	350	404	390
		TTF[f]	unitless	-	0.395	0.628	2.28	4.10	1.97
Strontium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.125	0.115	0.299	0.353	0.337
	Periphyton	Tissue Mean	mg/kg	8	79.6	130	479	479	445
		BCF[e]	unitless	-	636	1,127	1,603	1,358	1,319
	Caddisfly	Tissue Mean	mg/kg	8	5.18	11.7	4.06	5.66	17.7
		BCF[e]	unitless	-	41.4	102	13.6	16.0	52.6
		TTF[f]	unitless	-	0.0661	0.0925	0.00847	0.0118	0.0400
	Composite	Tissue Mean	mg/kg	8	20.4	16.4	240	58.8	47.3
		BCF[e]	unitless	-	163	142	804	167	140
		TTF[f]	unitless	-	0.258	0.130	0.499	0.125	0.108
Titanium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01
	Periphyton	Tissue Mean	mg/kg	8	264	210	64.5	43.5	122
		BCF[e]	unitless	-	26,388	20,988	6,452	4,350	12,192
	Caddisfly	Tissue Mean	mg/kg	8	2.64	26.6	4.69	5.05	40.2
		BCF[e]	unitless	-	264	2,656	469	505	4,023
		TTF[f]	unitless	-	0.0109	0.127	0.0854	0.314	0.376
	Composite	Tissue Mean	mg/kg	8	43.7	19.1	84.4	35.4	87.7
		BCF[e]	unitless	-	4,369	1,910	8,442	3,538	8,766
		TTF[f]	unitless	-	0.204	0.118	1.63	1.50	0.845
Uranium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.0000430	0.0000900	0.000364	0.000532	0.000549
	Periphyton	Tissue Mean	mg/kg	8	0.464	0.252	0.0870	0.0918	0.274
		BCF[e]	unitless	-	10,785	2,796	239	173	499
	Caddisfly	Tissue Mean	mg/kg	8	0.0122	0.0694	0.00368	0.0130	0.0740
		BCF[e]	unitless	-	284	771	10.1	24.5	135
		TTF[f]	unitless	-	0.0296	0.277	0.0435	0.148	0.297
	Composite	Tissue Mean	mg/kg	8	0.174	0.0483	0.0984	0.133	0.135
		BCF[e]	unitless	-	4,058	537	270	250	246
		TTF[f]	unitless	-	0.374	0.205	1.15	1.66	0.598
Vanadium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000640	0.000730	0.00100	0.000925	0.000922
	Periphyton	Tissue Mean	mg/kg	8	34.2	20.6	4.82	4.53	19.0
		BCF[e]	unitless	-	53,457	28,185	4,816	4,897	20,555
	Caddisfly	Tissue Mean	mg/kg	8	0.466	2.59	0.328	0.460	4.58
		BCF[e]	unitless	-	729	3,551	328	497	4,969
		TTF[f]	unitless	-	0.0151	0.147	0.0817	0.174	0.276
	Composite	Tissue Mean	mg/kg	8	4.88	1.80	7.45	4.47	11.1
		BCF[e]	unitless	-	7,627	2,464	7,451	4,832	12,081
		TTF[f]	unitless	-	0.159	0.106	1.85	1.34	0.743

Dissolved concentration at exposed area exceeded reference area by less than 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 5-times.
Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05).
Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05).
BCF for exposed area exceeded reference area by less than 2-times.
BCF for exposed area exceeded reference area by at least 2-times.
BCF for exposed area exceeded reference area by at least 10-times.
Mean TTF exceeds 1.
Mean TTF at exposed area exceeds 1 and the corresponding reference area TTF for a given year.
Mean TTF at exposed area exceeds 1, the corresponding reference area TTF for a given year, and mean TTFs for all previous years (pre-breach and 2017 when applicable).

BOLD = mean tissue selenium value exceeds long-term benthic invertebrate tissue guideline for selenium (4 mg/kg dw; BCMOE 2014).

BOLD/ITALICS = Indicates dissolved water value greater than the long-term average British Columbia Water Quality Guideline (BCMOWRLS 2024, 2025).

Notes: Results are shown for primary and secondary analytes that are presented in Table 6.7 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). "-" = no data for dissolved water concentration/ BCF was not calculated for analytes due to no data for dissolved water concentration. "na" = not applicable. Summary statistics reported to 3 significant figures for display purposes. HAC-R2, HAC-R5, and EDC-REF are the alternate names for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Monitoring stations included W10, HAC-13, HAC-05a, and HAC-08 for corresponding tissue sampling stations EDC-D, HAC-R1, HAC-U, and HAC-D, respectively (refer to Appendix Tables D.1.3, D.1.4, D.1.6, and D.1.7). For EDC-U routine water quality data were not available, so BCFs were calculated using spot water quality samples taken during tissue collection.

[b] Sample sizes for water quality monitoring for EDC-U (EDC-U spot water quality monitoring), EDC-D (W10), HAC-R1 (HAC-13), HAC-U (HAC-05a), and HAC-D (HAC-08) were 1, 1, 8, 8, and 9, respectively.

[c] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table D.1.1.

[d] Means were calculated for routine water quality stations using data collected between January 1, 2024 and the time of sampling in August 2024 in order to be consistent with means calculated during previous years (Minnow 2016d, 2017c, 2018c, 2019, 2020a, 2021a, 2022a, 2023a).

[e] Bioconcentration Factor (BCF) = Mean Tissue Concentration (mg/kg dw) / Mean Dissolved Water Concentration (mg/L), if the dissolved water concentration was reported as below the Laboratory Reporting Limit (LRL), then the LRL was substituted for the BCF calculation.

[f] Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated.

from HAC-R1 (from 2019 to 2021 and in 2024; Figures 6.9 and 6.10, Table 6.7; Appendix Tables D.5.1 to D.5.3, F.4.1 to F.4.10). The relative (exposed-reference) differences of copper concentrations for all tissue types from HAC-R1 and HAC-U in each year were similar to or significantly lower than the first or second year of post-breach monitoring (i.e., 2018 or 2019) with one exception (Figures 6.9 and 6.10, Table 6.7). The one exception was the relative difference of copper concentrations in in composite-taxa tissues from HAC-U that steadily increased from 2020 to 2022 then decreased significantly between 2022 to 2023 and remained unchanged in 2024 (Figure 6.10, Table 6.7). Copper concentrations in composite-taxa tissue from both areas of upper Hazeltine Creek have consistently been significantly higher than pre-breach conditions from 2021 to 2024, but in periphyton tissues were similar to or significantly lower than pre-breach conditions for all years (2018 to 2024; Figures 6.9 and 6.10, Table 6.7). The TTFs for copper in caddisfly tissues were significantly higher than reference in 2018, 2019, and 2021 at HAC-R1 and did not differ from reference at HAC-U (in any years). However, copper TTFs in exposed composite-taxa tissues were significantly higher than reference in all years (i.e., 2018 to 2024) at HAC-R1, and in most years (except 2018 and 2020) at HAC-U (Table 6.9; Appendix Figures F.4.7 to F.4.10, Appendix Tables F.4.11 to F.4.16). The copper TTFs for caddisfly and composite-taxa tissues from HAC- R1 and HAC-U in each year were similar to or significantly lower than the first year of post-breach monitoring (2018), except for the TTF for composite-taxa tissues at HAC-U in 2022 (Table 6.9). Combined, these results indicate that there has been no sustained increase in copper concentrations in the periphyton and benthic invertebrate tissues from upper Hazeltine Creek (or in the trophic transfer of copper to benthic invertebrates) since 2019 or earlier.

Mean concentrations of selenium in all tissue types from upper Hazeltine Creek were consistently elevated relative to the reference area (EDC-U) from 2018 to 2024 (Figures 6.9 and 6.10, Table 6.7; Appendix Tables F.4.1 to F.4.10). In 2024, the relative difference in selenium concentrations for all tissues from upper Hazeltine Creek was significantly higher than in the first year of post-breach monitoring (2018), except for composite-taxa tissues from HAC-R1. The relative (exposed-reference) difference of selenium concentrations decreased significantly between 2023 and 2024 in composite-taxa tissues from HAC-R1 and caddisfly tissues from HAC-U. For composite-taxa tissues from HAC-R1, this significant decrease between 2023 and 2024 resulted in selenium concentrations in 2024 that were similar to the first year of post-breach monitoring (2018; as well as 2019 and 2022), and for caddisfly tissues from HAC-U this resulted in selenium concentrations in 2024 that were similar to those in 2021 and 2022 (Figures 6.9 and 6.10, Table 6.7). The relative difference of selenium concentrations in most remaining tissues from upper Hazeltine Creek have been stable since at least 2021, except for periphyton tissue from HAC-R1. For periphyton tissue at HAC-R1, the relative difference in

Table 6.9: Summary of Statistical Contrasts for Caddisfly and Composite-Taxa Benthic Invertebrate Tissue Trophic Transfer Factors of Primary and Secondary Analytes with a Significant Positive Exposed - Reference Relative Difference for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024[a]

	Analytes	Upper Hazeltine Creek Reach 1 (HAC-R1; Exposed) — Upper Edney Creek (EDC-U; Reference)														Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2]; Exposed) — Upper Edney Creek (EDC-U; Reference)														Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5]; Exposed) — Lower Edney Creek (EDC-D [EDC-REF]; Reference)													
		Caddisfly							Composite-Taxa Benthic Invertebrate							Caddisfly							Composite-Taxa Benthic Invertebrate							Caddisfly							Composite-Taxa Benthic Invertebrate						
		2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Primary Analytes	Arsenic	A	A	A	A	A	A	A	AB (↑)	B (↑)	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	ABC	A	AB	C	AB	BC	AB	BC (ns)	C (↑)	BC (ns)	BC (↑)	A (↑)	BC (↑)	AB (↑)	C	A	AB	AB	B	AB	B	C (ns)	A (ns)	AB (ns)	B (ns)	AB (ns)	A (ns)	A (ns)
	Copper	AB	A	BCD	ABC	D	CD	CD	AB (↑)	BC (↑)	BC (↑)	A (↑)	BC (ns)	C (ns)	ABC (↑)	A	A	A	A	A	A	A	BC (ns)	BC (ns)	C (ns)	ABC (ns)	A (↑)	AB (ns)	AB (ns)	C	AB	A	BC	AB	B	AB	D (↓)	BC (ns)	BCD (ns)	CD (ns)	CD (ns)	A (ns)	AB (ns)
	Iron	AB	A	BC	ABC	C	ABC	BC	B -	B -	B -	A -	B -	B -	B -	AB	A	C	BC	AB	AB	AB	A -	A -	A -	A -	A -	A -	A -	D	AB	C	ABC	BC	AB	A	C -	AB -	B -	B -	AB -	A -	A -
	Selenium	A	A	A	A	A	A	A	BC (ns)	BC (ns)	AB (ns)	A (↑)	AB (ns)	CD (ns)	D (ns)	D	CD	CD	BC	AB	A	BCD	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	B	BC	CD	B	D	A	D	A (ns)	AB (ns)	BCD (ns)	ABC (ns)	CD (ns)	ABC (ns)	D (ns)
Secondary Analytes	Barium	AB	A	B	C	AB	AB	BC	C (ns)	ABC (ns)	BC (ns)	C (ns)	A (ns)	BC (ns)	AB (ns)	BCD	A	CD	D	AB	AB	BC	C (ns)	AB (ns)	C (ns)	BC (ns)	A (ns)	A (ns)	AB (ns)	D	A	ABC	AB	BC	C	ABC	B (↓)	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)
	Cadmium	ABC	A	BC	C	AB	ABC	BC	BC (↑)	C (↑)	ABC (ns)	ABC (↑)	A (ns)	AB (↑)	A (↑)	BC	A	D	CD	A	AB	ABC	BC (↑)	C (ns)	C (ns)	C (↑)	A (ns)	AB (↑)	A (↑)	C	B	B	A	B	BC	B	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	A (ns)	A (↑)
	Calcium	A	A	B	B	B	B	B	A (ns)	CD (↓)	D (↓)	CD (↓)	BC (↓)	B (ns)	B (ns)	A	A	D	C	B	C	BC	B (↓)	B (ns)	C (↓)	B (↓)	A (ns)	A (ns)	B (↓)	CD	CD	DE	A	E	BC	B	CD (↓)	DE (↓)	E (↓)	A (ns)	DE (↓)	AB (ns)	BC (ns)
	Cobalt	AB	A	BC	CD	BCD	B	D	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	BCD	A	E	DE	AB	ABC	CDE	A (ns)	A (↑)	A (ns)	A (↑)	A (ns)	A (↑)	A (↑)	B	A	A	A	A	A	A	C (ns)	AB (ns)	AB (ns)	B (ns)	AB (ns)	A (ns)	AB (ns)
	Manganese	B	A	BCD	CD	B	BC	D	C (ns)	AB (↑)	BC (ns)	AB (↑)	A (ns)	ABC (ns)	AB (↑)	BC	A	E	DE	AB	CD	CDE	BC (ns)	A (↑)	C (ns)	BC (↑)	A (ns)	A (↑)	AB (↑)	C	B	B	A	B	BC	BC	C (ns)	AB (ns)	AB (ns)	AB (ns)	AB (ns)	A (ns)	B (ns)
	Mercury	C	ABC	A	AB	BC	C	C	D (↑)	CD (↑)	A (↑)	AB (↑)	BC (↑)	D (↑)	CD (↑)	B	A	A	A	A	AB	A	B (ns)	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	A (↑)	D	ABCD	AB	CD	ABC	A	BCD	BC (↓)	A (ns)	AB (ns)	C (↓)	AB (ns)	AB (ns)	A (ns)
	Molybdenum	AB	D	A	A	CD	BC	AB	E (ns)	CDE (ns)	A (ns)	AB (↑)	DE (ns)	BCD (ns)	ABC (ns)	B	C	A	B	B	B	A	B (ns)	B (ns)	A (ns)	B (ns)	C (ns)	B (ns)	AB (ns)	A	AB	AB	C	B	AB	B	A (ns)	A (ns)	A (ns)	A (↓)	A (ns)	A (ns)	A (ns)
	Strontium	A	A	C	BC	B	B	BC	A (ns)	CD (ns)	D (ns)	CD (ns)	BC (ns)	AB (ns)	AB (ns)	AB	A	E	D	A	CD	BC	B (↓)	B (ns)	C (↓)	B (ns)	A (ns)	A (ns)	B (ns)	DE	CD	DE	A	E	BC	AB	B (↓)	B (↓)	B (↓)	A (ns)	B (↓)	A (ns)	A (ns)
	Titanium	-	A	A	A	A	A	A	-	B -	B -	A -	B -	B -	B -	-	A	C	BC	AB	AB	A	-	AB -	B -	A -	B -	A -	AB -	-	A	A	A	A	A	A	- -	B -	B -	AB -	AB -	A -	A -
	Uranium	ABC	A	D	BCD	ABC	AB	CD	B (ns)	B (↑)	B (↑)	A (↑)	A (↑)	B (↑)	B (↑)	BC	AB	D	C	A	AB	AB	CD (ns)	ABC (ns)	D (ns)	BC (↑)	A (ns)	AB (↑)	ABC (↑)	C	AB	AB	A	B	AB	AB	C (↓)	AB (ns)	AB (ns)	B (ns)	AB (ns)	A (ns)	AB (ns)
	Vanadium	A	A	B	AB	B	AB	AB	B (↑)	B (↑)	B (↑)	A (↑)	AB (↑)	B (↑)	B (↑)	AB	A	C	BC	AB	AB	A	A (ns)	A (↑)	A (ns)	A (↑)	A (ns)	A (↑)	A (↑)	C	AB	B	AB	B	A	AB	D (ns)	C (ns)	C (ns)	C (ns)	BC (ns)	A (ns)	AB (ns)

Indicates significantly higher TTF at exposed compared to reference area, and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly lower TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly higher TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly lower TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

(↑) = Indicates significantly higher tissue concentration relative to pre-breach in 2010 (α = 0.05).

(↓) = Indicates significantly lower tissue concentration relative to pre-breach in 2010 (α = 0.05).

(ns) = no significant different in analyte concentration relative to pre-breach in 2010 (α = 0.05).

Notes: "-" = no statistical comparison could be made since data were not available or all results were below Laboratory Reporting Limit (LRL). Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated. Refer to Appendix Tables F.4.11 to F.4.16 and F.4.22 to F.4.24 for statistical analyses results and magnitude of difference calculations. HAC-R2, HAC-R5, and EDC-REF are the alternate names for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Results are shown for primary and secondary analytes that are presented in Table 6.7 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). Years that share a letter (e.g., A,B,C) had ratios of TTFs (Exposed:Reference) that did not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

selenium concentrations was temporally stable from 2019 to 2022, then increased significantly in 2023 and remained unchanged in 2024, largely owing to a decrease in reference concentrations in 2023 and 2024 (Figures 6.9 and 6.10, Table 6.7). Mean concentrations of selenium in caddisfly (11.7 mg/kg dw at HAC-R1 and 14.0 mg/kg dw at HAC-U) and composite-taxa (4.61 mg/kg dw at HAC-R1 and 9.58 mg/kg dw at HAC-U) tissues from upper Hazeltine Creek in 2024 were above the BC interim guideline for aquatic life (4 mg/kg dw; BCMOE 2014; Table 6.8; Appendix Tables D.5.2 and D.5.3), which is consistent with most results from 2020 to 2023 (Figures 6.9 and 6.10). The selenium concentrations in caddisfly tissues from HAC-U in 2024 were notable, with a mean concentration that was 3.5-times the guideline (14.0 mg/kg dw), and a maximum concentration 5-times the guideline (20.1 mg/kg dw; Figure 6.10; Appendix Table D.5.2). Similar to previous monitoring years, selenium concentrations in periphyton and composite-taxa tissues[72] remained significantly lower than or similar to pre-breach conditions for both areas of upper Hazeltine Creek (Figures 6.9 and 6.10, Table 6.7; Appendix Tables D.5.1 to D.5.3, F.4.1 to F.4.10).

The TTFs for selenium in caddisfly and composite-taxa tissues from upper Hazeltine Creek were consistently higher than reference (from 2018 to 2024), except for composite-taxa tissue at HAC-R1 in 2023 and 2024 which was similar to reference (Table 6.9). Evaluation of temporal changes showed that selenium TTFs from upper Hazeltine Creek in 2024 were similar to or significantly lower than the first year of post-breach monitoring (2018) and also similar to prebreach conditions (Table 6.9). The TTFs for selenium in caddisfly tissues from HAC-R1 and composite-taxa tissues from HAC-U were temporally stable from 2018 to 2024. In contrast, the selenium TTFs in composite-taxa tissues from HAC-R1 in 2024 were similar to 2023 but significantly lower than all other prior years, while the selenium TTFs for caddisfly tissues from HAC-U decreased significantly between 2023 and 2024 to a result that was similar to all prior years. These decreases in the selenium TTFs for composite-taxa and caddisfly tissues from HAC-R1 and HAC-U, respectively, in 2024 compared to prior years corresponded with significantly decreased selenium concentrations in these benthic invertebrate tissues.

Collectively, temporal evaluations of tissue selenium results from upper Hazeltine Creek indicated an increase in post-breach periphyton and benthic invertebrate tissue selenium concentrations and trophic transfer of selenium to benthic invertebrates, particularly in caddisfly tissues, relative to reference. The increased selenium concentrations in benthic invertebrate tissues in upper Hazeltine Creek over the post-breach period (and increased TTFs for caddisfly tissue) have corresponded with increases in sediment selenium concentrations compared to reference (see Section 6.1.1.1 for sediment results), but not with aqueous total and dissolved selenium

[72] Caddisfly tissue results cannot be compared to pre-breach values because monitoring of this tissue type was initiated in 2018.

concentrations (which have not changed or decreased significantly from 2015 to 2024; Appendix Figures D.1.1. to D.1.3, Appendix Table D.1.9). In addition, the greater elevation of selenium concentrations in benthic invertebrate tissues from HAC-U compared to HAC-R1 in 2024 (and prior years) corresponded with the higher aqueous concentrations of total and dissolved concentrations of selenium, selenate, and selenite at this area (Appendix Figures D.1.1 to D.1.4, Appendix Tables D.1.3 and D.1.4). Dietary exposure is a more likely predictor of selenium bioaccumulation in benthic invertebrates (Mendes et al. 2023) than sediment exposure and primary benthic invertebrate consumers (e.g., scrapers, shredders, filterers, and collector-gatherer feeding groups of periphyton) typically have higher tissue selenium concentrations than predatory benthic invertebrate consumers. Caddisflies, in particular, have been shown to be 'hyper-accumulators' of selenium (Wayland and Crosley 2006; Mendes et al. 2022; Mendes et al. 2023) which is consistent with the higher selenium concentrations observed in caddisfly tissue compared to composite-taxa tissue samples. An increase in the selenium concentrations of any benthic invertebrate tissues did not occur over the last year (i.e., since 2023), and has not occurred in most benthic invertebrate tissues since at least 2021, with the notable exception of caddisflies from HAC-U in 2022 and 2023. Rather, the concentrations of selenium in exposed tissues and the trophic transfer of selenium to benthic invertebrates in 2024 were both lower than at least one prior year for composite-taxa and caddisfly tissues from HAC-R1 and HAC-U, respectively.

The third primary analyte, arsenic, had significantly higher concentrations relative to reference for composite-taxa tissues in 2024 at both HAC-R1 and HAC-U (Figures 6.9 and 6.10, Table 6.7). The relative difference for arsenic in composite-taxa tissues has not increased significantly compared to the first year of post-breach monitoring (2018), except for at HAC-U in 2022 (Figures 6.9 and 6.10, Table 6.7). Concentrations of arsenic in composite-taxa tissues concentrations from both areas of upper Hazeltine Creek in all post-breach years were similar to or significantly lower than pre-breach concentrations (Table 6.7; Appendix Tables F.4.7 and F.4.10). The TTFs for arsenic in composite-taxa tissues from both upper Hazeltine Creek areas have been significantly higher than reference and pre-breach conditions (for composite-taxa tissues) for all monitoring years, but have not increased significantly compared to the first year of monitoring (i.e., 2018) except for in 2022 at HAC-U (Table 6.9). Although composite-taxa tissue BCFs and TTFs were elevated relative to reference in 2024 (Tables 6.8 and 6.9), the absence of significantly increased concentrations of arsenic in these tissue in 2024 compared to the first year of post-breach monitoring (2018), relative to reference, indicate there was no sustained increase in arsenic concentrations in periphyton or benthic invertebrate tissues or in the trophic transfer of arsenic to benthic invertebrates over the post-breach period.

Concentrations of the seven secondary analytes identified for data interpretation in exposed tissues (barium, calcium, manganese, molybdenum, strontium, titanium, and vanadium) varied among tissue types (Figures 6.9 and 6.10, Table 6.7; Appendix Figures F.4.1 to F.4.6, Appendix Tables D.5.1 to D.5.3, F.4.1 to F.4.10). Periphyton tissues from both upper Hazeltine Creek areas only had concentrations of calcium and strontium that were consistently higher than reference and pre-breach conditions in all years (2018 to 2024; Table 6.7). However, the relative (exposed-reference) difference of calcium and strontium concentrations in periphyton tissues in each year has not increased significantly compared to 2019 or earlier (Figures 6.9 and 6.10, Table 6.7). Composite-taxa tissues from both upper Hazeltine Creek areas also had concentrations of calcium and strontium in 2024 that were significantly higher than reference and pre-breach conditions, except for strontium at HAC-U which was similar to pre-breach conditions. Temporally, the relative difference of calcium and strontium concentrations in composite-taxa tissues at HAC- R1 and HAC-U have varied but in 2024 were significantly lower or similar compared to the first year of post-breach monitoring (Figures 6.9 and 6.10, Table 6.7). The TTFs for calcium and strontium in composite-taxa tissues from both upper Hazeltine Creek areas in 2024 were similar to or significantly lower than reference and pre-breach in 2024 (Table 6.9), although the BCFs for both analytes in composite-taxa tissues were higher compared to reference at both HAC-R1 and HAC-U in 2024 (Table 6.8). These observations indicate that while calcium and strontium concentrations were significantly higher in composite-taxa tissues from upper Hazeltine Creek, there has been no sustained increase in the concentrations of these analytes in exposed tissues over the post-breach period, relative to reference, and the trophic transfer of these analytes to benthic invertebrates has remained lower than reference conditions (Table 6.9; Appendix Figures F.4.7 to F.4.10, Appendix Tables F.4.11 to F.4.16).

Caddisfly and composite-taxa tissues from both areas of upper Hazeltine Creek had concentrations of molybdenum that were significantly higher than reference in most years, excluding 2022 for both tissue types from both areas, 2019 for caddisfly tissues from both areas, and 2023 for caddisfly tissues from HAC-R1 only (Figures 6.9 and 6.10, Table 6.7; Appendix Tables F.4.5 and F.4.10). Although the relative difference of molybdenum concentrations in caddisfly and composite-taxa tissues have varied temporally, the relative difference in 2024 was similar to or significantly lower than the first year of post-breach monitoring. In addition, molybdenum concentrations in composite-taxa tissues from both exposed areas were similar to or significantly lower than pre-breach conditions, except for 2020 at HAC-U (Figures 6.9 and 6.10, Table 6.7). The TTFs for molybdenum in caddisfly and composite-taxa tissues from both areas of upper Hazeltine Creek were significantly higher than at the reference area in most years (including 2024), but for composite-taxa tissues were similar to pre-breach conditions (for which pre-breach data exist), except for at HAC-R1 in 2021 (Table 6.9). The relative differences of the

TTFs in 2024 were similar to the first or second year of post-breach monitoring (i.e., 2018 or 2019), except for the TTFs for caddisfly tissues from HAC-U in 2024 which were significantly higher than most prior years (except 2020; Table 6.9; Appendix Figures F.4.7 to F.4.10, Appendix Tables F.4.11 to F.4.16). However, the relative difference of molybdenum concentrations in caddisfly tissues from HAC-U in 2024 were not similarly higher than most previous years (Figure 6.10, Table 6.7). Collectively, the results for molybdenum indicate there has been no sustained increase in the concentrations of this analyte in periphyton and benthic invertebrate tissues over the post-breach period, and the trophic transfer of molybdenum to benthic invertebrates also did not increase over this period, except for caddisfly tissues from HAC-U.

Concentrations of four secondary analytes in composite-taxa tissues from upper Hazeltine Creek were significantly higher than reference in 2024, including barium concentrations at both areas (HAC-R1 and HAC-U), titanium and vanadium concentrations at HAC-R1, and manganese concentrations at HAC-U (Figures 6.9 and 6.10, Table 6.7). For each of these analytes, the concentrations in composite-taxa tissues from both exposed areas throughout the post-breach monitoring period (i.e., 2018 to 2024) have remained similar to or significantly lower than pre-breach conditions, with one exception (vanadium concentrations at HAC-R1 in 2021). In addition, the relative differences in the concentrations of these analytes in 2024 were similar to the first or second years of post-breach monitoring (i.e., 2018 or 2019), indicating there has been no consistent increase over the post-breach period. For titanium, the relative differences in the concentrations of this analyte in composite-taxa tissues were also temporally stable over the post-breach monitoring period (i.e., no significant *Area*×*Year* interaction). The TTFs for barium in composite-taxa tissues from both upper Hazeltine Creek areas were significantly higher than at the reference area from 2022 to 2024, and in 2019 and 2020 at HAC-R1, and 2019 at HAC-U. Similarly, composite-taxa tissues from HAC-R1 had TTFs for titanium and vanadium that were significantly higher than reference in all years (i.e., 2018 to 2024), as did the composite-taxa TTFs for manganese at HAC-U (Table 6.9). The TTFs for these four analytes were significantly higher than pre-breach conditions in most post-breach monitoring years; however, in all cases the TTFs in 2024 for these analytes in composite-taxa tissues were similar to either the first or second year of post-breach monitoring (Table 6.9; Appendix Figures F.4.7 to F.4.10, Appendix Tables F.4.11 to F.4.16). Combined, these results indicate that there has been no sustained increase over the post-breach period in the concentrations of these four secondary analytes in periphyton and benthic invertebrate tissues or in the trophic transfer of these analytes to benthic invertebrates.

Overall, the results of tissue quality monitoring in upper Hazeltine Creek indicated that while copper concentrations in periphyton and benthic invertebrate tissues in 2024 were significantly higher than reference (all tissue types) and pre-breach (composite-taxa tissues only), there was no consistent increase in the concentrations of copper in exposed tissues over the

post-breach period (i.e., compared to 2019 or earlier), or in the trophic transfer of copper to benthic invertebrates. Selenium concentrations in periphyton and benthic invertebrates (caddisfly and composite-taxa) from upper Hazeltine Creek were consistently higher than reference throughout the post-breach period (i.e., 2018 to 2024). While results indicated a temporal increase in the concentrations of selenium in exposed tissues as well as the trophic transfer of selenium to benthic invertebrates over the post-breach period, relative to reference, no increase occurred over the last year (i.e., since 2023) in any benthic invertebrate tissues from upper Hazeltine Creek. Additionally, most benthic invertebrate tissues have shown no increase in selenium concentrations since at least 2021, with the notable exception of caddisflies from HAC-U in 2022 and 2023. Rather, the concentrations of selenium in exposed tissues, and the trophic transfer of selenium to benthic invertebrates, were lower in 2024 than at least one prior year for composite-taxa and caddisfly tissues from HAC-R1 and HAC-U, respectively. Mean selenium concentrations in benthic invertebrate tissues from upper Hazeltine Creek have been above the guideline for the protection of aquatic life since 2020 or 2021, despite remaining lower than pre-breach conditions (where pre-breach data are available). The magnitude of the selenium guideline exceedance in 2024 was higher at HAC-U than at HAC-R1, which corresponded with the higher aqueous concentrations of total and dissolved concentrations of selenium, selenate, and selenite at this area, as well as increasing concentrations of selenium in sediments over time, relative to reference. For the remaining primary and secondary analytes, there was no sustained increase in the concentrations of these analytes in exposed tissues, relative to reference, or in the trophic transfer of the analytes to benthic invertebrates, over the post-breach period as evidenced by results that were similar to the first or second year of post-breach monitoring (i.e., 2018 or 2019).

6.1.4.2 Lower Hazeltine Creek

For most analytes evaluated, concentrations in periphyton and/or benthic invertebrate tissues at the lower Hazeltine Creek area have not increased relative to the reference area over time (Appendix Figures F.4.11 to F.4.13, Appendix Tables D.5.4 to D.5.6, F.4.17 to F.4.21). Three primary analytes (copper, iron, and selenium) and 11 secondary analytes (barium, cadmium, calcium, cobalt, manganese, mercury, molybdenum, strontium, titanium, uranium, and vanadium) met the criteria for inclusion in data interpretation (i.e., had concentrations in at least one tissue type from the exposed lower Hazeltine Creek area that were significantly higher than reference in 2024 or in all years; Figure 6.11, Table 6.7).

MPMC implements routine water quality monitoring in lower Hazeltine Creek at HAC-08 (a station upstream of HAC-D; Figure 4.2). Results from this routine water quality monitoring station indicated that of the primary and secondary analytes, only aqueous concentrations of dissolved

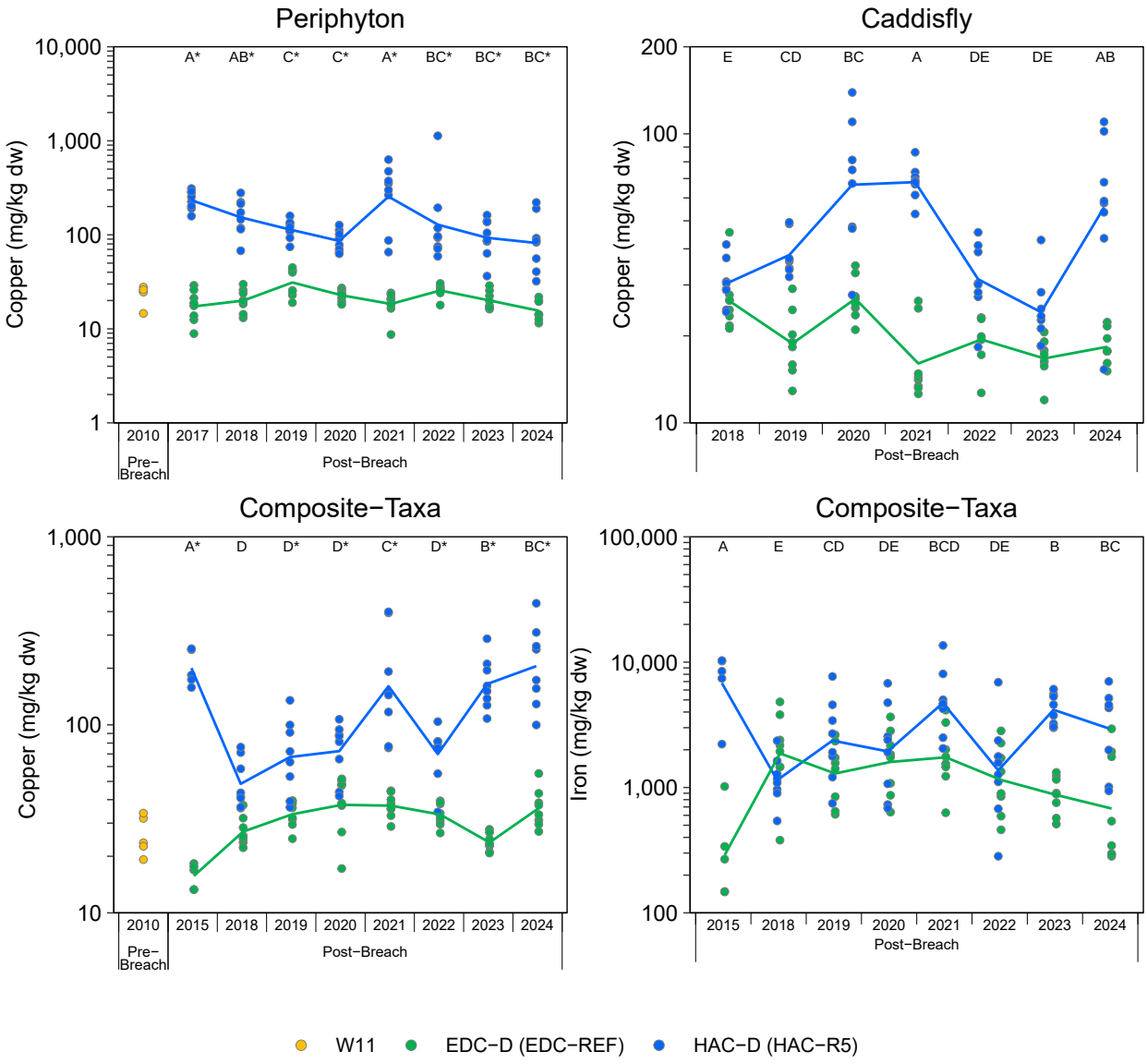
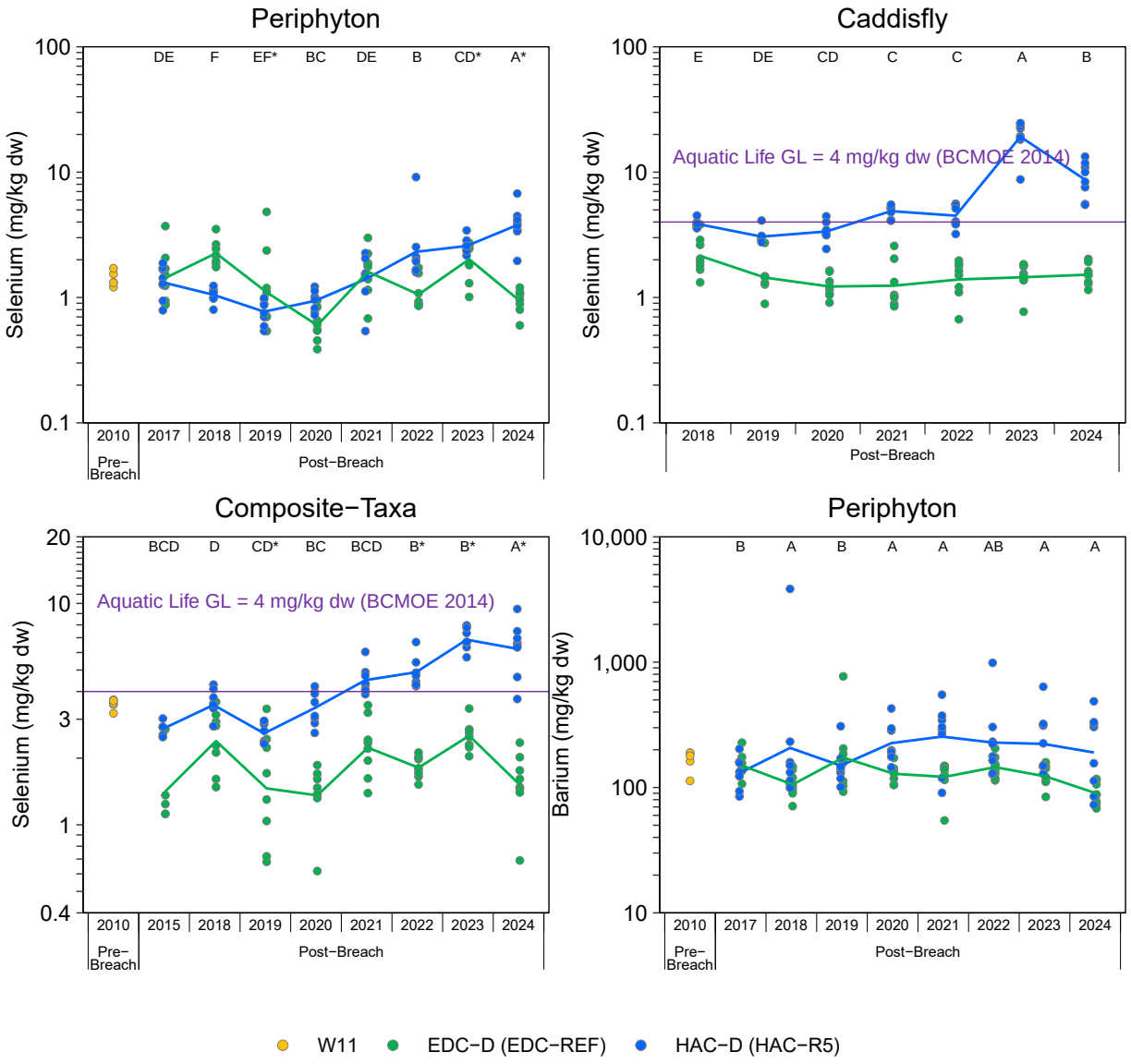


Figure 6.11: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: GL = Guideline, mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre−breach equivalent of HAC−D (HAC−R5). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed−reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least −squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log-normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the exposed site is different than pre-breach conditions, as determined using a one-way temporal ANOVA. Only years with samples from both reference and exposed areas are plotted.



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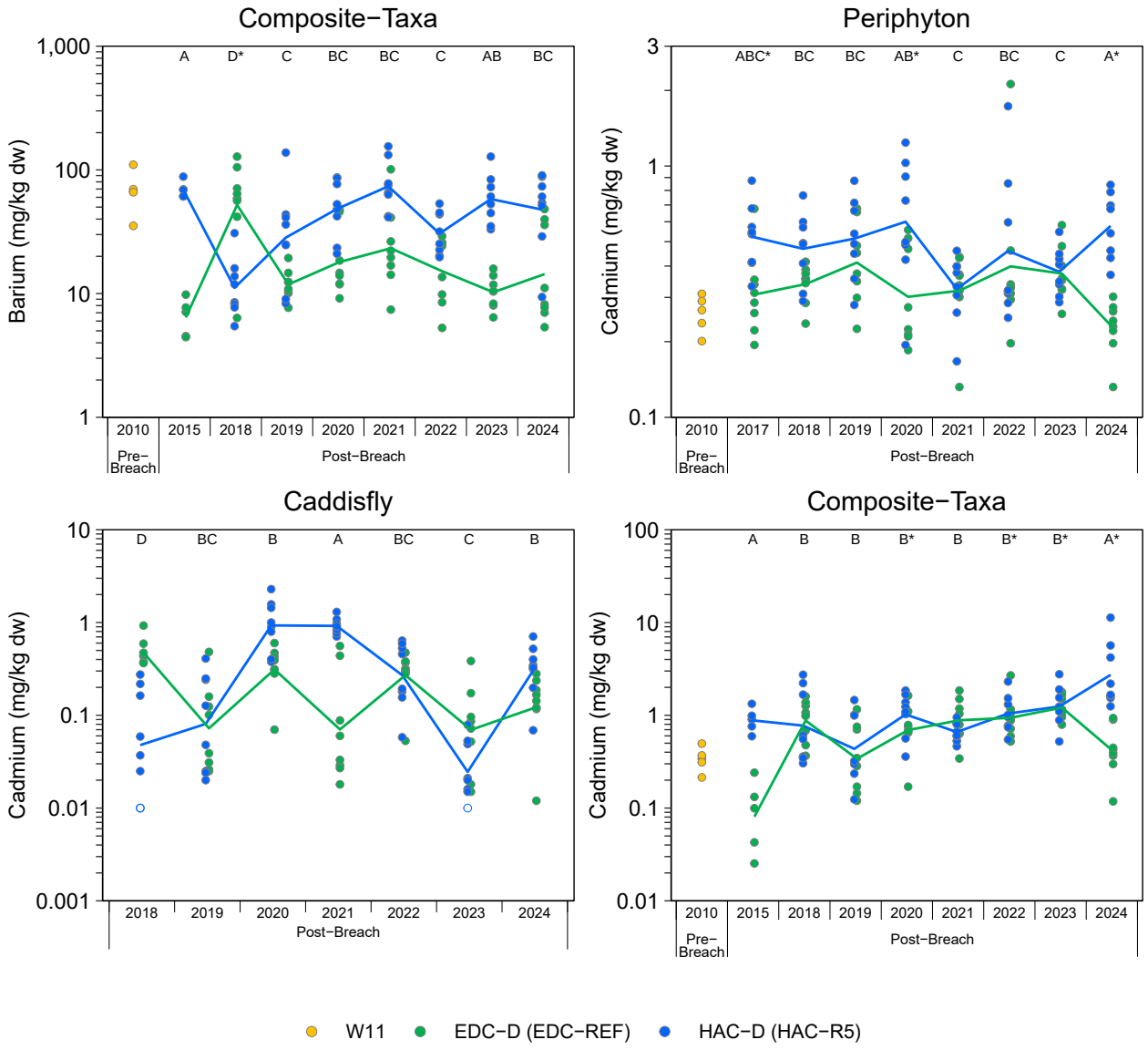

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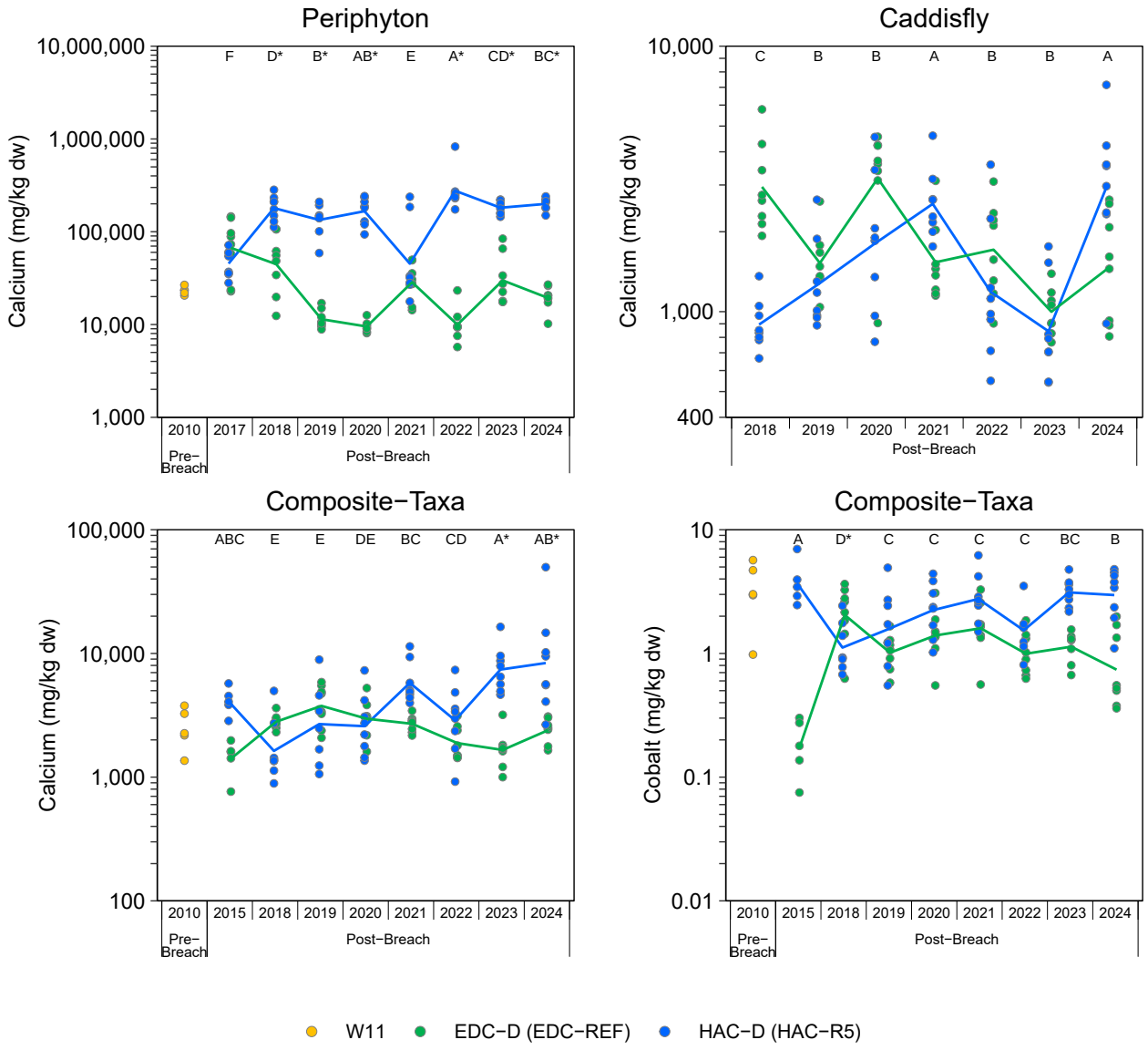

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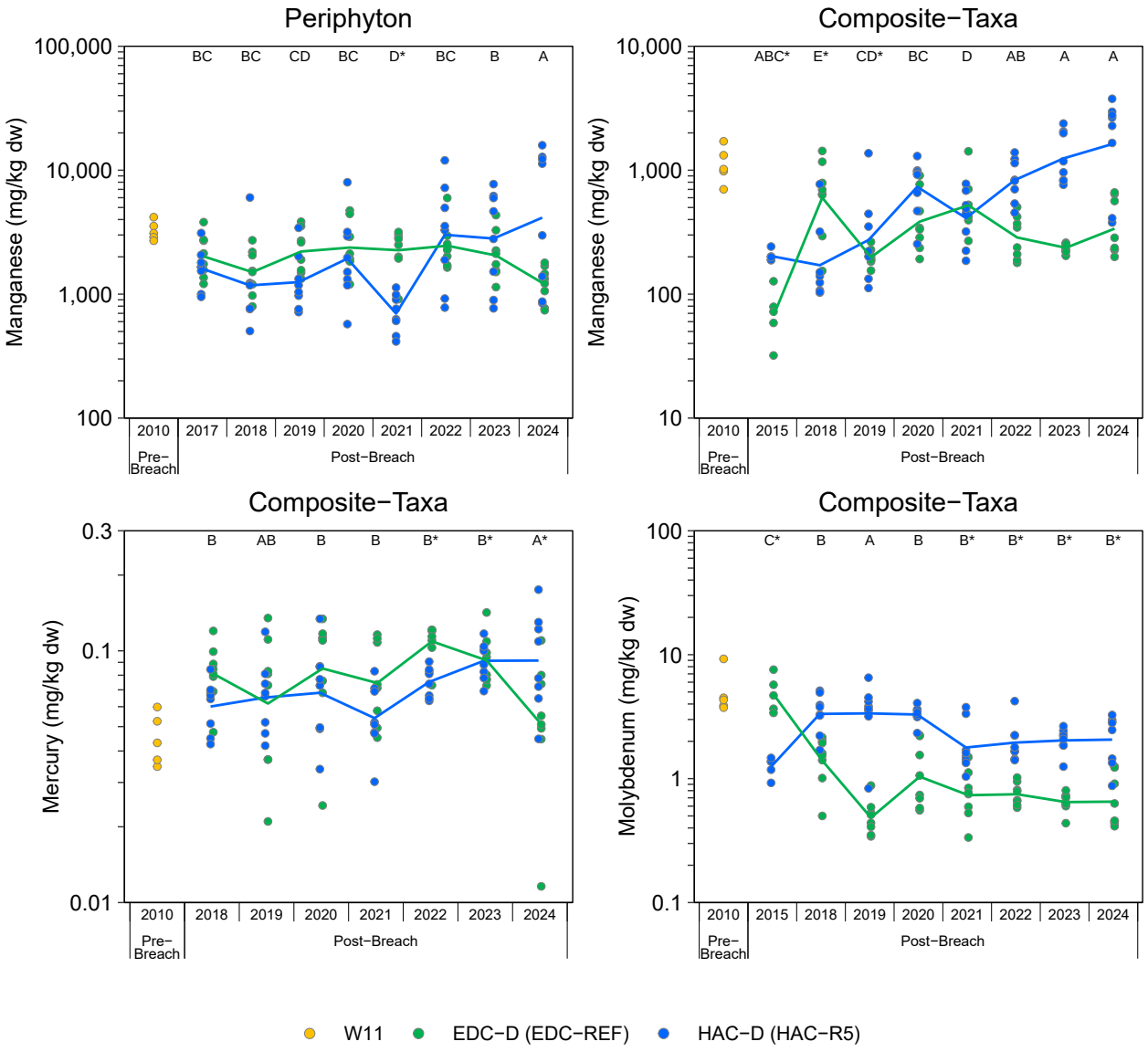

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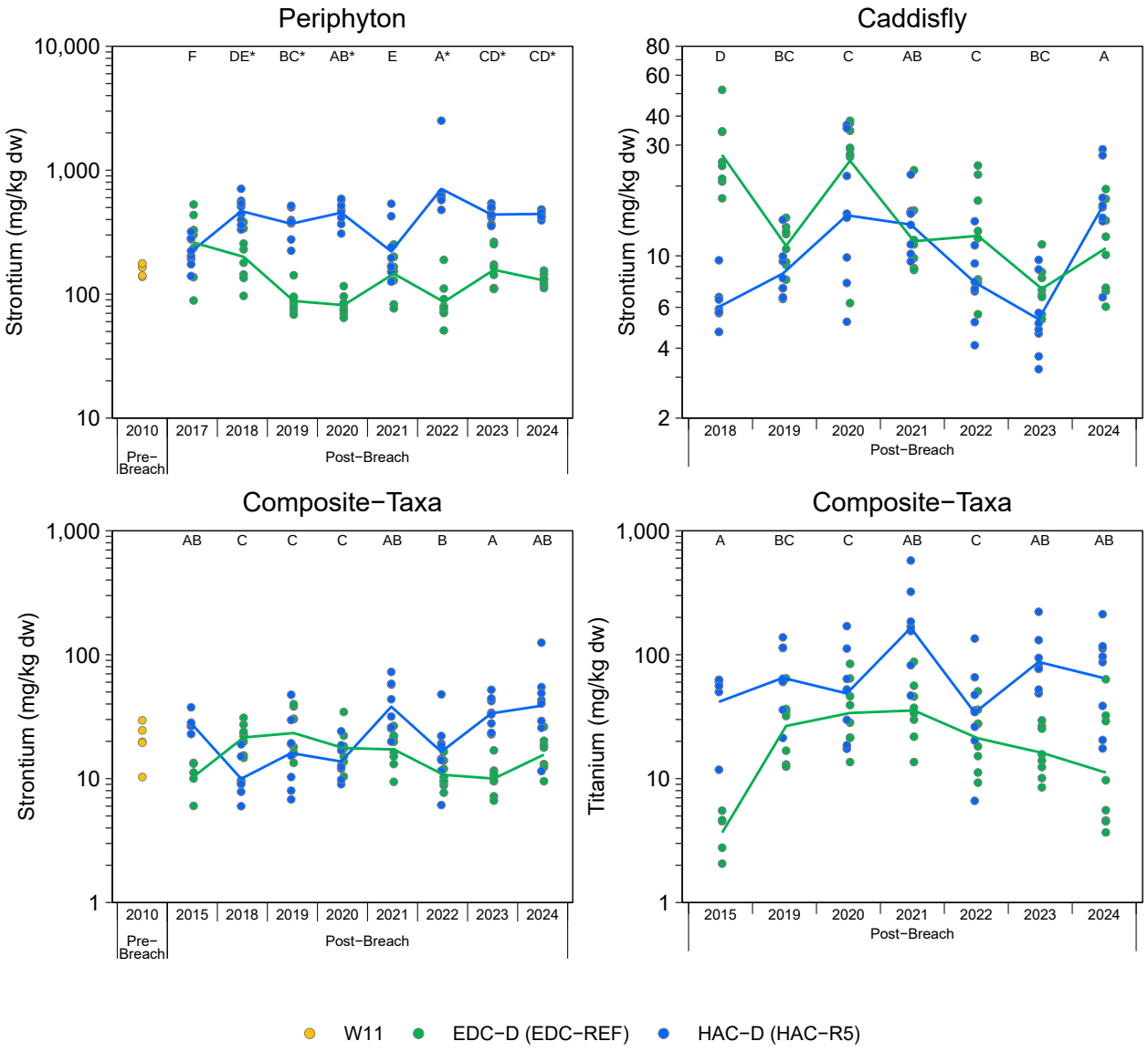

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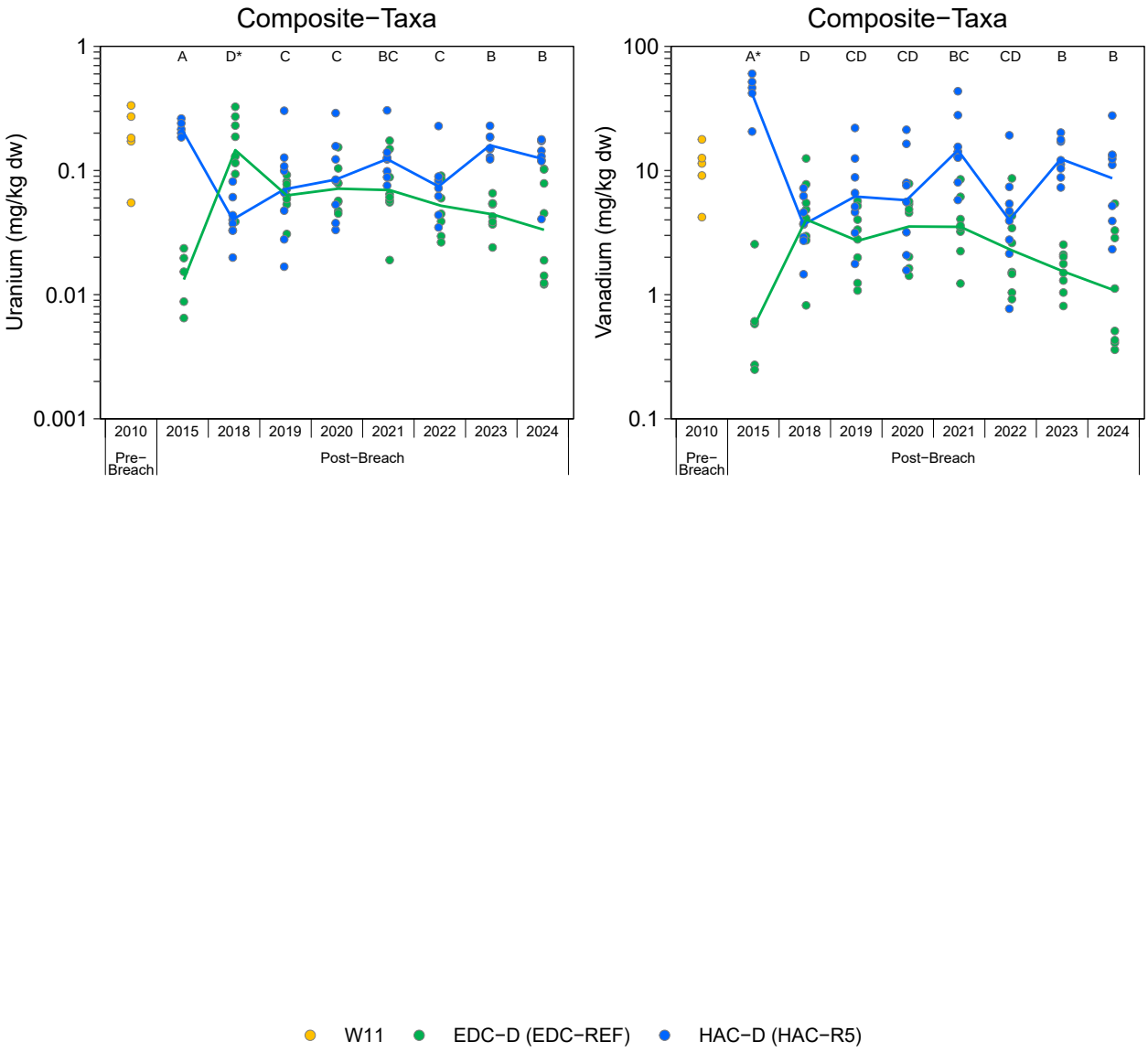

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copper and total selenium exceeded the BCWQG during the year preceding sampling (i.e., September 2023 to August 2024). Specifically, concentrations of dissolved copper consistently exceeded the chronic BCWQG (100% of samples) and total selenium exceeded the chronic BCWQG in 7.7% of samples (Appendix Table D.1.6). Temporal analysis of routine water quality data from HAC-08 from 2015 to 2024 indicated that, of the three primary and 11 secondary analytes identified for data interpretation (above), only concentrations of dissolved vanadium increased significantly (Appendix Figures D.1.1 to D.1.3, Appendix Table D.1.9). Evaluation of aqueous selenium speciation parameters was initiated in 2024 (see Section 4.6 for details) to investigate possible causes of the temporal increases of selenium concentrations in periphyton and benthic invertebrate tissues from Hazeltine Creek (Minnow 2024a). This monitoring indicated that mean concentrations of selenate and selenite at HAC-08 were 8.3- and 2.6-times those reported at the reference area (EDC-D), respectively. Concentrations of the remaining measured selenium species (selenocyanate and unknown selenium species) were below the LRL at all sampling stations (Appendix Tables D.1.2 and D.1.6, Appendix Figure D.1.4).

Of the three primary and 11 secondary analytes identified for inclusion in data interpretation, only dissolved aqueous concentrations of copper, selenium, calcium, molybdenum, strontium, and uranium were elevated (greater than 2-times reference) at HAC-D relative to the reference area (Table 6.8)[73]. BCFs were slightly (<2-times) higher than reference for copper in caddisfly tissues and for iron in periphyton tissues, were between 2- and 10-times higher than reference for copper in periphyton and composite-taxa tissues and for iron in caddisfly tissues, and were >10-times higher than reference for iron in composite-taxa tissues (Table 6.8). The BCFs for barium and strontium were slightly elevated relative to reference (<2-times), while BCFs were between 2- and 10-times greater than reference for cadmium, calcium, cobalt, manganese, and vanadium, in one or more tissue type (periphyton, caddisfly or composite-taxa) from lower Hazeltine Creek. In addition, the BCF for cadmium in composite-taxa tissues was >10-times greater than reference (Table 6.8).

Mean copper concentrations in periphyton, caddisfly, and composite-taxa tissues from lower Hazeltine Creek (HAC-D) were consistently elevated relative to the reference area (EDC-D) from 2019 onwards (Figure 6.11, Table 6.7; Appendix Tables D.5.4 to D.5.6, F.4.17 to F.4.21). In addition, copper concentrations in periphyton and composite-taxa tissues were consistently higher than pre-breach in most sampling years, except 2018 for composite-taxa tissues (pre-breach data do not exist for caddisfly tissues; Figure 6.11, Table 6.7). Temporally, the relative (exposed-reference) differences in copper concentrations for periphyton

[73] Elevated analytes were identified as those with mean concentrations at the exposed station that were at least twice the mean concentration at the reference station.

and composite-taxa tissue in 2024 were similar to or significantly lower than in the first post-breach year of monitoring (i.e., 2018), and for caddisfly tissues in 2024 were significantly higher than most prior years (including 2018) but were similar to 2020 and 2021 (Figure 6.11, Table 6.7). The TTFs for copper in caddisfly and composite-taxa tissues were similar to or significantly lower than reference and pre-breach conditions in all years (pre-breach data do not exist for caddisfly tissues; Table 6.9; Appendix Tables F.4.22 to F.4.24). Overall, copper concentrations in all three tissue types were significantly higher than reference and pre-breach (where pre-breach data exist), and the BCFs only slightly exceeded the reference conditions in periphyton (2.3-times), composite-taxa (2.3-times), and caddisfly (1.3-times) tissues (Table 6.8). However, copper TTFs were similar to or lower than reference and pre-breach. Combined, these results indicated there was no sustained increase in the concentrations of copper in periphyton and composite-taxa tissues, or in the trophic transfer of copper to benthic invertebrates (caddisfly or composite-taxa), over the post-breach period. The significant increase in the copper concentrations of caddisfly tissues in 2024, relative to reference, represented a return to copper concentrations that were observed during final remediation works in this area (i.e., 2020 and 2021). Continued monitoring will help to determine whether this increase represented a single anomalous year or is part of a long-term trend.

Mean selenium concentrations in caddisfly and composite-taxa tissues from lower Hazeltine Creek (HAC-D) were consistently elevated relative to the reference area (EDC-D) over the post-breach period (i.e., 2018 to 2024), while selenium concentrations in periphyton tissues from HAC-D were significantly higher than reference in 2020, 2022, and 2024 only (Figure 6.11, Table 6.7; Appendix Tables D.5.4 to D.5.6, F.4.17 to F.4.21). The relative (exposed-reference) difference of selenium concentrations in composite-taxa and periphyton tissues in 2024 were significantly higher than all prior monitoring years. Selenium concentrations in these tissues were also significantly higher than pre-breach conditions from 2023 to 2024 for periphyton tissue, and from 2022 to 2024 for composite-taxa tissue (Figure 6.11, Table 6.7). In caddisfly tissues, the relative (exposed-reference) difference of selenium concentrations was stable from 2020 to 2022, then increased significantly in 2023 to higher than all prior years, and decreased again in 2024 to a result that was intermediary to the 2022 and 2023 results (Figure 6.11, Table 6.7). Mean concentrations of selenium in caddisfly (9.12 mg/kg dw) and composite-taxa (6.46 mg/kg dw) tissues from lower Hazeltine Creek in 2024 were above the BC interim guideline for aquatic life (4 mg/kg dw; BCMOE 2014) which is similar to 2021 to 2023, but differs from prior years (2015 to 2020) when mean concentrations were below the guideline (Figure 6.11, Tables 6.7 and 6.8; Appendix Tables D.5.4, D.5.6, D.5.8, and D.5.9). In contrast to the results for selenium concentrations in tissues, the TTFs for selenium in caddisfly and composite-taxa tissues from lower Hazeltine Creek were significantly lower than reference in

2024, similar to 2022, which differs from all other post-breach years when the TTFs for these tissues were significantly higher than reference (Table 6.9; Appendix Tables F.4.22 to F.4.24). For composite-taxa and caddisfly tissues, the relative differences of selenium TTFs in 2024 were similar to 2022 and 2020 but significantly lower than all other prior years. The TTFs for selenium in composite-taxa tissues did not differ significantly from pre-breach conditions in all post-breach monitoring years (pre-breach data do not exist for caddisfly tissues; Table 6.9). The selenium TTF results in 2024 for lower Hazeltine Creek were consistent with the selenium BCFs from this area in 2024, which were also lower than at the reference area for all tissue types (periphyton, caddisfly, and composite-taxa; Table 6.8).

Collectively, evaluations of lower Hazeltine Creek data indicated a temporal increase in post-breach periphyton and benthic invertebrate tissue selenium concentrations, but not in the trophic transfer of selenium to benthic invertebrates, relative to reference. The temporal increase in tissue selenium concentrations was particularly pronounced in caddisfly tissues between 2022 and 2023, which was then followed by a decrease between 2023 and 2024. The selenium concentrations in all three tissue types (periphyton, caddisfly, and composite-taxa) in 2024 were significantly higher than all prior years, relative to reference, except for caddisfly tissues in 2023. In addition, selenium concentrations in periphyton and composite-taxa tissues (tissues for which pre-breach data exist) have been significantly higher than pre-breach conditions since 2023 for periphyton tissues, and since 2022 for composite-taxa tissues. The temporal increases in tissue selenium concentrations in lower Hazeltine Creek over the post-breach period corresponded with increases in sediment selenium concentrations in this area (see Section 6.1.1.2 for sediment results), but not higher BCFs or TTFs compared to reference, or aqueous total and dissolved selenium concentrations (which have not changed or decreased significantly from 2015 to 2024; Appendix Figures D.1.1. to D.1.3, Appendix Table D.1.9). Selenium concentrations in benthic invertebrates from lower Hazeltine Creek have been higher than pre-breach conditions since 2022 and higher than the BC interim guideline for aquatic life since 2021.

For the third primary analyte, iron, mean concentrations in composite-taxa tissues from lower Hazeltine Creek (HAC-D) in 2024 were significantly higher than reference (pre-breach data does not exist for iron; Figure 6.11, Table 6.7). Temporally, the relative differences of iron concentrations in composite-taxa tissues in 2024 were significantly higher than 2018, 2020 and 2022, and similar to or significantly lower than all remaining prior years (including the first year of post-breach monitoring [2015]; Figure 6.11, Table 6.7; Appendix Table F.4.20). The BCFs for iron in composite-taxa tissues from lower Hazeltine Creek in 2024 were higher than reference by 11.8-times (Table 6.8), which was consistent with the TTFs for iron in composite-taxa tissues from HAC-D that were also significantly higher than reference in 2024 (similar to most prior years except for 2018 and 2020). The relative difference of iron TTFs for composite-taxa tissues in

2024 was significantly higher than the first year of monitoring (i.e., 2018), but similar to the second year of monitoring (i.e., 2019; Table 6.9; Appendix Figure F.4.15, Appendix Table F.4.23). The significant increase in TTFs in 2024 compared to 2018 was not reflected in the iron concentrations of composite-taxa tissues, which were significantly lower in 2024 than in the first year of post-breach monitoring (i.e., 2015; Table 6.7). In addition, the TTFs for iron in exposed composite-taxa tissues remained below one, indicating a decrease in iron concentrations between the increasing trophic levels (i.e., between periphyton and benthic invertebrates; Table 6.8). Combined, these results indicate that for those exposed tissues with iron concentrations greater than reference (i.e., composite-taxa), there has not been a sustained increase in the tissue iron concentrations, or in the trophic transfer of iron to benthic invertebrates, compared to at least the second year of post-breach monitoring.

Temporal changes in the 11 secondary analytes identified for data interpretation (barium, cadmium, calcium, cobalt, manganese, mercury, molybdenum, strontium, titanium, uranium, and vanadium) differed between tissue types from lower Hazeltine Creek (HAC-D; Figure 6.11, Table 6.7; Appendix Figures F.4.11 to F.4.13, Appendix Tables D.5.4 to D.5.6, F.4.17 to F.4.21). Mean concentrations of cadmium, calcium, and strontium in periphyton, caddisfly, and composite-taxa tissues from lower Hazeltine Creek (HAC-D) were significantly higher than at the reference area in 2024. For periphyton and composite-taxa tissues from HAC-D (for which there are pre-breach data), the concentrations of these three analytes in 2024 were also significantly higher than pre-breach conditions, except for strontium in composite-taxa tissues (Figure 6.11, Table 6.7). For each of these three analytes, the relative (exposed-reference) differences have varied over time but in 2024 were similar to the first or second year of post-breach monitoring, with three exceptions. The three exceptions were calcium in periphyton and caddisfly tissues and strontium in caddisfly tissues. The relative differences of calcium concentrations in periphyton tissues in 2024 were similar to 2019 but were significantly higher than the prior two years of post-breach sampling (Figure 6.11, Table 6.7). The relative differences of calcium and strontium concentrations in caddisfly tissues were significantly higher in 2024 compared to all previous monitoring years except for 2021 (Figure 6.11, Table 6.7). These results indicated an increase in the cadmium and strontium concentrations in caddisfly tissues at lower Hazeltine Creek in 2024, relative to reference, but this was isolated to caddisfly tissue (i.e., not similarly observed in periphyton or composite-taxa samples). The TTFs for calcium, cadmium, and strontium in the three tissue types (periphyton, caddisfly, and composite-taxa) from HAC-D were similar to or significantly lower than reference in all years (except for cadmium in caddisfly tissue in 2021; Table 6.9; Appendix Tables F.4.22 to F.4.24), indicating no potential mine-related influence on the trophic transfer of these analytes to benthic invertebrates. The BCFs for these three tissue types from HAC-D in 2024 were relatively

similar to those from the reference area for strontium and calcium (except for the BCF for calcium in periphyton tissue which was 3.8-times reference). The BCFs for cadmium in tissues from HAC-D in 2024 were more elevated compared to reference (3.9-, 3.5-, and 11.5-times higher than reference in periphyton, caddisfly, and composite-taxa tissues; Table 6.8), however as indicated above, the concentrations of cadmium in these three tissue types from HAC-D have not increased relative to the first or second year of post-breach monitoring.

Mean concentrations of barium and manganese in periphyton and composite-taxa tissues from HAC-D were significantly higher than reference in 2024 and were similar to or significantly lower than pre-breach conditions in all post-breach years (Figure 6.11, Table 6.7). The relative differences of these two analytes in periphyton and composite-taxa tissues in 2024 were similar to or significantly lower than the first year of monitoring, except for manganese in periphyton which had a relative difference in 2024 that was significantly higher than all prior years (Figure 6.11, Table 6.7). These results indicated an increase in the manganese concentrations of periphyton tissues from lower Hazeltine Creek in 2024, relative to reference, but this was isolated to periphyton tissues only. The TTFs for barium and manganese in composite-taxa tissues from HAC-D in 2024 were similar to both reference and pre-breach conditions (Table 6.9; Appendix Tables F.4.22 to F.4.24). The BCFs for composite-taxa tissues from HAC-D in 2024 were similarly only slightly (1.5-times) higher than reference for barium, while the BCFs for manganese were more elevated compared to reference in 2024 (3.7-times; Table 6.8).

In addition to the secondary analytes discussed above, the composite-taxa tissues from lower Hazeltine Creek in 2024 also had concentrations of the secondary analytes cobalt, mercury, molybdenum, titanium, uranium, and vanadium that were significantly higher than reference but similar to or significantly lower than pre-breach conditions, except for mercury concentrations which were significantly higher than pre-breach (Figure 6.11, Table 6.7, Appendix Tables F.4.20, and F.4.21). For five of these six analytes (excluding mercury), the relative difference in analyte concentrations in 2024 was similar to or significantly lower than the first or second year of monitoring, indicating there has been no sustained increase in the concentrations of these analytes in exposed composite-taxa tissues over this period, relative to reference. For mercury, the relative difference of concentrations in composite-taxa tissues in 2024 was significantly higher than all prior years (i.e., 2018 to 2023; Figure 6.11, Table 6.7).

The TTFs for these six secondary analytes in composite-taxa tissues from lower Hazeltine Creek in 2024 (cobalt, mercury, molybdenum, titanium, uranium, and vanadium) were significantly higher than reference but similar to pre-breach (where pre-breach data exists; Table 6.9; Appendix Figure F.4.15, Appendix Tables F.4.22 to F.4.24). The relative (exposed-reference) difference of TTFs for the majority of these six analytes in each year has been similar to or

significantly lower compared to the second year of post-breach monitoring (i.e., 2019). This was not true for titanium and vanadium, which had significantly higher relative differences in 2024 when compared to 2021 (and earlier) for vanadium, and 2020 (and earlier) for titanium (Table 6.9; Appendix Figure F.4.15). The BCF for titanium in composite-taxa tissues was 4.6-times higher than the reference, while the BCF for vanadium was 4.9-times higher (Table 6.8). While aqueous concentrations of total vanadium significantly increased in lower Hazeltine Creek (from 2015 to 2024), no significant temporal increase in titanium concentrations was observed over the same period (Appendix Table D.1.9). However, TTFs for both titanium and vanadium in composite-taxa tissues in 2024 remained similar to pre-breach and were below a value of one, indicating that concentrations of these analytes decreased between with increasing trophic levels (i.e., between periphyton and benthic invertebrates; Tables 6.8 and 6.9). Overall, the results indicated that the relative differences of concentrations of these six analytes in composite-taxa tissues from HAC-D (cobalt, mercury, molybdenum, titanium, uranium, and vanadium) did not show a sustained increase over the post-breach period (i.e., compared to the first or second year of post-breach monitoring), with one exception. The one exception was mercury in composite-taxa tissues which had significantly higher relative differences of concentrations in 2024 compared to all prior years, but this was isolated to composite-taxa tissues. Continued monitoring will help to determine whether the increased concentrations of mercury in composite-taxa tissues represent a single anomalous year or are part of a long-term trend. Although the trophic transfer of titanium and vanadium to composite-taxa tissues in 2024 was higher compared to prior years, this did not correspond with an increase in the concentrations of these two analytes in composite-taxa tissues, and trophic transfer was similar to pre-breach conditions.

Overall, the results of tissue quality monitoring in lower Hazeltine Creek indicated that copper concentrations in periphyton and benthic invertebrate tissues were significantly higher than reference and pre-breach (where pre-breach data exist). However, the copper concentrations in these tissues, and the trophic transfer of copper to benthic invertebrates, have not shown sustained increases over the post-breach period, except for the copper concentrations in caddisfly tissues. In caddisfly tissues, copper concentrations increased significantly between 2023 and 2024, relative to reference, representing a return to the concentrations observed during final remediation works in this area (i.e., 2020 and 2021), but this increase was limited to caddisfly tissues only. Temporal evaluations indicated a temporal increase in the selenium concentrations in periphyton and benthic invertebrate tissues from lower Hazeltine Creek over the post-breach period to concentrations that were higher than pre-breach conditions (where data exist). Selenium concentrations in periphyton and benthic invertebrate tissues from lower Hazeltine Creek were consistently higher than reference throughout the post-breach period, and in 2024

were significantly higher than all prior years, except for caddisfly tissues in 2023. The temporal increases in tissue selenium concentrations in lower Hazeltine Creek over the post-breach period corresponded with temporal increases in sediment selenium concentrations in this area, but not higher BCFs or TTFs for selenium compared to reference, or aqueous total and dissolved selenium concentrations. Selenium concentrations in benthic invertebrates from lower Hazeltine Creek have been higher than pre-breach conditions since 2022 and higher than the BC interim guideline for aquatic life since 2021. For the remaining primary and secondary analytes, there were no increases in the concentrations of these analytes compared to 2020 or earlier in more than one tissue type. Concentrations of four secondary analytes (calcium, manganese, mercury, and strontium) in 2024 were significantly higher than all prior years, but these increases were isolated to a single tissue-type for each analyte and were not supported by similar increases in the trophic transfer of these analytes to benthic invertebrates over time or compared to the reference area. Continued monitoring will help to determine whether the increased concentrations of cadmium, manganese, mercury, and strontium represented a single anomalous year or are part of a long-term trend.

6.1.4.3 Tissue-Type Comparison

A comparison between benthic invertebrate (caddisfly and composite) tissue findings was completed to evaluate if results were consistent between the two tissue types. This qualitative comparison focused on analytes with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 or in all monitoring years for at least one tissue type in at least one area.

Among the primary analytes, the significant positive exposed-reference differences detected in analyte concentrations and TTFs for caddisfly tissues in 2024 were largely a subset of those detected for composite-taxa tissues from Hazeltine Creek (upper and lower creek areas; Table 6.10). This means that the significant elevation of analyte concentrations and TTFs in the exposed caddisfly tissues, relative to reference, was largely captured by the results of the composite-taxa monitoring, while the reverse was not true (i.e., caddisfly monitoring generally captured fewer significant exposed-reference differences for primary analytes than composite-taxa monitoring). Any instances in which the significant positive exposed-reference differences in the analyte concentrations or TTFs for caddisfly tissues in 2024 were not captured by composite-taxa tissue results were detailed below (including the MODs).

There were five instances in which a positive exposed-reference difference was detected for caddisfly tissue results in 2024 that was not detected in composite-taxa tissues. Specifically, these occurred for selenium TTFs for caddisfly tissues from HAC-R1, and copper,

Table 6.10: Summary Magnitude of Difference (MOD)[a] of Exposed - Reference Contrasts of Primary and Secondary Analyte Concentrations and Trophic Transfer Factors (TTFs) in Caddisfly and Composite-Taxa Benthic Invertebrate Tissues for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Upper Edney Creek (EDC-U; Reference), Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed), and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes		Upper Hazeltine Creek Reach 1 (HAC-R1; Exposed)				Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2]; Exposed)				Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5]; Exposed)			
		Upper Edney Creek (EDC-U; Reference)				Upper Edney Creek (EDC-U; Reference)				Lower Edney Creek (EDC-D [EDC-REF]; Reference)			
		Tissue		TTF		Tissue		TTF		Tissue		TTF	
		Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa
Primary Analytes	Arsenic	ns	46	483	722	ns	54	771	400	-71	ns	ns	196
	Copper	ns	434	ns	392	31	436	290	ns	203	469	-42	ns
	Iron	ns	ns	473	1,270	-61	-48	762	721	ns	335	225	873
	Selenium	1,201	250	192	ns	1,458	529	38	152	473	311	ns	ns
Secondary Analytes	Barium	-78	174	ns	682	ns	157	312	ns	ns	232	-63	ns
	Cadmium	-87	ns	ns	297	ns	ns	255	195	148	565	ns	ns
	Calcium	ns	577	-96	-67	ns	219	-84	-94	100	249	-81	-66
	Cobalt	-90	-24	ns	860	-88	-51	490	ns	ns	301	ns	372
	Manganese	-84	ns	ns	723	-55	211	484	ns	ns	381	ns	ns
	Mercury	ns	ns	662	417	ns	ns	516	600	ns	79	ns	95
	Molybdenum	203	199	571	563	262	220	948	1,084	ns	217	ns	371
	Strontium	ns	693	-87	ns	ns	187	-53	-83	51	148	-56	ns
	Titanium	ns	146	738	830	ns	ns	525	1,091	ns	482	ns	1,003
	Uranium	-67	-36	ns	231	ns	-38	204	283	ns	275	ns	271
	Vanadium	ns	89	437	1,249	ns	ns	572	822	ns	702	ns	934

Indicates significantly higher tissue concentration or TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly higher tissue concentration or TTF at exposed compared to reference area (α = 0.05), without a significant (Area x Year) interaction of the two-way ANOVA. Values represent the MOD exposed:reference, which did not change significantly among monitoring years.

Notes: ns = not significant. Results are shown for primary and secondary analytes that are presented in Table 6.7 (i.e., analytes that had a significant positive exposed - reference difference i 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). ns = no significant difference between exposed at reference area. TTF calculated as (benthic invertebrate tissue analyte concentration) / (periphyton tissue analyte concentration). HAC-R2, HAC-R5, and EDC-REF are the alternate names for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

barium, cobalt, and manganese TTFs for caddisfly tissues from HAC-U (Table 6.10). There were an additional five instances in which a significant *Area x Year* interaction was detected for the TTFs for composite-taxa tissues (indicating a significant change in the exposed-reference differences of TTFs over time) but a significant *Area x Year* interaction was not detected for the TTFs for caddisfly tissues (indicating temporal stability in the exposed-reference differences of TTFs). These five instances occurred for arsenic and titanium TTFs for caddisfly tissues from HAC-R1, as well as iron, selenium, and vanadium TTFs for caddisfly tissues from HAC-U (Table 6.10). The remaining observed differences between the results for caddisfly tissues compared to composite-taxa tissues (for either analyte concentrations or TTFs) were limited to the magnitude of the observed exposed-reference differences, and these are discussed in more detail below.

The MODs for selenium concentrations in 2024 were consistently higher for caddisfly tissues than for composite-taxa tissues across all three exposed areas (by 1.5- to 4.8-times). Of the secondary analytes, cadmium, mercury, and molybdenum were the only analytes with higher MODs observed for caddisfly tissues compared to composite-taxa tissues. The MODs for molybdenum concentrations in caddisfly tissues in 2024 were slightly higher than those composite-taxa tissues at both HAC-R1 and HAC-U (by 1.02- to 1.2-times), as was the MOD for the molybdenum TTFs in caddisfly tissues (1.6-times higher than composite-taxa tissues). The MODs for the TTFs of mercury and cadmium in caddisfly tissues from HAC-R1 and HAC-U, respectively, were also higher than those observed for composite-taxa tissues (by 1.3- to 1.6-times; Table 6.10).

Overall, results from both upper and lower Hazeltine Creek indicate that the significant elevations in the concentrations and TTFs and analytes in exposed caddisfly tissues, relative to reference, were largely captured by composite-taxa monitoring. However, the magnitude of the differences between the exposed and reference results for selenium were often higher in caddisfly tissues than in composite-taxa tissues. As such, the results indicated that if monitoring were limited to composite-taxa samples only for tissue quality monitoring, most changes in the concentrations and TTFs of primary and secondary analytes in caddisfly tissues would still be captured, but the higher magnitude of the differences in selenium results that was observed in caddisfly tissues would not be fully captured. This is consistent with findings from 2020, 2021 and 2022 (Minnow 2021a, 2022a, 2023a) but not 2023 (Minnow 2024a).

6.1.5 Fish Tissue Quality

Tissue quality monitoring of juvenile fish was completed in creek habitats in 2024 in response to observed temporal increases in the selenium concentrations of benthic invertebrate tissues from Hazeltine Creek (Minnow 2024a), and to satisfy Condition 3(g) for the draft CEMP approval conditions dated May 16, 2024 (BCMOECCS 2024; see Section 4.5.1). Specifically, post-breach

tissue quality monitoring of juvenile whole-body fish was initiated in 2018 and 2024 in upper and lower creek areas, respectively. Whole-body samples of juvenile rainbow trout were collected from upper Hazeltine Creek (HAC-U [HAC-R2])[74] with Frypan Creek (FPC- R2) serving as reference in 2018 and 2024 (Figure 4.4, Table 4.5) [75]. Whole-body samples of juvenile rainbow trout and juvenile coho salmon were targeted for monitoring in lower Hazeltine Creek (HAC-D [HAC-R5]), with the unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as reference in 2024. Only one rainbow trout was captured from HAC-D (HAC-R5), limiting statistical comparisons for this species. However, the target number of coho salmon (n=8) were collected from HAC-D (HAC-R5) and the associated reference area (EDC-D [EDC-REF]; Figure 4.4, Table 4.5) and were therefore the focus of the statistical analyses for the lower creek areas (see Section 4.5.3.1 for details).

A review of the 2024 fish tissue quality results (Appendix B) indicated that these data can be used with an acceptable level of confidence for interpretation, although the occurrence of some natural heterogeneity in analyte results were considered during data interpretation. A review of the 2024 fish aging results (Appendix B) indicated that laboratory accuracy for aging data can be used with a high level of confidence for interpretation (see Section 5.1.7 for details).

6.1.5.1 Comparisons to Guidelines

Mean selenium and mercury concentrations in juvenile whole-body rainbow trout samples from upper Hazeltine Creek (HAC-U) in 2018 and 2024 were below consumption guidelines for the protection of human health, while mean selenium concentrations in these samples exceeded the guideline for the protection of aquatic life (4 mg/kg dw; BCMOE 2014) in 2018 (4.39 mg/kg dw) and 2024 (6.42 mg/kg dw; Figure 6.12, Table 6.11). The rate of guideline exceedances in these rainbow trout samples from HAC-U was the same in 2018 and 2024 (87.5% of samples; Table 6.11; Appendix Tables D.7.1 and D.7.2) although the mean concentrations differed. Detailed statistical analyses of the temporal changes in the selenium concentration of rainbow trout from HAC-U are discussed in Section 6.1.5.1. In both 2018 and 2024, selenium concentrations in all juvenile whole-body rainbow trout samples from the reference area (FPC-R2) were below the aquatic life guideline (Figure 6.12, Table 6.11).

In the single juvenile whole-body rainbow trout sample from lower Hazeltine Creek (HAC-D) and in all eight rainbow trout samples from the reference site (EDC-D) the selenium concentrations were below the guideline for the protection of aquatic life in 2024 (4 mg/kg dw; Table 6.11;

[74] Rainbow Trout from upper Hazeltine Creek in 2018 were captured from two stations in HAC-R1 and two stations in HAC-U (HAC-R2). See Appendix Table D.6.1 and Minnow (2019d) for details of sampling locations within these two areas.

[75] HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas for HRWG reporting. The original area names only (i.e., HAC-U, HAC-D, and EDC-D) are used throughout the remainder of this report section (Section 6.1.5).

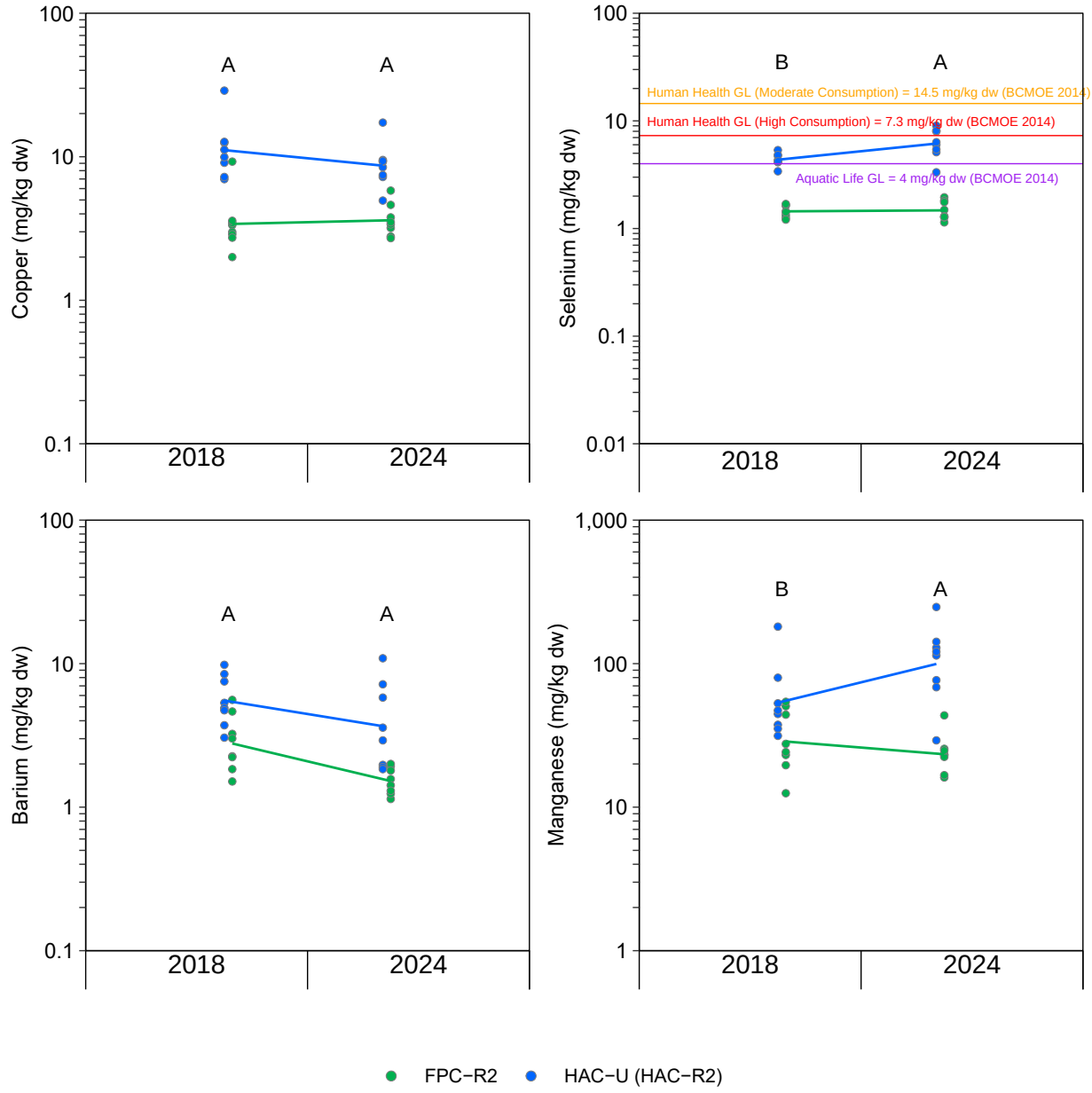

Figure 6.12: Juvenile Rainbow Trout Whole−body Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Frypan Creek (FPC−R2; Reference) Monitoring Areas, 2018 to 2024

Notes: GL = Guideline, dw = dry weight. HAC−R2 is the alternate name for the HAC−U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Rainbow trout from Upper Hazeltine Creek were collected from HAC−R1 and HAC−U (HAC−R2) in 2018 and only from HAC−U (HAC−R2) in 2024. Plots are only included for primary and secondary analytes that had a significant Area × Time interaction term and were higher at exposed than reference areas in 2024. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g.,A,B,C) have ratios of concentrations (HAC−U:FPC−R2) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (HAC−U:FPC−R2).

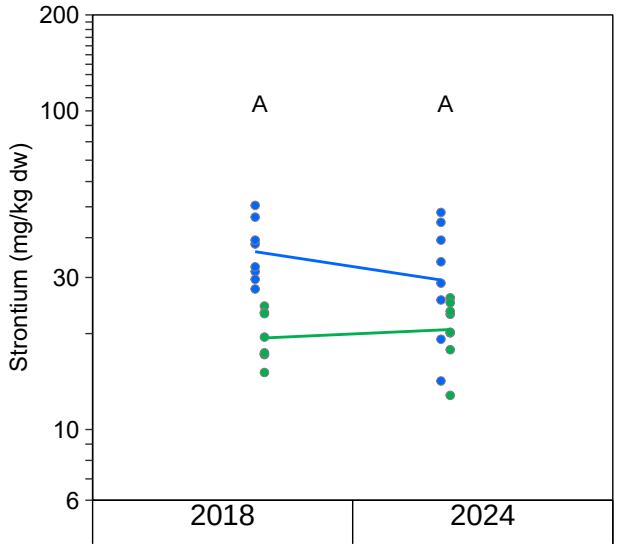

Figure 6.12: Juvenile Rainbow Trout Whole−body Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Frypan Creek (FPC−R2; Reference) Monitoring Areas, 2018 to 2024

Notes: GL = Guideline, dw = dry weight. HAC−R2 is the alternate name for the HAC−U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Rainbow trout from Upper Hazeltine Creek were collected from HAC−R1 and HAC−U (HAC−R2) in 2018 and only from HAC−U (HAC−R2) in 2024. Plots are only included for primary and secondary analytes that had a significant Area × Time interaction term and were higher at exposed than reference areas in 2024. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g.,A,B,C) have ratios of concentrations (HAC−U:FPC−R2) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (HAC−U:FPC−R2).

Table 6.11: **Juvenile Fish Whole-body Selenium and Mercury Concentrations from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed), Frypan Creek (FPC-R2; Reference), and Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas Relative to the British Columbia Guideline for the Protection of Aquatic Life, 2018 to 2024**

Waterbody or Area [a]		Type	Species	Season/ Year[b]	Sample Size	Mercury		Selenium			
						Human Health (CFIA 2015) Guideline = 0.5 mg/kg ww		Mean	Aquatic Life Guideline (4 mg/kg dw)	Human Health (BCMOE 2014) High Consumption = 7.3 mg/kg dw Moderate Consumption = 14.5 mg/kg dw	
						Mean	Frequency > Guideline		Frequency > Guideline	Frequency > Moderate	Frequency > High
Frypan Creek	FPC-R2	Reference	Rainbow Trout	September 2018 (Minnow 2019d)	8	0.0419	0%	1.45	0%	0%	0%
Upper Hazeltine Creek	HAC-R1, HAC-U (HAC-R2)	Exposed			8	0.0348	0%	4.39	88%	0%	0%
Frypan Creek	FPC-R2	Reference	Rainbow Trout	August 2024	8	0.0294	0%	1.50	0%	0%	0%
Upper Hazeltine Creek	HAC-U (HAC-R2)	Exposed			8	0.0319	0%	6.42	88%	0%	38%
Lower Edney Creek	EDC-D (EDC-REF)	Reference	Rainbow Trout	August and October 2024[b]	8	0.0298	0%	2.31	0%	0%	0%
			Coho Salmon		8	0.0288	0%	2.34	0%	0%	0%
Lower Hazeltine Creek	HAC-D (HAC-R5)	Exposed	Rainbow Trout		1	0.0207	0%	2.30	0%	0%	0%
			Coho Salmon		8	0.0197	0%	4.42	50%	13%	0%

Indicates mean selenium concentration greater than the BC Aquatic Life guideline for muscle tissue or whole-body in fish (4 mg/kg dw; BCMOE 2014).

Indicates mean selenium concentration greater than the Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Indicates mean selenium concentration greater than the Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Indicates mean mercury concentration greater than the Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: mg/kg dw = milligrams per kilogram dry weight. ">" = greater than. "%" = percent.

[a] HAC-R2, EDC-REF, and HAC-R5 are the alternate names used the for the HAC-U, EDC-D, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] See Appendix Tables D.6.1, D.6.2, and D.6.3 for detailed catch information.

Appendix Table D.7.3). However, the mean selenium concentration (4.42 mg/kg dw) in juvenile whole-body coho salmon samples from lower Hazeltine Creek (HAC-D) exceeded the guideline in 2024 in 50% of samples, whereas no exceedances were observed at the reference area (EDC-D; maximum = 3.04 mg/kg dw; Figure 6.13, Table 6.11; Appendix Table D.7.4).

Rainbow trout and coho salmon only reside in Hazeltine Creek during their juvenile life stages; rainbow trout typically return to Polley Lake within their first year of life (e.g., Minnow 2019d, 2024b) and coho salmon return to coastal marine waters after 1 to 2 years of life (Scott and Crossman 1998) via the Quesnel River to the Fraser River (which flows to the Pacific Ocean). Therefore, the period of exposure of rainbow trout and coho salmon exposure to selenium in Hazeltine Creek (via dietary exposure) is limited to the juvenile life stages before most tissue growth occurs, and before reproductive development and potential selenium transfer to ovary tissues occur (ovary tissues are recommended for assessing the effects of selenium on fish; see Section 5.1.7.1). This is supported by selenium concentrations in the tissues rainbow trout from Polley Lake which have not increased over the post-breach period or have decreased in some cases (see Section 5.1.7).

6.1.5.2 Spatial and Temporal Comparisons

Statistical comparisons of morphological measures (fork length and body weight) of juvenile rainbow trout from upper Hazeltine Creek indicated there were no significant differences in fish size between years (i.e., 2018 and 2024; Appendix Tables D.6.4, D.6.5, and F.5.1). Juvenile coho salmon from lower Hazeltine Creek (HAC-D [HAC-R5]) were significantly longer and heavier (by 21% and 71%, respectively), but not older, than those from the reference area (EDC-D) in 2024 (Appendix Tables D.6.6, D.6.7, and F.5.2).

Data interpretation of juvenile whole-body rainbow trout samples from upper Hazeltine Creek (for which there are data from 2018 and 2024) was focused on primary and secondary analytes (Table 2.4) with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 (if the analysis *Area×Year* interaction was significant) or in all monitoring years (if the *Area×Year* interaction was not significant[76]). Increasing analyte concentrations at the exposed area (HAC-U) relative to reference area (FPC-R2) over time, or consistently elevated analyte concentrations at the exposed area relative to reference, were not detected for most analytes (Figure 6.12; Appendix Figure F.5.1, Appendix Table F.5.1). Two primary analytes (copper and selenium) and three secondary analytes (barium, manganese, and strontium) met the criteria for inclusion in data interpretation outlined above.

[76] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from all available years were combined for the analyses.

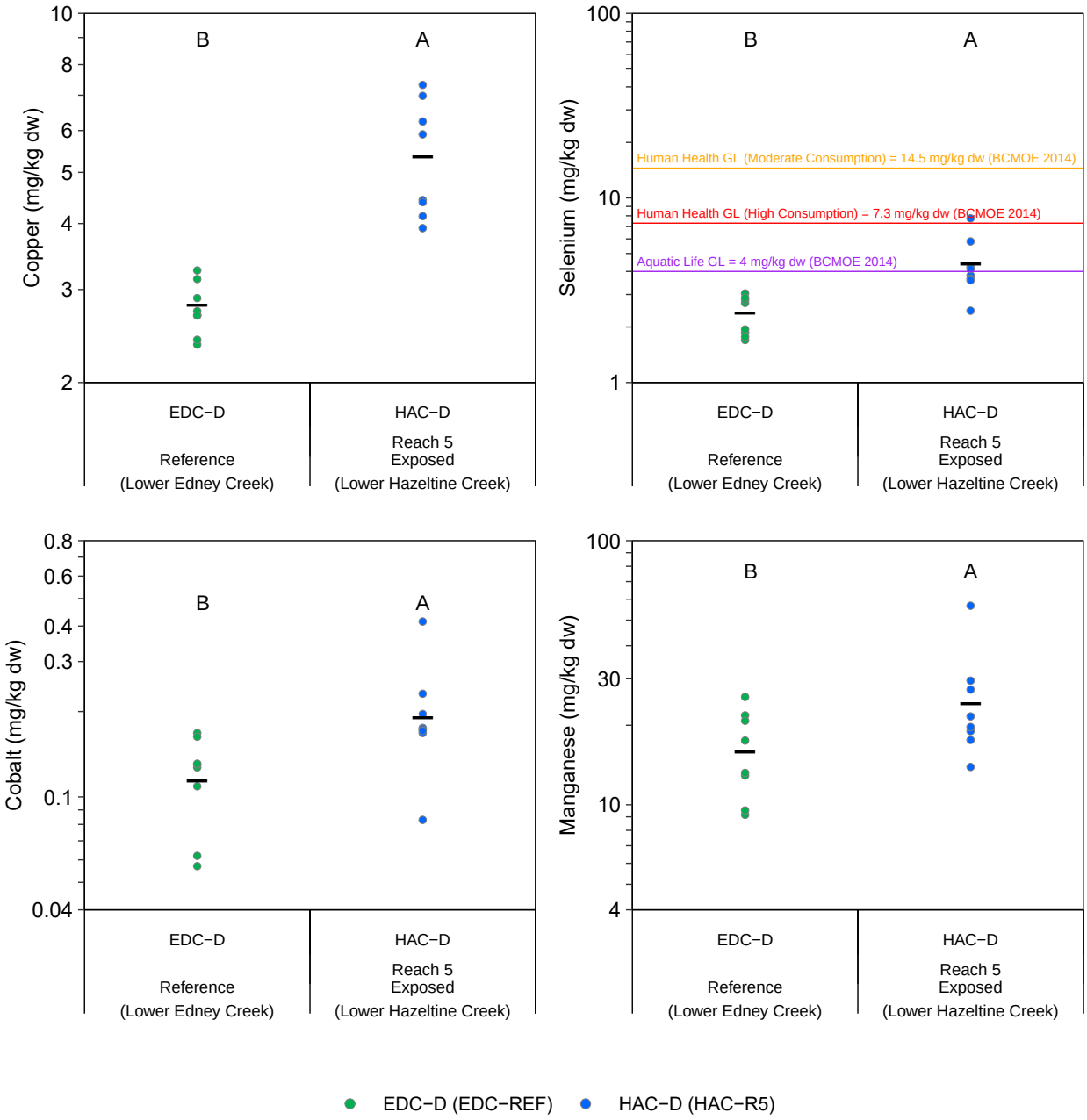

Figure 6.13: Juvenile Coho Whole−body Tissue Primary and Secondary Analyte Concentrations with a Significant Area Difference Between the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2024

Notes: GL = Guideline, dw = dry weight. HAC−R5 and EDC−REF are the alternate names for the HAC−D and EDC−D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Plots are only included for primary and secondary analytes that had a significant Area differences in 2024. Individual samples are plotted and lines join the least−squares estimated mean values for areas included in the statistical analysis. Statistical analyses were conducted using a one−way ANOVA with the factor Area. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Areas that share a letter (e.g., A,B,C) do not differ significantly. Letter A was assigned to the area with the highest analyte concentration.

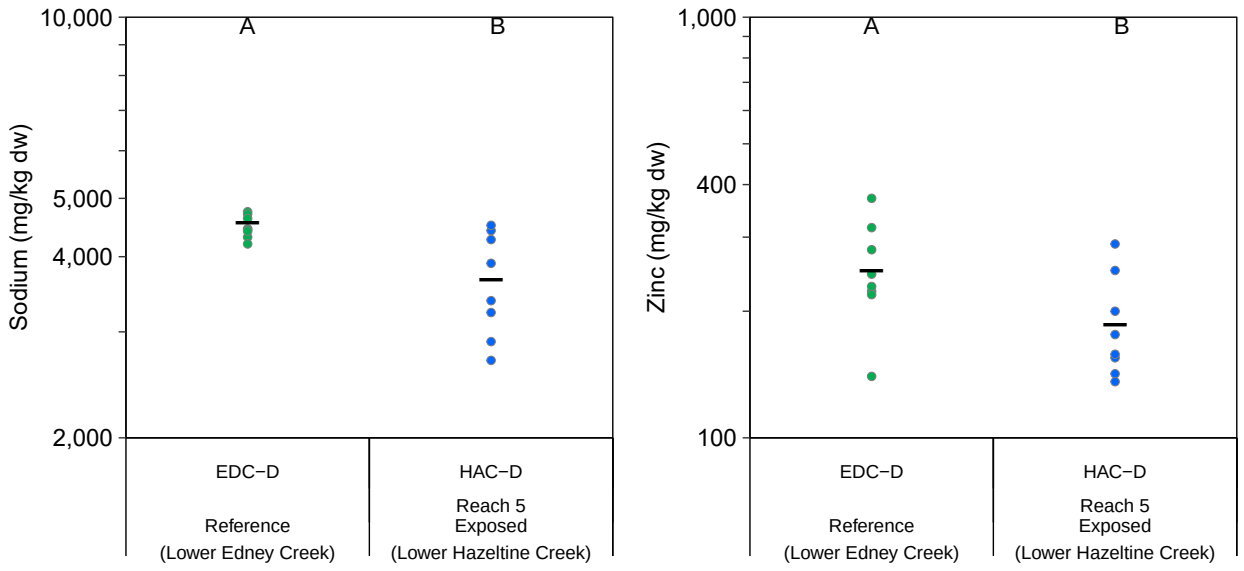

Figure 6.13: Juvenile Coho Whole−body Tissue Primary and Secondary Analyte Concentrations with a Significant Area Difference Between the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2024

Notes: GL = Guideline, dw = dry weight. HAC−R5 and EDC−REF are the alternate names for the HAC−D and EDC−D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Plots are only included for primary and secondary analytes that had a significant Area differences in 2024. Individual samples are plotted and lines join the least−squares estimated mean values for areas included in the statistical analysis. Statistical analyses were conducted using a one−way ANOVA with the factor Area. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Areas that share a letter (e.g., A,B,C) do not differ significantly. Letter A was assigned to the area with the highest analyte concentration.

Selenium was the only primary analyte with a significant *Area×Year* interaction, which indicates that the relative (exposed-reference) difference in selenium concentrations changed significantly between 2018 and 2024 (i.e., the geometric mean concentrations at the exposed area were not trending the same as the geometric mean concentrations at the reference area). Specifically, the relative (exposed-reference) difference in selenium concentrations of juvenile whole-body rainbow trout from the upper creek areas increased significantly from 2018 to 2024 (by 38%; Figure 6.12; Appendix Table F.5.1). For copper, the *Area×Time* interaction was not significant, indicating that the relative (exposed-reference) difference of concentrations of this analyte in the rainbow trout samples remained consistent across both years. Therefore, although copper concentrations in juvenile whole-body rainbow trout from HAC-U were significantly higher than those at the reference areas (by 180%), this difference was temporally stable between the 2018 and 2024 (Figure 6.12; Appendix Table F.5.1). These results indicated significantly higher concentrations of selenium and copper in juvenile rainbow trout from upper Hazeltine Creek in 2018 and 2024 compared to reference, and increased selenium concentrations in the tissues of exposed fish over time relative to reference.

Of the three secondary analytes identified in data interpretation for upper Hazeltine Creek (i.e., barium, manganese, and strontium), manganese was the only analyte with a significant *Area×Year* interaction term. Manganese concentrations in juvenile whole-body rainbow trout samples from upper Hazeltine Creek were significantly higher than those from the reference area in both 2018 and 2024, and the relative (exposed-reference) difference of these concentrations increased significantly between 2018 and 2024 (by 128%; Figure 6.12; Appendix Table F.5.1). In contrast, the *Area×Year* interaction term was not significant for barium and strontium, indicating that concentrations of these analytes in exposed tissues have remained consistently elevated relative to reference tissues in both years (119% and 63% higher in exposed tissues for barium and strontium, respectively, relative to reference; Figure 6.12; Appendix Table F.5.1). These findings indicate that while the relative difference of barium and strontium concentrations remained stable between 2018 and 2024, manganese concentrations in juvenile rainbow trout increased significantly over this period at upper Hazeltine Creek, relative to reference.

Data analysis and interpretation of juvenile whole-body coho salmon samples from the lower creek areas focused on spatial differences of primary and secondary analyte concentrations in 2024 since there were no data available from prior years (i.e., temporal comparisons were not possible). Analyte concentrations in juvenile whole-body coho salmon samples from lower Hazeltine Creek (HAC-D) showed few differences relative to the reference area (EDC-D) in 2024 (Figure 6.13; Appendix Table F.5.2). Two primary analytes (copper and selenium) and four secondary analytes (cobalt, manganese, sodium, and zinc) showed a significant *Area* effect in the spatial analyses, indicating that concentrations of these analytes differed significantly between

the exposed and reference area in 2024. These six analytes therefore met the criteria for inclusion in data interpretation.

Concentrations of both copper and selenium in juvenile whole-body coho salmon samples from HAC-D in 2024 were significantly higher (by 91% and 84% respectively) than those from the reference area (EDC-D; Figure 6.13; Appendix Table F.5.2). The significantly higher selenium concentrations of the juvenile coho salmon, relative to reference, was consistent with the selenium tissue guideline exceedances observed for these fish from HAC-D but not at EDC-D (Section 6.1.5.1).

Four secondary analytes were identified for inclusion in data interpretation for lower creek areas (cobalt, manganese, sodium, and zinc). Of these, concentrations of sodium and zinc in juvenile whole-body coho salmon samples from lower Hazeltine Creek (HAC-D) were significantly lower than those from the reference area (EDC-D), indicating no potential mine-related effect (Figure 6.13; Appendix Table F.5.2). In contrast, concentrations of cobalt and manganese were significantly higher in exposed compared to reference coho (by 67% and 53%, respectively; Figure 6.13; Appendix Table F.5.2) in 2024. Evaluation of temporal changes in the concentrations of these analytes in juvenile fish tissues from lower Hazeltine Creek will be possible following continued data collections.

Overall, fish tissue quality monitoring in upper Hazeltine Creek indicated that concentrations of two primary analytes (copper and selenium) and three secondary analytes (barium, manganese, and strontium) in juvenile whole-body rainbow trout were significantly higher than those from the reference area in 2024. Of these five analytes, results indicated temporal increase in the selenium and manganese concentrations in juvenile rainbow trout between 2018 and 2024. In lower Hazeltine Creek, concentrations of two primary analytes (copper and selenium) and two secondary analytes (cobalt and manganese) in juvenile whole-body coho salmon were significantly higher than those from the reference area in 2024. Temporal analyses for lower Hazeltine Creek fish tissue quality results will be possible following continued data collections.

6.1.5.3 Comparison to Benthic Invertebrate Tissue

The spatial and temporal (where possible) analysis of juvenile whole-body rainbow trout and coho salmon indicated that the concentrations of two primary analytes (copper and selenium) were significantly higher in these fish from Hazeltine Creek (exposed) compared to the associated reference areas (see Section 6.1.5.2). These results were consistent with significantly higher copper and selenium concentrations in periphyton and benthic invertebrate tissues from upper and lower Hazeltine Creek, relative to reference areas (see Section 6.1.4). In addition, the concentrations of selenium in periphyton and benthic invertebrate tissues from both upper and lower Hazeltine Creek have increased significantly over the post-breach period, relative to

reference, which is consistent with the significant increase in juvenile whole-body rainbow trout tissue selenium concentrations from upper Hazeltine Creek over the post-breach period (i.e., 2018 to 2024), relative to reference (see Section 6.1.5.2).

The primary route of selenium accumulation in fish is through dietary exposure with an average TTF between benthic invertebrates and fish of approximately 1.1 (and a range of 0.6 to 1.6 based on 25 fish species; Presser and Luoma 2010). As such, the relationship between selenium concentrations observed in juvenile whole-body fish tissues and benthic invertebrates (their primary food source) were evaluated for rainbow trout (2018 and 2024) and coho salmon (2024) relative to composite-taxa and caddisfly benthic invertebrate tissue samples collected at corresponding sampling areas and dates. A line representing a one-to-one relationship was included on each plot to represent an average selenium TTF of approximately one between fish and benthic invertebrate tissues (Presser and Luoma 2010).

The relationships between selenium concentrations in juvenile whole-body rainbow trout samples compared to those in benthic invertebrate tissues (i.e., representing dietary exposure) from upper Hazeltine Creek differed over time and differed from those observed at the reference area (FPC-R2). At the reference area, the selenium concentrations in juvenile whole-body rainbow trout samples in 2018 were similar to those from benthic invertebrates from this area (i.e., results were close to the one-to-one line; Figure 6.14), consistent with the literature-based average TTF of 1.1 (Presser and Luoma 2010). In upper Hazeltine Creek (HAC-U) in 2018, the selenium concentrations in juvenile whole-body rainbow trout samples were higher, on average, than those in benthic invertebrate tissues from the same area (i.e., were above the one-to-one line; Figure 6.14), similar to the results described by Cianciolo et al. (2020). In contrast, the selenium concentrations in juvenile whole-body rainbow trout samples from upper Hazeltine Creek in 2024 were lower, on average, than those in benthic invertebrates from the same area (i.e., were below the one-to-one line; Figure 6.14).

In the lower Hazeltine Creek, the relationships between selenium concentrations in juvenile whole-body coho salmon samples compared to those in benthic invertebrates also differed from those observed at the reference area (EDC-D). Comparisons between tissue selenium concentrations in the lower creek areas were limited to 2024 because earlier juvenile fish tissue quality data do not exist. At the reference area, the selenium concentrations in juvenile whole-body coho salmon samples were slightly higher, on average, than those in benthic invertebrates from this area (Figure 6.15). The opposite was observed in lower Hazeltine Creek (exposed), with selenium concentrations in juvenile whole-body coho salmon samples that were slightly lower, on average, than those in benthic invertebrates from this area (Figure 6.15).

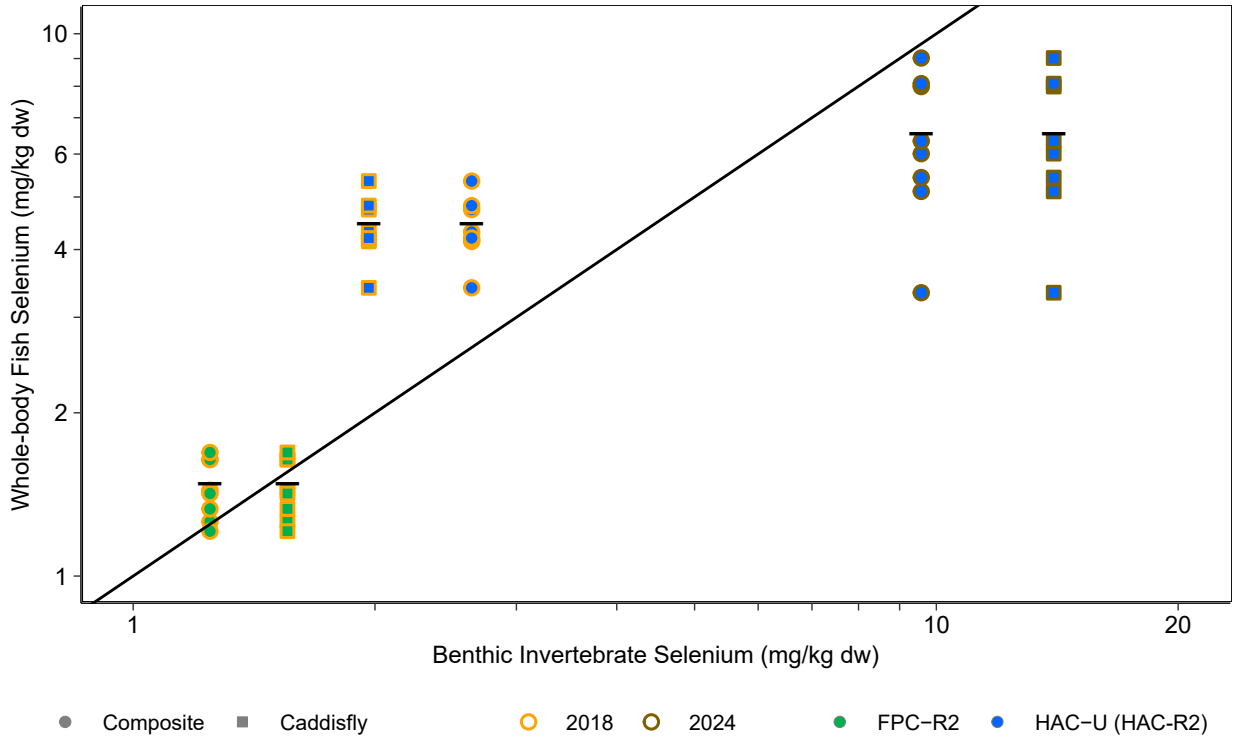

Figure 6.14: Juvenile Rainbow Trout Whole-body Tissue Selenium Concentrations Compared to Caddisfly and Composite-Taxa Benthic Invertebrate Tissue Selenium Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Benthic invertebrate tissue quality data plotted for Frypan Creek in 2018 were from Reach 3 (i.e., FPC-R3), which were the only available data (i.e., data were not available for Reach 2 [FPC-R2] in 2018). Benthic invertebrate tissue quality at Frypan Creek was not collected after 2018 (see Table 4.4). Green represents reference areas and blue represents exposed areas. Black bars denote mean fish selenium concentrations. Mean benthic invertebrate tissue selenium concentrations for each area and year were used for comparison to fish tissue selenium concentrations.

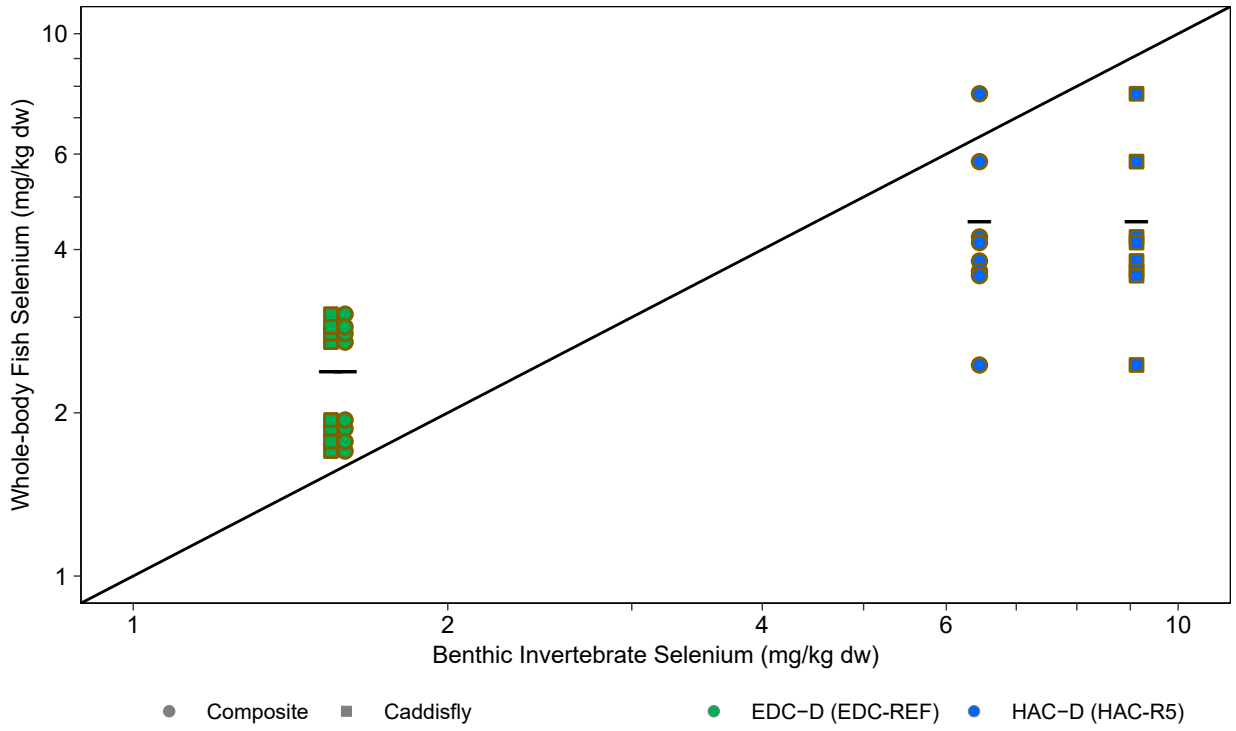

Figure 6.15: Juvenile Coho Whole-body Tissue Selenium Concentrations Compared to Caddisfly and Composite-Taxa Benthic Invertebrate Tissue Selenium Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R5 and EDC-REF are the alternate names for HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Black bars denote mean fish selenium concentrations. Mean benthic invertebrate tissue selenium concentrations for each area were used for comparison to fish tissue selenium concentrations.

Benthic invertebrate tissue selenium concentrations were evaluated for both caddisfly and composite-taxa tissue sample types (see Section 4.4.1 for details). Mean selenium concentrations in caddisfly tissues in 2024 and prior years were often higher than those in composite-taxa tissues, consistent with caddisflies being known as 'hyper-accumulators' of selenium (Wayland and Crosley 2006; Mendes et al. 2022; Mendes et al. 2023; see Section 6.1.4.1). While the selenium concentrations in both caddisfly and composite-taxa benthic invertebrate tissues were higher than those measured in juvenile whole-body rainbow trout and coho salmon samples in 2024, this difference was greater for caddisfly tissues than for composite-taxa benthic invertebrate samples. This suggests that selenium concentrations in juvenile whole-body rainbow trout and coho salmon samples were more reflective of dietary exposure to composite-taxa benthic invertebrates (i.e., a mix of benthic invertebrate taxa) than to caddisfly tissues.

Overall, the selenium concentrations measured in juvenile whole-body rainbow trout and coho salmon from Hazeltine Creek in 2024 were lower than those measured in benthic invertebrates from corresponding monitoring areas (representing dietary selenium exposure); a difference that was larger for caddisfly tissues than for composite-taxa benthic invertebrate tissues. These results suggested that the selenium concentrations in juvenile fish from Hazeltine Creek were more reflective of dietary exposure to composite-taxa benthic invertebrates (i.e., a mix of benthic invertebrate taxa) than caddisfly tissues.

6.2 Edney Creek

6.2.1 Periphyton Community and Productivity

Periphyton community and productivity monitoring was conducted at a remediated (exposed) area of lower Edney Creek (E1 [EDC-EXP]) in 2023, with an unimpacted area of lower Edney Creek (EDC-D [EDC-REF]) serving as reference (Minnow 2024a).[77] The results of this monitoring are summarized briefly herein with detailed methods and results presented in Minnow (2024a).

6.2.1.1 Community

In 2023, the periphyton community of the exposed area (E1) of lower Edney Creek had significantly lower density and significantly higher total taxon richness than at the reference area (EDC-D) and similar Diatom richness, Simpson's Evenness, and Simpson's Diversity to the reference area. Density at E1 was consistently significantly lower than at EDC-D from 2019 to

[77] For HRWG reporting, EDC-EXP and EDC-REF are the alternate names used for the E1 and EDC-D sampling areas. The original area names only (i.e., E1 and EDC-D) are used throughout the remainder of this report section (Section 6.2.1).

2023; however, density increased at E1 in 2023 relative to all prior years. Total taxon richness and Diatom richness increased significantly from 2021 to 2023, from lower than reference in 2021 to similar to reference in 2023. Simpson's Evenness and Diversity decreased significantly at both E1 and EDC-D in 2023 compared to 2021, but these metrics at E1 remained similar to reference from 2019 to 2023. The temporal variability in community metrics at E1 between 2021 and 2023 was likely related to the remediation efforts in this area that were concluded in 2021 (after 2021 biological sampling) and substrate transport that occurred in this area due to high spring freshet flows.

Periphyton community composition at both the exposed (E1) and reference (EDC-D) areas were dominated by Cyanobacteria and to a lesser extent Diatoms, Chlorophytes, and Rhodophytes from 2019 to 2023. Periphyton community composition at E1 was similar to reference conditions from 2019 to 2023 in terms of the relative densities (%) of taxa. The consistent similarity in periphyton community composition between E1 and EDC-D in all years suggested these communities have likely been similarly affected by physical and chemical factors (e.g., light exposure, water temperature, nutrient availability) within the creek.

Combined, the results indicated that the periphyton community at the exposed area of lower Edney Creek had largely recovered to reference conditions, while recovery of density was ongoing.

6.2.1.2 Productivity

Mean periphyton chlorophyll-a concentrations (mg/m²) in E1 in 2023 were well below the BCWQG of 100 mg/m² (BCMOWLRS 2025) and below the threshold indicative of moderately enriched streams (21 mg/m²; Biggs 1996). Periphyton productivity (as measured by chlorophyll-a concentrations and AFDM) at E1 were consistently lower than at the reference area (EDC-D) from 2017 to 2023. Similar temporal changes at the exposed area compared to reference suggested temporal variability at both areas was related to natural changes in physical and chemical factors (e.g., light exposure, water temperature, nutrient availability). The consistently lower periphyton productivity at E1 compared EDC-D from 2017 to 2023 was likely related to the remediation efforts that concluded in this area in 2021 (after 2021 biological sampling) and substrate transport that occurred in this area due to high spring freshet flows.

6.2.2 Benthic Invertebrate Community and Productivity

Benthic invertebrate community and productivity monitoring in lower Edney Creek in 2023 was completed at a remediated (exposed) area (E1 [EDC-EXP]), with an unimpacted area of lower

Edney Creek (EDC- D [EDC-REF]) serving as reference (Minnow 2024a).[78] The results of this monitoring are summarized briefly herein with detailed methods and results presented in Minnow (2024a).

6.2.2.1 Community

The benthic invertebrate community at the exposed lower Edney Creek (E1) area in 2023 was similar to the reference area (EDC-D) in terms of density and Simpson's Diversity. Taxon richness and Simpson's Evenness were slightly but significantly higher and lower, respectively, at E1 in 2023 relative to reference. Mean density at E1 was similar to reference over the 2016 to 2023 period. Taxon richness at E1 was significantly higher than reference in 2023, which reflected an improvement from 2016 to 2021, when taxon richness was significantly lower at E1 compared to EDC-D. Simpson's Diversity and Evenness at E1 similarly showed improvement from prior years (i.e., 2021) to 2023, with Simpson's Diversity increasing from significantly lower than reference (EDC-D) in 2021 to similar to reference in 2023. Simpson's Evenness at E1 was lower than EDC-D in both 2021 and 2023 but was similar to reference in 2023 than 2021. Overall, the benthic invertebrate community at the exposed area of lower Edney Creek (E1) showed recovery following the remediation efforts in 2020 and 2021, with taxon richness and Simpson's Diversity changing from lower than reference in 2021 to similar to or higher than reference in 2023, and Simpson's Evenness that was more similar to reference in 2023 than in 2021.

Benthic invertebrate community composition at E1 in 2023 was dominated by Chironomidae followed by EPT, which differed from reference (EDC-D) where the community was dominated by EPT followed by Chironomidae. For these dominant taxa, Chironomidae (%) at E1 was significantly higher than reference for most years (except being significantly lower than reference in 2017. EPT (%) at E1 was similar to reference from 2016 to 2023. Within EPT, Ephemeroptera (%) and Trichoptera (%) at E1 were significantly lower and higher, respectively, than reference in 2023, and Plecoptera (%) was similar to reference from 2016 to 2023. The lower Ephemeroptera (%) at E1 than reference in 2023 was not owing to a significant temporal change in Ephemeroptera (% or density) which were unchanged from 2022 to 2023 but rather to a significant increase in other taxa (non-Chironomidae Diptera).

Collectively, the results indicated recovery of the benthic invertebrate community at E1 following the completion of final remediation works in 2020 and 2021 (after biological monitoring occurred in 2021), including similar dominance of sensitive EPT taxa to reference. However, the remaining

[78] For HRWG reporting, EDC-EXP and EDC-REF are the alternate names used for the E1 and EDC-D sampling areas. The original area names only (i.e., E1 and EDC-D) are used throughout the remainder of this report section (Section 6.2.2).

differences in community composition relative to reference suggested that recovery of the community was still ongoing.

6.2.2.2 Productivity

Mean dry benthic invertebrate biomass at E1 in 2023 was significantly higher than 2019 but similar to other years, and similar to reference from 2017 to 2023. Mean wet weight benthic invertebrate biomass in 2023 was similar to all prior years, and similar to reference from 2017 to 2023 (Minnow 2024a). The higher mean benthic invertebrate dry biomass in 2023 than in 2019 at E1 is consistent with the higher total density results (i.e., significantly higher in 2023 than 2019). For both wet and dry biomass, the similarity at E1 to reference in each year is also consistent with the total density results (i.e., similar total density at E1 in each year relative to reference Minnow 2024a).

6.2.3 Periphyton and Benthic Invertebrate Tissue Quality

Periphyton and benthic invertebrate tissue quality monitoring was completed annually between 2022 and 2024, with monitoring in each year including an exposed section of lower Edney Creek (E1 [EDC-EXP]), with an unimpacted area of Edney Creek (EDC-D [EDC-REF]) serving as reference (Figure 4.2, Table 4.4).[79]

A review of the 2024 periphyton and benthic invertebrate tissue quality results (Appendix B) indicated that the data largely met the established DQOs and can be used with a high level of confidence for interpretation, although field precision was low and natural heterogeneity in analyte results were considered during data interpretation (see Section 6.1.4.1 for details). A review of 2024 supporting water data quality indicated that these data can be used with a good level of confidence for interpretation (see Section 5.1.3 for details).

Data interpretation was focused on primary and secondary analytes (Table 2.4) with a significant positive relative (exposed-reference) difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 (if the analysis *Area*×*Year* interaction was significant) or in all monitoring years (if the *Area*×*Year* interaction was not significant[80]) for at least one tissue type (periphyton, caddisfly, or composite-taxa benthic invertebrate).

[79] EDC-EXP and EDC-REF are the alternate names used for the E1 and EDC-D sampling areas for HRWG reporting. The original area names only (i.e., E1 and EDC-D) are used throughout the remainder of this report section (Section 6.2.3).

[80] If no significant change was detected in the relative (exposed-reference) difference among years (i.e., the *Area* x *Year* interaction was not significant), then data from all available years were combined for the analyses.

Data interpretation was further focused by integrating the results of water quality monitoring (i.e., bioconcentration) and TTFs of benthic invertebrate tissue analyte concentrations as detailed in Section 6.1.4.1. Combined, these approaches were used to identify analytes for which concentrations in biota and TTFs at the exposed area have increased at a rate that differs from reference and that may represent a potential risk to aquatic biota. Results for composite-taxa benthic invertebrate tissue samples are referred to as composite-taxa for the remainder of this section.

For most analytes evaluated, there was no increase in concentrations in periphyton and/or benthic invertebrate tissues from the exposed (E1) area relative to the reference (EDC-D) area over time (Appendix Figure F.4.15, Appendix Tables D.5.4 to D.5.6, F.4.25 to F.4.27). Two primary analytes (copper and iron) and eight secondary analytes (barium, cadmium, calcium, cobalt, sodium, titanium, uranium and vanadium) met the criteria for inclusion in data interpretation (i.e., had concentrations in at least one tissue type from the lower Edney Creek exposed area that were significantly higher than reference in 2024 or in all years; Table 6.12). None of the primary or secondary analytes showed a significant *Area×Year* interaction and a significant positive relative (exposed-reference) difference in 2024 for all three tissue types from lower Edney Creek (E1; Table 6.12; Appendix Figure F.4.16; Appendix Tables F.4.25 to F.4.27).

MPMC implements routine water quality monitoring in lower Edney Creek at EDC-01a (a station near sampling area E1; Figure 4.2).[81] Results from this routine water quality monitoring station indicated that only aqueous concentrations of dissolved copper exceeded the BCWQG (BCMOWLRS 2025). Dissolved copper exceeded the chronic BCWQG in 38% of samples in the preceding year (i.e., September 2023 to August 2024; Appendix Table D.1.8; BCMOWLRS 2025). Temporal analysis of routine water quality data from EDC-01a from 2021 to 2024 indicated that dissolved copper and dissolved manganese have decreased significantly over this period, but there were no other temporal changes in total and dissolved aqueous primary and secondary analyte concentrations over this period (Appendix Figures D.1.1 to D.1.3, Appendix Table D.1.9). Evaluation of aqueous selenium speciation parameters was initiated in 2024 (see Section 4.6 for details) to investigate possible causes of the temporal increases of selenium concentrations in periphyton and benthic invertebrate tissues from Hazeltine Creek (Minnow 2024a). Monitoring results from 2024 indicated that mean concentrations of selenate and selenite at EDC-01a were 2.7- and 1.3-times those reported at the reference area (EDC-D), respectively, while concentrations of the remaining measured selenium species

[81] Data collected at EDC-01 from 2015 to 2020 were excluded from analyses since EDC-01 was relocated and renamed as EDC-01a in 2021 (following the completion of remediation works in this area).

Table 6.12: Summary of Statistical Contrasts for Periphyton, Caddisfly, and Composite-Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed - Reference Relative Difference for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024[a]

Analytes		Lower Edney Creek (E1 [EDC-EXP]; Exposed) / Lower Edney Creek (EDC-D [EDC-REF]; Reference)																	
		Periphyton						Caddisfly						Composite-Taxa Benthic Invertebrate					
		2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Primary Analytes	Copper	A	A	A	A	A	A	D	B	B	A	CD	BC	C	BC	AB	BC	A	BC
	Iron	AB	A	AB	B	AB	A	A	A	A	A	A	A	A	A	A	A	A	A
Secondary Analytes	Barium	B	B	A	B	B	B	A	A	A	A	A	A	A	A	A	A	A	A
	Cadmium	AB	AB	AB	B	A	A	A	A	A	A	A	A	AB	B	AB	B	AB	A
	Calcium	BC	B	A	C	B	B	C	BC	BC	A	BC	B	C	BC	BC	B	A	B
	Cobalt	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Sodium	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Titanium	BC	AB	A	C	AB	A	A	A	A	A	A	A	A	A	A	A	A	A
	Uranium	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	Vanadium	BC	A	AB	C	ABC	AB	A	A	A	A	A	A	A	A	A	A	A	A

Indicates significantly higher tissue concentration at exposed compared to reference area, and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Notes: "-" = no statistical comparison could be made because data were not available or all results below Laboratory Reporting Limit (LRL), refer to Appendix Tables F.4.25 to F.4.27 for statistical analyses results and magnitude of difference calculations. Data were analysed in units of mg/kg dry weight. <LRL = greater than 50% LRL data for both stations so the time period was omitted from the analysis. EDC-EXP and EDC-REF are the alternate names used the for the E1 and EDC-D sampling areas, respectively, for HRWG reporting.

[a] This table only presents results for primary and secondary analytes with a significant positive exposed-reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant) for one or more tissue types (periphyton, caddisfly, or composite benthic invertebrate) in at least one area. Years that share a letter (e.g., A,B,C) had ratios of analyte concentrations (Exposed:Reference) that did not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

(selenocyanate and unknown selenium species) were below the LRL at all sampling stations (Appendix Tables D.1.2 and D.1.8, Appendix Figure D.1.4).

Of the two primary analytes and the eight secondary analytes identified above for further evaluation, dissolved aqueous concentrations of copper, barium, calcium, sodium, and vanadium were slightly (<2-times) higher than reference area conditions, while uranium concentrations were <5-times higher than at the reference area (EDC-D; Table 6.13).[82] Overall, this indicates similar water quality between the exposed and reference areas (except for elevated dissolved uranium concentrations), and no temporal increase in analyte concentrations at E1 since 2021. Mean BCFs were slightly (<2-times) higher than reference for cobalt and vanadium and up to approximately 4-times greater than reference for copper, iron, barium, cadmium, and titanium for at least one tissue type (Table 6.13).

Copper concentrations in caddisfly and composite-taxa were significantly higher at the exposed area of lower Edney Creek (E1) in 2024 relative to reference (EDC-D) and had a significant *Area×Year* interaction (Table 6.12). Mean concentrations of copper in periphyton tissues from E1 were consistently higher than reference (EDC-D) from 2019 to 2024, but the relative (exposed-reference) difference was temporally stable (i.e., *Area×Year* interaction was not significant; Figure 6.16, Table 6.12; Appendix Table F.4.25). Copper concentrations in composite-taxa tissues from E1 were higher than reference from 2021 to 2024, however, the relative difference of copper concentrations in 2024 was similar to or significantly lower than all prior post-breach years (Figure 6.16, Table 6.12; Appendix Table F.4.27). In caddisfly tissues from E1, copper concentrations were higher than reference in most years from 2020 to 2024 (except 2023) but the relative difference in 2024 was similar to or significantly lower than all prior years except 2019 (Figure 6.16, Table 6.12; Appendix Table F.4.26). Despite the tissue copper concentrations being higher than reference for all tissue types, the TTFs for caddisfly and composite-taxa tissues from E1 were lower than reference in all years (Table 6.14; Appendix Tables F.4.28 and F.4.29). Therefore, the concentrations of copper in the aquatic biota in lower Edney Creek, and the trophic transfer of copper to benthic invertebrates, have not increased compared to 2020 or earlier.

For the other identified primary analyte, iron, only composite-taxa tissues from the exposed area of lower Edney Creek (E1) had concentrations that were significantly higher than reference in 2024, but the relative difference was temporally stable (i.e., *Area×Year* interaction was not

[82] Elevated analytes were identified as those with mean concentrations at the exposed station that were at least twice the mean concentration at the reference station.

Table 6.13: Summary of Primary and Secondary Analyte Concentrations in Water, Periphyton, Caddisfly, and Composite-Taxa Tissues, BCFs, and TTFs for the Lower Edney Creek (E1 [EXP-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes	Component	Metric	Units	n	Area	
					Reference	Exposed
					Lower Edney Creek	Lower Edney Creek
					EDC-D (EDC-REF)	E1 (EDC-EXP)
Copper	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	***0.00363***	***0.00574***
	Periphyton	Tissue Mean	mg/kg	8	16.0	107
		BCF[e]	unitless	-	4,401	18,709
	Caddisfly	Tissue Mean	mg/kg	8	18.5	34.7
		BCF[e]	unitless	-	5,090	6,047
		TTF[f]	unitless	-	1.21	0.452
	Composite	Tissue Mean	mg/kg	8	36.9	54.1
		BCF[e]	unitless	-	10,169	9,411
		TTF[f]	unitless	-	2.42	0.775
Iron	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.192	0.130
	Periphyton	Tissue Mean	mg/kg	8	11,242	16,268
		BCF[e]	unitless	-	58,555	125,564
	Caddisfly	Tissue Mean	mg/kg	8	1,415	1,393
		BCF[e]	unitless	-	7,368	10,749
		TTF[f]	unitless	-	0.129	0.120
	Composite	Tissue Mean	mg/kg	8	1,048	1,809
		BCF[e]	unitless	-	5,460	13,964
		TTF[f]	unitless	-	0.113	0.119
Barium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.0107	0.0157
	Periphyton	Tissue Mean	mg/kg	8	91.4	307
		BCF[e]	unitless	-	8,541	19,541
	Caddisfly	Tissue Mean	mg/kg	8	60.6	40.9
		BCF[e]	unitless	-	5,666	2,598
		TTF[f]	unitless	-	0.662	0.374
	Composite	Tissue Mean	mg/kg	8	20.4	24.5
		BCF[e]	unitless	-	1,907	1,557
		TTF[f]	unitless	-	0.253	0.157
Cadmium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.00000830	0.00000741
	Periphyton	Tissue Mean	mg/kg	8	0.233	0.286
		BCF[e]	unitless	-	28,042	38,641
	Caddisfly	Tissue Mean	mg/kg	8	0.158	0.227
		BCF[e]	unitless	-	19,021	30,680
		TTF[f]	unitless	-	0.756	0.888
	Composite	Tissue Mean	mg/kg	8	0.485	1.80
		BCF[e]	unitless	-	58,464	242,507
		TTF[f]	unitless	-	2.08	6.64
Calcium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	17.2	31.6
	Periphyton	Tissue Mean	mg/kg	8	20,038	30,750
		BCF[e]	unitless	-	1,165	972
	Caddisfly	Tissue Mean	mg/kg	8	1,619	1,498
		BCF[e]	unitless	-	94.1	47.4
		TTF[f]	unitless	-	0.0822	0.0497
	Composite	Tissue Mean	mg/kg	8	2,448	3,312
		BCF[e]	unitless	-	142	105
		TTF[f]	unitless	-	0.138	0.119
Cobalt	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	<0.0001	<0.0001
	Periphyton	Tissue Mean	mg/kg	8	5.79	7.58
		BCF[e]	unitless	-	57,938	75,775
	Caddisfly	Tissue Mean	mg/kg	8	1.66	1.19
		BCF[e]	unitless	-	16,620	11,938
		TTF[f]	unitless	-	0.300	0.216
	Composite	Tissue Mean	mg/kg	8	0.918	1.82
		BCF[e]	unitless	-	9,181	18,181
		TTF[f]	unitless	-	0.187	0.260

Dissolved concentration at exposed area exceeded reference area by less than 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 2-times.
Dissolved concentration at exposed area exceeded reference area by at least 5-times.
Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05).
Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05).
BCF for exposed area exceeded reference area by less than 2-times.
BCF for exposed area exceeded reference area by at least 2-times.
BCF for exposed area exceeded reference area by at least 10-times.
Mean TTF exceeds 1.
Mean TTF at exposed area exceeds 1 and the corresponding reference area TTF for a given year.
Mean TTF at exposed area exceeds 1, the corresponding reference area TTF for a given year, and mean TTFs for all previous years (pre-breach and 2017 when applicable).

BOLD = mean tissue selenium value exceeds long-term benthic invertebrate tissue guideline for selenium (4 mg/kg dw; BCMOE 2014).

BOLD/ITALICS = Indicates dissolved water value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Notes: Results are shown for primary and secondary analytes that are presented in Table 6.12 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). "-" = no data for dissolved water concentration and BCF was not calculated for analytes due to no data for dissolved water concentration. "na" = not applicable. Summary statistics reported to 3 significant figures for display purposes. EDC-EXP and EDC-REF are the alternate names used the for the E1 and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Monitoring stations included W10 and EDC01a for corresponding tissue sampling stations EDC-D and E1, respectively (refer to Appendix Tables D.1.7 and D.1.8).

[b] Sample sizes for water quality monitoring was n=2 for EDC-D (W10) and n=13 for EDC-01a (E1).

[c] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWRLS 2024, 2025) outlined in Table D.1.1.

[d] Means were calculated for routine water quality stations using data collected between January 1, 2024 and the time of sampling in August 2024 in order to be consistent with means calculated during previous years (Minnow 2016d, 2017c, 2018c, 2019, 2020a, 2021a, 2022a, 2023a, 2024a).

[e] Bioconcentration Factor (BCF) = Mean Tissue Concentration (mg/kg dw) / Mean Dissolved Water Concentration (mg/L), if the dissolved water concentration was reported as below the Laboratory Reporting Limit (LRL), then the LRL was substituted for the BCF calculation.

[f] Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated.

Table 6.13: Summary of Primary and Secondary Analyte Concentrations in Water, Periphyton, Caddisfly, and Composite-Taxa Tissues, BCFs, and TTFs for the Lower Edney Creek (E1 [EXP-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes	Component	Metric	Units	n	Area	
					Reference	Exposed
					Lower Edney Creek	Lower Edney Creek
					EDC-D (EDC-REF)	E1 (EDC-EXP)
Sodium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	2.79	5.39
	Periphyton	Tissue Mean	mg/kg	8	442	490
		BCF[e]	unitless	-	158	91.0
	Caddisfly	Tissue Mean	mg/kg	8	2,615	2,692
		BCF[e]	unitless	-	937	500
		TTF[f]	unitless	-	6.30	6.68
	Composite	Tissue Mean	mg/kg	8	3,226	4,611
		BCF[e]	unitless	-	1,156	856
		TTF[f]	unitless	-	7.79	11.4
Titanium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	<0.01	<0.01
	Periphyton	Tissue Mean	mg/kg	8	210	421
		BCF[e]	unitless	-	20,988	42,075
	Caddisfly	Tissue Mean	mg/kg	8	26.6	31.0
		BCF[e]	unitless	-	2,656	3,102
		TTF[f]	unitless	-	0.127	0.134
	Composite	Tissue Mean	mg/kg	8	19.1	37.6
		BCF[e]	unitless	-	1,910	3,756
		TTF[f]	unitless	-	0.118	0.0974
Uranium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.0000900	0.000306
	Periphyton	Tissue Mean	mg/kg	8	0.252	0.327
		BCF[e]	unitless	-	2,796	1,068
	Caddisfly	Tissue Mean	mg/kg	8	0.0694	0.0645
		BCF[e]	unitless	-	771	211
		TTF[f]	unitless	-	0.277	0.337
	Composite	Tissue Mean	mg/kg	8	0.0483	0.0734
		BCF[e]	unitless	-	537	240
		TTF[f]	unitless	-	0.205	0.260
Vanadium	Aqueous Dissolved[a,b,c]	Mean[d]	mg/L	-	0.000730	0.000790
	Periphyton	Tissue Mean	mg/kg	8	20.6	36.6
		BCF[e]	unitless	-	28,185	46,313
	Caddisfly	Tissue Mean	mg/kg	8	2.59	2.87
		BCF[e]	unitless	-	3,551	3,631
		TTF[f]	unitless	-	0.147	0.141
	Composite	Tissue Mean	mg/kg	8	1.80	3.77
		BCF[e]	unitless	-	2,464	4,769
		TTF[f]	unitless	-	0.106	0.112

Dissolved concentration at exposed area exceeded reference area by less than 2-times.

Dissolved concentration at exposed area exceeded reference area by at least 2-times.

Dissolved concentration at exposed area exceeded reference area by at least 5-times.

Indicates significantly higher tissue concentration at exposed compared to reference area (α = 0.05).

Indicates significantly lower tissue concentration at exposed compared to reference area (α = 0.05).

BCF for exposed area exceeded reference area by less than 2-times.

BCF for exposed area exceeded reference area by at least 2-times.

BCF for exposed area exceeded reference area by at least 10-times.

Mean TTF exceeds 1.

Mean TTF at exposed area exceeds 1 and the corresponding reference area TTF for a given year.

Mean TTF at exposed area exceeds 1, the corresponding reference area TTF for a given year, and mean TTFs for all previous years (pre-breach and 2017 when applicable).

BOLD = mean tissue selenium value exceeds long-term benthic invertebrate tissue guideline for selenium (4 mg/kg dw; BCMOE 2014).

BOLD/ITALICS = Indicates dissolved water value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Notes: Results are shown for primary and secondary analytes that are presented in Table 6.12 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). "-" = no data for dissolved water concentration and BCF was not calculated for analytes due to no data for dissolved water concentration. "na" = not applicable. Summary statistics reported to 3 significant figures for display purposes. EDC-EXP and EDC-REF are the alternate names used the for the E1 and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Monitoring stations included W10 and EDC01a for corresponding tissue sampling stations EDC-D and E1, respectively (refer to Appendix Tables D.1.7 and D.1.8).

[b] Sample sizes for water quality monitoring was n=2 for EDC-D (W10) and n=13 for EDC-01a (E1).

[c] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWRLS 2024, 2025) outlined in Table D.1.1.

[d] Means were calculated for routine water quality stations using data collected between January 1, 2024 and the time of sampling in August 2024 in order to be consistent with means calculated during previous years (Minnow 2016d, 2017c, 2018c, 2019, 2020a, 2021a, 2022a, 2023a, 2024a).

[e] Bioconcentration Factor (BCF) = Mean Tissue Concentration (mg/kg dw) / Mean Dissolved Water Concentration (mg/L), if the dissolved water concentration was reported as below the Laboratory Reporting Limit (LRL), then the LRL was substituted for the BCF calculation.

[f] Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated.

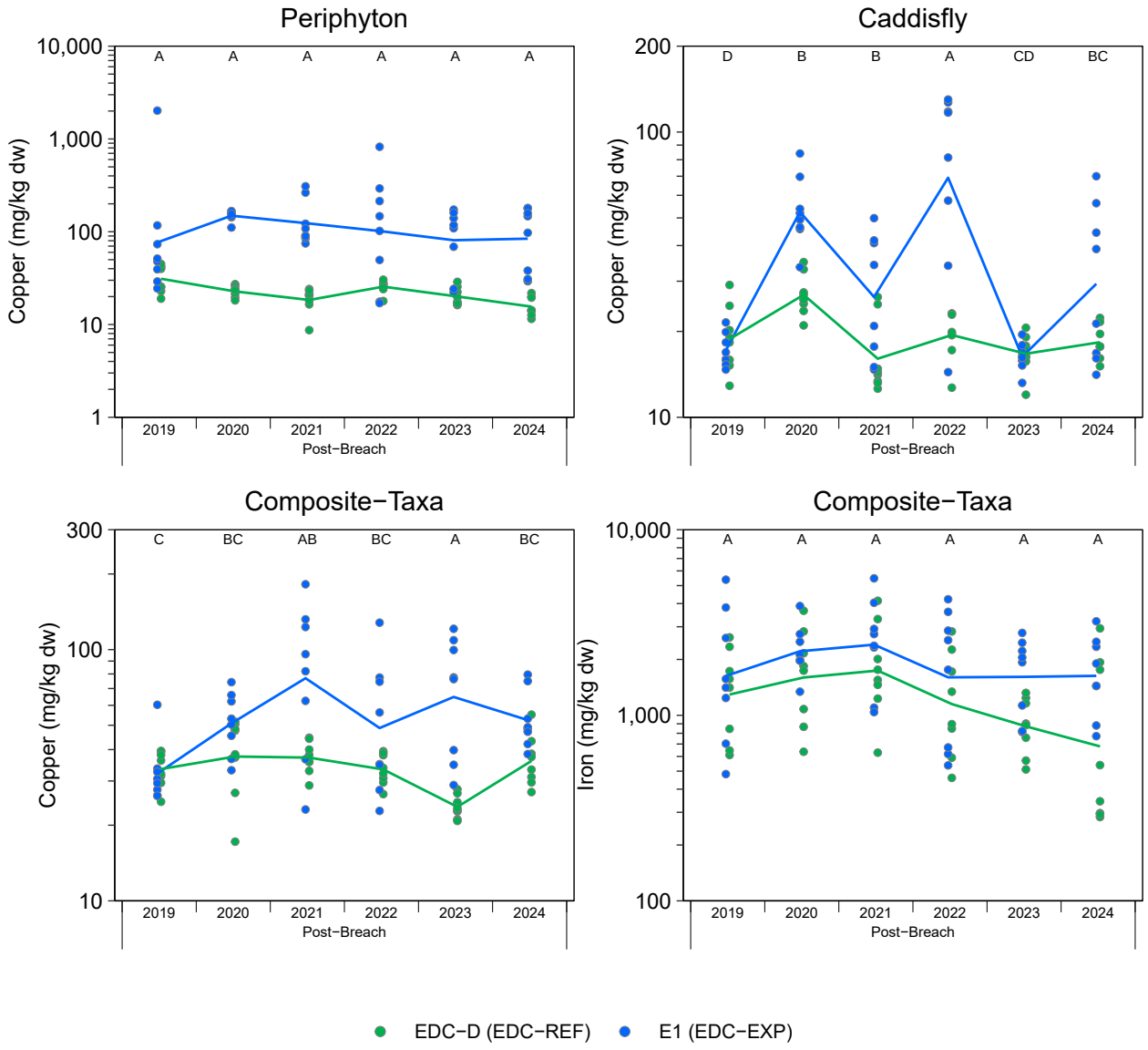

Figure 6.16: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC −REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. EDC-REF and EDC-EXP are the alternate names for the EDC-D and E1 sampling areas, respectively, for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed −reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

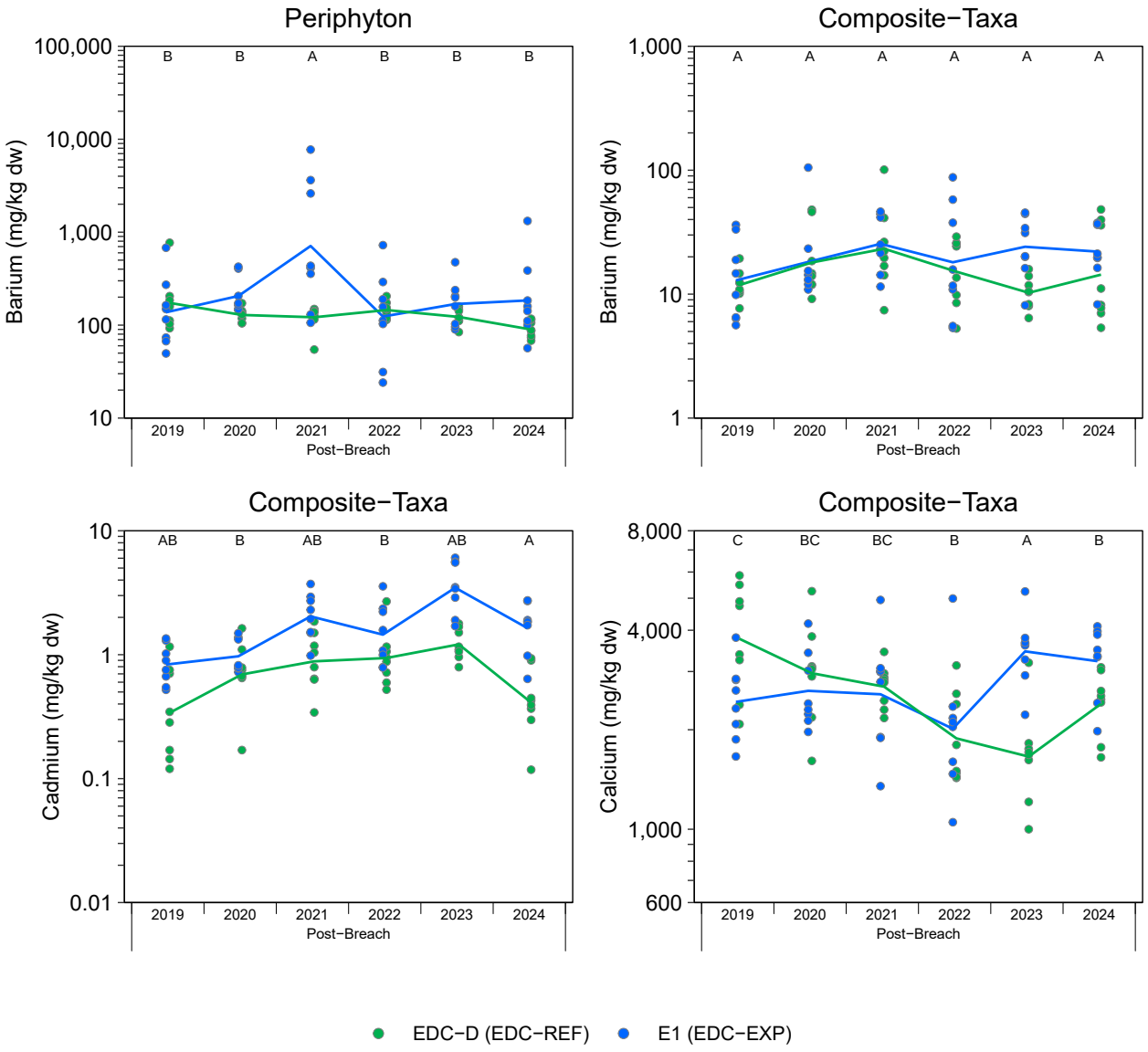

Figure 6.16: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC −REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. EDC-REF and EDC-EXP are the alternate names for the EDC-D and E1 sampling areas, respectively, for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed −reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

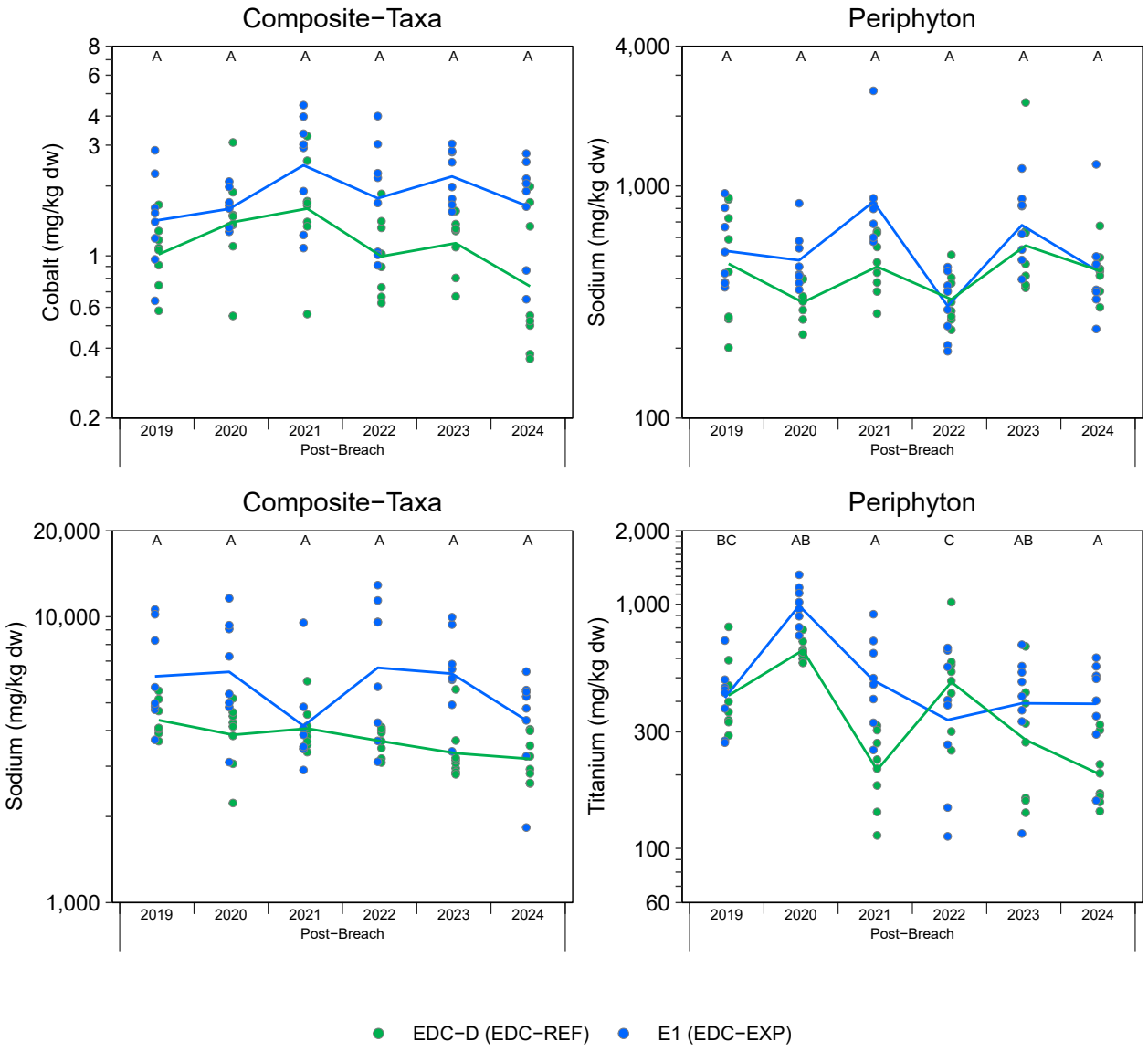

Figure 6.16: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC −REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. EDC-REF and EDC-EXP are the alternate names for the EDC-D and E1 sampling areas, respectively, for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed −reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

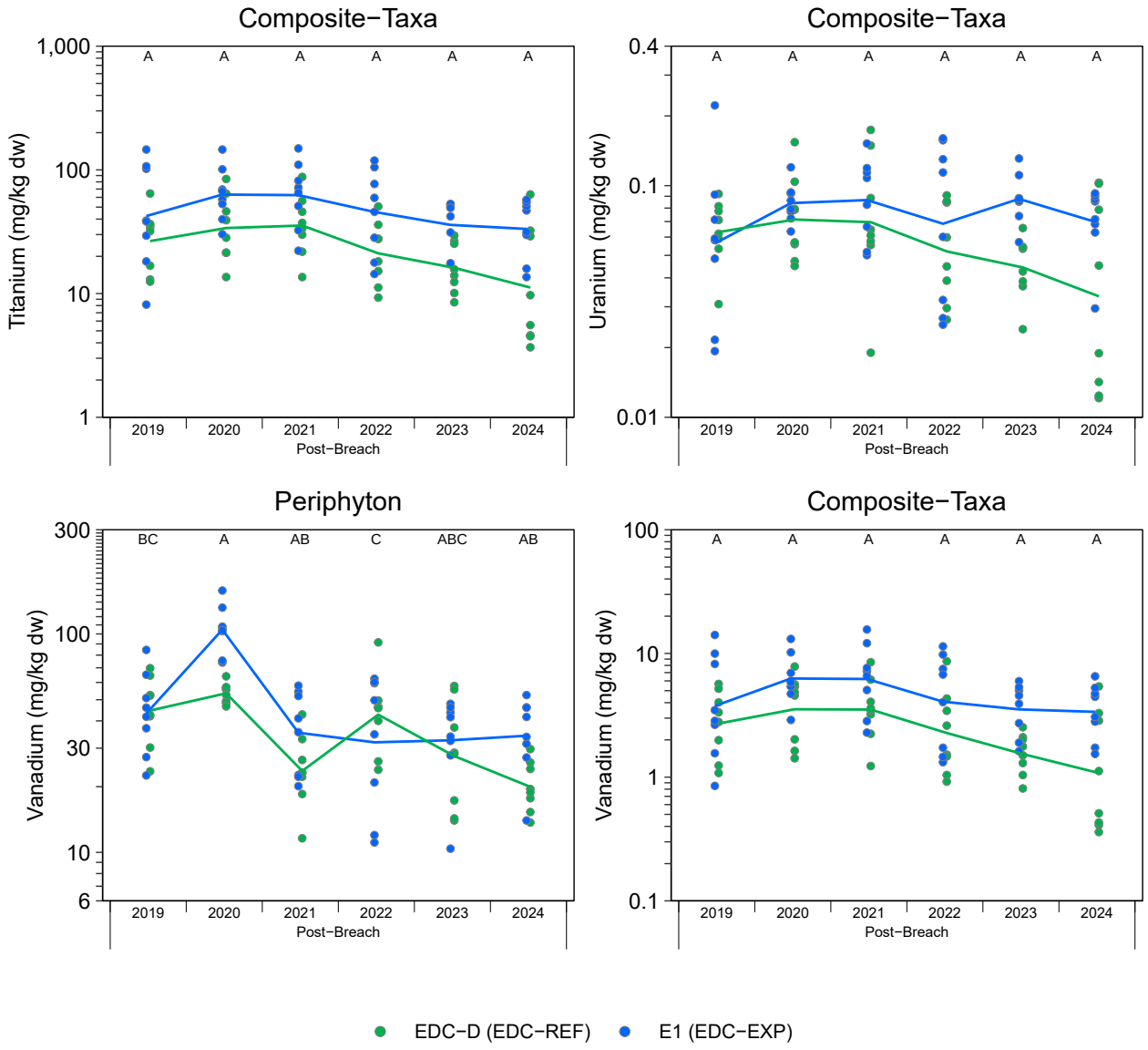

Figure 6.16: Periphyton, Caddisfly, and Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC −REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. EDC-REF and EDC-EXP are the alternate names for the EDC-D and E1 sampling areas, respectively, for HRWG reporting. Plots are only included for primary and secondary analytes with a significant positive exposed −reference difference (i.e., analytes with exposed concentrations significantly higher than reference) in 2024 (if the analysis Area×Year interaction was significant) or in all monitoring years (if the Area×Year interaction was not significant). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

Table 6.14: Summary of Statistical Contrasts for Caddisfly and Composite-Taxa Benthic Invertebrate Tissue Trophic Transfer Factors of Primary and Secondary Analytes with a Significant Positive Exposed - Reference Relative Difference for the Lower Edney Creek (E1 [EXP-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024[a]

Analytes		Lower Edney Creek (E1; Exposed) / Lower Edney Creek (EDC-D; Reference)											
		Caddisfly						Composite-Taxa Benthic Invertebrate					
		2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Primary Analytes	Copper	A	A	A	A	A	A	A	A	A	A	A	A
	Iron	A	A	A	A	A	A	A	A	A	A	A	A
Secondary Analytes	Barium	AB	B	B	A	B	B	A	AB	B	A	A	A
	Cadmium	C	ABC	AB	A	BC	BC	A	A	A	A	A	A
	Calcium	B	B	C	A	B	B	B	B	C	A	AB	AB
	Cobalt	A	A	A	A	A	A	A	A	A	A	A	A
	Sodium	AB	AB	B	A	AB	A	A	AB	B	A	A	A
	Titanium	BC	BC	C	A	AB	ABC	A	A	A	A	A	A
	Uranium	A	A	A	A	A	A	A	A	A	A	A	A
	Vanadium	A	A	A	A	A	A	A	A	A	A	A	A

Indicates significantly higher TTF at exposed compared to reference area, and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly lower TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was not significant (α = 0.05; i.e., the difference between exposed and reference did not change significantly among years).

Indicates significantly higher TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly lower TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Notes: "-" = no statistical comparison could be made since data were not available or all results were below Laboratory Reporting Limit (LRL). Trophic Transfer Function (TTF) = Benthic Invertebrate Tissue Concentration / Periphyton Tissue Concentration. If the reported analyte concentrations for either periphyton or benthic invertebrate tissue were below the LRL, the TTF was not calculated. Refer to Appendix Tables F.4.28 to F.4.29 for statistical analyses results and magnitude of difference calculations. EDC-EXP and EDC-REF are the alternate names used for the for the E1 and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Results are shown for primary and secondary analytes that are presented in Table 6.12 (i.e., those with a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). Years that share a letter (e.g., A,B,C) had ratios of TTFs (Exposed:Reference) that did not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

significant; Figure 6.16, Table 6.12; Appendix Tables F.4.25 to F.4.27). Similarly, the TTFs for iron in composite-taxa tissues from E1 were temporally stable from 2019 to 2024 (i.e., *Area×Year* interaction was not significant; Table 6.14; Appendix Figure F.4.18). Selenium concentrations in all three tissue types from E1 in 2024 (periphyton, caddisfly, and composite-taxa) did not differ significantly from the reference area (EDC-D; Appendix Tables F.4.25 to F.4.27), therefore temporal changes in tissue selenium concentrations and selenium TTFs were not evaluated. Selenium concentrations in benthic invertebrate tissues from E1 in 2024 (maximum = 2.20 and 3.27 mg/kg dw in caddisfly and composite-taxa tissues, respectively; Appendix Tables D.5.5 and D.5.6) were below the BC interim guideline for the protection of aquatic life (4 mg/kg dw; BCMOE 2014).

Of the eight secondary analytes identified for data interpretation, barium, sodium, titanium, and vanadium were significantly higher in periphyton tissues from lower Edney Creek (E1) in 2024 than those from the reference area (EDC-D; Figure 6.16, Table 6.12; Appendix Table F.4.25). For sodium concentrations, the relative (exposed-reference) difference in periphyton tissues was temporally stable from 2019 to 2024 (i.e., *Area×Year* interaction was not significant). The relative (exposed-reference) differences of barium and vanadium concentrations in periphyton in 2024 were similar to the first year of post-breach monitoring (2019), while titanium concentrations in 2024 were significantly higher compared to 2019 and 2022 but similar to remaining prior years (Figure 6.16, Table 6.12). None of the eight secondary analytes (identified above) were significantly higher in caddisfly tissues from E1 in 2024 compared to the reference area (Figure 6.16, Table 6.12; Appendix Figure F.4.15, Appendix Table F.4.26). Concentrations of barium, cobalt, sodium, titanium, uranium, and vanadium in composite-taxa tissues were significantly higher at the exposed area relative to reference in all years (2019 to 2024) but the relative differences of these analyte concentrations were temporally stable over this period (i.e., no significant *Area×Year* interaction; Figure 6.16, Table 6.12; Appendix Table F.4.27). Concentrations of cadmium and calcium in composite-taxa tissues from E1 in 2024 were also significantly higher than reference, but the relative differences of the analyte concentrations in 2024 were similar to the first or second (i.e., 2019 or 2020) year of monitoring for cadmium and calcium, respectively (Figure 6.16, Table 6.12; Appendix Table F.4.27). The TTFs for cadmium, cobalt, titanium, uranium, and vanadium in composite-taxa tissue from E1 were elevated relative to reference from 2019 to 2024 but were temporally stable over this period (Table 6.14; Appendix Figure F.4.18, Appendix Table F.4.29). The TTFs for caddisfly tissues from E1 in 2024 were similar to or significantly lower than those from the reference area for each of the primary and secondary analytes identified for discussion. The evaluation of secondary analytes in periphyton, caddisfly, and composite-taxa tissues in 2024 indicates there was no significant increase in the tissue analyte concentrations, or trophic transfer of these analytes to benthic invertebrates, in the

exposed area of lower Edney Creek compared to the first (i.e., 2019) or second (i.e., 2020) year or monitoring, relative to reference.

Overall, the results of tissue quality monitoring in the exposed area of lower Edney Creek in 2024 indicated that copper concentrations in periphyton and benthic invertebrate tissues and iron concentrations in composite-taxa tissues were significantly higher than reference. However, there was no increase in the copper or iron concentrations of these tissues compared to the first or second year of post-breach monitoring (i.e., 2019 or 2020). Selenium concentrations in exposed tissues (periphyton and benthic invertebrates) were similar to reference results, indicating no potential mine-related influence, and remained below the guideline for the protection of aquatic life in benthic invertebrate tissues. Although the tissue analyte concentrations of eight secondary analytes were significantly higher at the exposed area compared to reference area in 2024, there was no sustained increase in the concentrations of these analytes in exposed tissues, or in the trophic transfer of these analytes to benthic invertebrates (relative to reference), with results in 2024 being similar to the first (2019) or second (2020) year of monitoring.

6.2.3.1 Tissue-Type Comparisons

A comparison between benthic invertebrate (caddisfly and composite-taxa) tissue findings was completed to evaluate if results were consistent between the two tissue types. This qualitative comparison focused on analytes with a significant positive exposed-reference difference (i.e., analytes with concentrations that were significantly higher in tissues from the exposed area compared to those from the reference area) in 2024 or in all monitoring years for at least one tissue type in at least one area.

Among the primary and secondary analytes evaluated benthic invertebrate tissues from lower Edney Creek in 2024, the significant positive exposed-reference differences in analyte concentrations and TTFs identified for caddisfly tissues were a subset of those identified for composite-taxa tissues (Table 6.15). This indicates that the analyte concentrations and TTFs in exposed caddisfly tissues that were significantly elevated relative to reference were captured by composite-taxa monitoring, while the reverse was not true (i.e., caddisfly monitoring identified fewer significant relative differences for both primary and secondary analytes than composite-taxa monitoring; Table 6.15). These results indicate that composite-taxa tissue sampling effectively detected all changes also occurring in caddisflies for both tissue analyte concentrations and TTFs. Overall, results from lower Edney Creek suggest that if monitoring were limited to composite-taxa tissue samples, changes in caddisfly tissue analyte concentrations and TTFs would still be captured.

Table 6.15: Summary Magnitude of Difference (MOD)[a] of Exposed - Reference Contrasts of Primary and Secondary Analyte Concentrations and Trophic Transfer Factors (TTFs) in Caddisfly and Composite-Taxa Benthic Invertebrate Tissue for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Analytes		Lower Edney Creek (E1 [EDC-EXP]; Exposed) / Lower Edney Creek (EDC-D [EDC-REF]; Reference)			
		Tissue		TTF	
		Caddisfly	Composite-Taxa	Caddisfly	Composite-Taxa
Primary Analytes	Copper	60	45	-65	-66
	Iron	-35	57	-38	50
Secondary Analytes	Barium	ns	32	-74	ns
	Cadmium	ns	299	ns	173
	Calcium	ns	35	-45	ns
	Cobalt	ns	63	ns	88
	Sodium	ns	50	ns	ns
	Titanium	ns	105	ns	50
	Uranium	-39	39	ns	52
	Vanadium	ns	95	-50	53

Indicates significantly higher tissue concentration or TTF at exposed compared to reference area (α = 0.05), and the interaction (Area x Year) term of the two-way ANOVA was significant (α = 0.05; i.e., the difference between exposed and reference changed significantly among years).

Indicates significantly higher tissue concentration or TTF at exposed compared to reference area (α = 0.05), without a significant (Area x Year) interaction of the two-way ANOVA. Values represent the MOD exposed:reference, which did not change significantly among monitoring years.

Notes: Results are shown for primary and secondary analytes that are presented in Table 6.12 (i.e., analytes that had a significant positive exposed - reference difference in 2024 or in all monitoring years for one or more tissue types [periphyton, caddisfly, or composite benthic invertebrate] in at least one area). ns = no significant difference between exposed at reference area. TTF calculated as (benthic invertebrate tissue analyte concentration) / (periphyton tissue analyte concentration). EDC-EXP and EDC-REF are the alternate names used the for the E1 and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

7 SUMMARY OF FINDINGS

This section provides an overall summary of the findings of sediment and aquatic biological monitoring completed under the Mount Polley CEMP from 2022 to 2024, drawing on additional historical monitoring results for data interpretation as required. As identified in Section 2, this section considers multiple lines of evidence to identify well supported findings versus those that are not fully supported and/or those for which uncertainty exists. Throughout the following sub-sections, each monitoring component builds on evidence from others, typically over the line of evidence sequence from sediment quality to primary producer to secondary producer/benthic invertebrates to fish. Where temporal changes in sediment and tissue quality results are discussed in the following sub-sections, these are relative to reference results.[83] The discussion of temporal and spatial differences in the following sub-sections are limited to those differences that were statistically significant.

7.1 Polley Lake

7.1.1 Sediment Quality

Sediments from the deep basins of Polley Lake in 2024 remained clearly influenced by breach material, based on chemical and physical characteristics. Sediments from the deep areas of Polley Lake in 2024 were characterized by concentrations of arsenic and copper greater than pre-breach/reference conditions and BCWSQG. Copper was the most substantially elevated analyte, with mean concentrations in 2024 that exceeded the upper BCWSQG by 2.5- and 2.9-times in the Northwest (POL-P1) and Southeast (POL-P2) basins, respectively. Copper concentrations in sediments from both basins of Polley Lake, relative to reference, have been temporally stable (i.e., no significant change) from 2018 to 2024 and during this period have been similar to or significantly lower than immediate post-breach conditions (i.e., 2014). Arsenic concentrations of Polley Lake deep sediments have been stable since 2021 at POL-P1 and since 2018 at POL-P2, relative to reference, and have been significantly lower than immediate post-breach conditions (i.e., 2014) since at least 2018. The TOC content of deep Polley Lake sediments was slightly higher in 2024 than in previous-post breach monitoring years (except for 2021), suggesting early evidence of recovery of TOC content, but this change was not yet statistically significant. Overall, the 2024 sediment quality results indicated that temporal changes in the physical and chemical characteristics of sediments in both the Northwest and Southeast basins of Polley Lake have been limited since the breach in 2014, and no significant

[83] Temporal changes were assessed in the relative (exposed-reference) difference among years. See Section 3.1.3.2 for detailed methods.

changes in sediment characteristics or analyte concentrations have occurred since at least 2021, but recovery is occurring slowly.

Sediments from the shallow areas of Polley Lake, which were last sampled in 2022, had mean arsenic, copper, and iron concentrations that exceeded reference conditions and BCWSQG. Specifically, mean arsenic concentrations in the exposed sediment exceeded the lower BCWSQG by 2.4-times, and mean copper and iron concentrations exceeded the upper BCWSQG by 3.4--and 1.5-times, respectively. Of the analytes with concentrations that exceeded reference conditions and BCWSQG in 2024 (i.e., arsenic, copper, and iron), copper was the only analyte with concentrations in reference sediments that exceeded the BCWSQG (i.e., exceeded the lower BCWQG by 2.4-times). The TOC content, arsenic, copper, and iron concentrations in shallow Polley Lake sediments in 2022 were similar to those reported in the previous sampling event (i.e., 2019) indicating temporal stability of these analyte concentrations.

Sediment toxicity testing was conducted for deep and shallow areas of Polley Lake (and reference; Bootjack Lake) in 2024 and 2022, respectively. Test organisms (*C. dilutus*) exposed to sediments from deep areas of Polley Lake in 2024 showed no unacceptable responses of survival or growth relative to the sand control or reference sediments, using a weight-of evidence approach associated with endpoints of survival and growth compared to reference results. Similarly, test organisms (*H. azteca)* exposed to sediments from shallow areas of Polley Lake in 2022 showed no unacceptable response of survival and growth relative to the reference area or the sand control. Sediment toxicity testing of deep and shallow sediments from Polley Lake has consistently shown no unacceptable responses of test organisms since the initiation of post-breach monitoring. Conditions of the CEMP outlined that sediment toxicity testing of the shallow Polley Lake area must be continued "*unless MPMC can clearly show that copper concentrations in all Polley Lake shallow sediment samples are below the 95th percentile of the copper concentrations in the Bootjack Lake reference area shallow sediment samples."* (BCMOECCS 2021). This condition was not met in 2022 in Polley Lake shallow sediments, indicating that toxicity testing of these shallow sediments must be completed in 2025.

7.1.2 Aquatic Life

Phytoplankton community and productivity monitoring in Polley Lake indicated that phytoplankton productivity (assessed by chlorophyll-a concentrations) was significantly lower than at the reference area (Bootjack Lake) in 2024, and lower than most prior years (except 2021). The chlorophyll-a results in 2024 characterized both Polley Lake and Bootjack Lake as oligotrophic, which was similar to results from 2020 to 2021, but differed from when the lakes were classified as mesotrophic (i.e., in 2019, 2022, and 2023). The phytoplankton community in Polley Lake in 2024 was characterized by total density and taxon richness that were significantly

lower, and Simpson's Diversity and Evenness that were significantly higher, compared to the reference area. Phytoplankton density has varied temporally, which is attributable to significant changes in Cyanobacteria densities in both lakes that were likely driven by natural changes in environmental parameters. Taxon richness in Polley Lake has consistently been significantly lower than at the reference area (except in 2020), while Simpson's Diversity and Evenness have been similar to or significantly higher than at the reference area in all years. Cyanobacteria (the dominant taxa in both lakes) has shown similar or significantly lower relative densities (%) in Polley Lake compared to the reference area in all years, while Chrysophytes and Cryptomonads (%) have been consistently higher and lower, respectively, compared to the reference area. Collectively, the lack of directional consistency in the differences of the Polley Lake community endpoints, relative to the reference area (i.e., no consistent increasing or decreasing patterns), suggests that the observed differences were likely related to environmental factors (e.g., light exposure, water temperature, nutrient availability).

Zooplankton community and productivity monitoring in Polley Lake in 2024 indicated that zooplankton biomass (dw) was significantly higher than at the reference area (Bootjack Lake). In most prior years (2019 to 2022), biomass was either similar to or significantly higher than reference (except 2023). The zooplankton community in Polley Lake in 2024 was characterized by total density, and Simpson's Diversity and Evenness that were significantly lower than at the reference area, and taxon richness that was similar to the reference area. These community metrics have varied temporally, both within Polley Lake (excluding Simpson's Evenness which has been temporally stable), and relative to the reference area, without obvious directional consistency (i.e., no obvious temporal increase or decrease in the endpoints). The zooplankton community in Polley Lake has consistently had higher dominance of Cyclopoida (%) and lower dominance of Rotifera (%) than Bootjack Lake throughout the monitoring period (excluding 2022 for Cyclopoida), while Copepod Nauplii (%) in Polley Lake were significantly higher than Bootjack Lake from 2019 to 2022 but were similar to the reference area in 2023 and 2024. Collectively, the observed temporal variability in most endpoints at both the exposed and reference areas, and the lack of directional consistency in the differences of the Polley Lake community metrics, relative to reference, suggested that the observed differences were likely related to environmental factors (e.g., water temperature, nutrient availability, phytoplankton community, and predation).

Zooplankton tissue quality monitoring in Polley Lake in 2024 indicated that concentrations of primary and secondary analytes in zooplankton were similar to or lower than reference. Although temporal variability has been observed over the post-breach monitoring period (i.e., 2019 to 2024), the primary and secondary analyte concentrations of zooplankton tissues from Polley Lake in 2024 were not significantly higher than the first year of monitoring that included

sample replicates (i.e., 2019), indicating no sustained increase over this period. Rather, the concentrations of several analytes (copper, manganese, mercury, molybdenum, nickel, and tin) in zooplankton tissues from Polley Lake in 2024 were significantly lower than in 2019. The mean selenium concentration in zooplankton tissues from Polley Lake in 2024 was approximately 1.1-times the BC guideline for the protection of aquatic life but did not differ significantly from reference in 2024. Selenium concentrations in exposed zooplankton tissues have not increased significantly since 2019 (i.e., the first year of monitoring). Surface water quality data from Polley Lake (2015 to 2024) corroborated the zooplankton tissue quality results and showed stable or decreasing concentrations for all aqueous primary and secondary analytes except dissolved copper and dissolved and total vanadium.

Benthic invertebrate community monitoring in Polley Lake in 2024 indicated that the community of the two basins of Polley Lake differed from one another. The benthic invertebrate community at the Northwest basin (POL-P1) was characterized by total density, taxonomic richness, and Simpson's Evenness that were similar to both pre-breach (1999) and reference conditions (or significantly higher than pre-breach for density). At the Southwest basin (POL-P2) density and Simpson's Evenness were significantly lower compared to POL-P1 and reference, and Simpson's Evenness was also significantly lower than pre-breach (1999) conditions. Although taxon richness at both basins of Polley Lake in 2024 was similar to pre-breach and reference conditions (and was similar between the basins), Simpson's Diversity at both basins in 2024 was significantly lower than reference and pre-breach conditions, and was significantly lower at POL-P2 (which is closer to the breach location) compared to POL-P1. Total density in both basins decreased significantly from 2018 to 2024 but has remained similar to or significantly higher than reference and/or pre-breach conditions in all years since 2016. The benthic invertebrate community of both Polley Lake basins in 2024 was dominated by Chironomidae and, to a lesser extent, Oligochaeta. Although the community composition at two Polley Lake basins in 2024 differed significantly in terms of Chironomidae (%) and Oligochaeta (%), the relative density (%) and density of all major taxa groups in both basins were similar to reference and/or pre-breach (1999) conditions. Overall, the benthic invertebrate community at deep basins of Polley Lake in 2024 were largely comparable to the communities documented in Polley Lake in 1999 (pre-breach) and/or the reference area communities (Bootjack Lake) in 2024, excluding Simpson's Evenness at POL-P2, and Simpson's Diversity at both POL-P1 and POL-P2. This indicated that the benthic invertebrate community structure of Polley Lake in 2024 has mostly recovered to pre-breach and/or reference conditions since the breach in 2014. Remaining differences between the two Polley Lake basins indicate that recovery is more advanced at the Northwest basin (POL-P1), which is consistent with its greater distance from the location of the breach impact.

Fish community and population health assessments undertaken annually from 2019 to 2024 documented the influence of the temporary loss of Hazeltine Creek due to the breach (August 2014 to April 2018), which supports most of the fish recruitment to Polley Lake. Following consecutive years of increases in spring rainbow trout CPUE (2022 and 2023) which featured the highest recorded values since 2016 (28.4 fish/trap/day in 2023), CPUE in 2024 (28.2 fish/trap/day) was almost unchanged from the previous year. Increased spring CPUE from 2022 to 2024 compared to 2017 to 2021 suggests that most of the remaining 2018 to 2020 rainbow trout cohorts, resulting from restoration of fish access to Hazeltine Creek in 2018, have reached maturity. In the fall of 2024, when fishing was randomized in Polley Lake, CPUE for rainbow trout was lower than in all previous years of monitoring. Following three years of elevated rainbow trout fall CPUE when the population lacked older age classes (i.e., 2019 to 2021), the population in 2024 may have returned to an abundance and age-size structure more comparable to 2016. The assessment of rainbow trout size distribution provides further insight into the population trends observed in Polley Lake. Length frequency distributions for rainbow trout over time showed a proportional shift towards smaller and younger fish in 2019 and a subsequent shift towards a more even distribution among size classes with the survival of the 2018 and 2019 cohorts. In 2022 and 2023, a more balanced distribution among size classes was observed than in previous years, and in 2024 the distribution most closely resembled that in 2016 (two years post-breach). These temporal changes in length frequency distributions may also help to explain the trends observed in rainbow trout CPUE, with higher CPUE from 2019 to 2021 (reflecting a period of higher population density resulting from restoration of fish access to Hazeltine Creek in 2018) and a subsequent decrease in CPUE from 2022 to 2024 (reflecting a lower density population with more representation from older age classes). CPUE for longnose sucker in the spring has declined over the past four years, and was lowest in 2024 since monitoring began in 2016, while CPUE in the fall of 2024 was the second lowest recorded since 2016. The CPUE for longnose sucker in spring and fall has shown temporal variability, which might be attributable to several factors that can affect the success of netting efforts (e.g., temperature driven activity effects and/or gear efficacy). Length frequency distributions of longnose sucker in 2024 showed fewer age-1 fish and more age-3 fish relative to 2023 with both years more closely resembling the size structure in 2016 than in prior years (i.e., 2020 to 2022).

Fish tissue quality monitoring of rainbow trout and longnose sucker from Polley Lake in 2024 indicated that fish muscle analyte concentrations were below the guidelines for the protection of human health (which exist for mercury and selenium), indicating that these fish were safe for human consumption. Mean selenium concentrations in rainbow trout and longnose sucker muscle in 2024 were moderately (1.1- and 1.5-times, respectively) greater than the BC guideline for the protection of aquatic life, consistent with prior years. Evaluation of ovary tissue is

recommended for the assessment of potential selenium-associated effects on fish, and mean selenium concentrations in the ovary tissues of both fish species from Polley Lake in 2024 were below the BC guideline for the protection of aquatic life and the threshold for reproductive effects. Selenium concentrations in most rainbow trout and longnose sucker tissues from Polley Lake have remained elevated relative to reference since the uncontrolled surface runoff to Polley Lake from 2006 to 2009 but the difference has not increased over the post-breach period. In fact, selenium concentrations in rainbow trout liver tissues and longnose sucker kidney tissues from Polley Lake did not differ significantly from the reference area in 2024, marking the first time this has occurred in any fish tissues from Polley Lake fish since the start of mining operations. In addition, selenium concentrations in rainbow trout muscle tissue and longnose sucker muscle and ovary tissues in 2024 were significantly lower than pre-breach (2012) results. The observed decreases in fish tissue selenium concentrations in Polley Lake corresponded with the absence of increased selenium concentrations in zooplankton tissue (i.e., dietary exposure) over the monitoring period (2019 to 2024) and with a significant decrease in both total and dissolved selenium concentrations in surface waters of Polley Lake from 2015 to 2024. Concentrations of the remaining primary analytes and 15 secondary analytes were significantly higher in exposed tissues relative to reference in 2024 in at least one tissue type in one or both species. However, the results for most of these analytes were inconsistent among tissues and species, were temporally stable, and/or were similar to the first or second year of monitoring, indicating there has been no sustained increase of analyte concentrations in fish tissues from Polley Lake since the initiation of post-breach monitoring. Cobalt was the only analyte that showed higher concentrations in multiple fish tissues (longnose sucker liver and kidney) in 2024 compared to all prior years; continued monitoring will help to determine whether the increased tissue cobalt concentrations represented a single anomalous year or are part of a long-term trend.

7.1.3 Key Findings

Key findings of CEMP monitoring of Polley Lake from 2022 to 2024 (Table 7.1) were:

- Sediment Quality (shallow areas: 2022; deep areas: 2024):
    - Concentrations of arsenic and copper in deep Polley Lake sediments in 2024 were higher than BCWSQG and reference/pre-breach conditions while TOC content was much lower than reference. Limited changes in the sediments have occurred over the post-breach period, with no significant changes in sediment arsenic and copper concentrations since at least 2021, but recovery is occurring slowly. The TOC content of the deep Polley Lake sediments has been temporally stable over the post-breach period.

Table 7.1: Summary of Mount Polley CEMP Sediment and Aquatic Life Results for Polley Lake, 2022 to 2024[a]

Area		Sediment			Plankton			Benthic Invertebrate	Fish	
		Quality[b]	Toxicity[c]		Productivity	Community[d]	Zooplankton Tissue Quality[e]	Community[d]	Usage and Population Health	Tissue Quality[f]
			Survival	Growth						
Shallow	POL-S	**2022** Analytes of Interest = As, Cu, Fe Mean Cu and Fe > upper BCWSQG and ref 95th; Mean As > lower BCWSQG and ref 95th; TOC < ref **Temporal Evaluation (2019 to 2022)** As, Cu, Fe in 2022 = 2019 TOC in 2022 = 2019	***H. azteca* (14-day)** **2022** No unacceptable response (97% of Control; 104% of Reference) **Temporal Evaluation (2019 to 2022)** No unacceptable / Moderate response (2019); No unacceptable response (2022)	***H. azteca* (14-day)** **2022** No unacceptable response (126% of Control; 114% of Reference) **Temporal Evaluation (2019 to 2022)** No unacceptable response	-	-	-	-	**Temporal Evaluation (2016 to 2024)** CPUE Spring: RB CPUE in 2024 < 2016, > 2017 to 2022, = 2023; LSU CPUE in 2024 < 2016 to 2023 (all years) CPUE Fall: RB CPUE in 2024 < 2016 to 2023 (all years); LSU in 2024 < 2016 to 2021 and 2023, > 2022 Condition (Spring/Fall; All): RB in spring 2024 = 2016 to 2021, > 2022 to 2023; LSU in spring 2024 < 2016 to 2023; RB in fall 2024 < 2016 to 2021, = 2022 to 2023; LSU in fall 2024 < 2014 to 2020, = 2021 to 2023 Weight-at-age (Spring; females): RB in 2024 = 2016 to 2019 and 2022, 2023, < 2020 to 2021; LSU in 2024 = 2016 to 2017 and 2020 to 2023, < 2018 to 2019 Fall Length Frequency Distributions: RT size distribution in 2024 most closely resembled that in 2016 (two years following the breach). In prior post-breach years, RT size distribution in 2019 showed the highest frequency of smaller and younger fish, and in 2022 and 2023 showed more even distribution among size classes (and more similarity to the 2016 distribution). LSU size distribution in 2024 showed fewer age-1 fish and more age-3 fish compared to 2023 with both years more closely resembling the size structure in 2016 than in 2020 to 2022.	**Temporal Evaluation (2015 to 2024)** Guidelines and Thresholds: RB and LSU (MU) mean [Hg] and [Se] < Human Health GL in all years; RB (MU) and LSU (MU) mean [Se] > Aquatic Life GL in all years (except for RB in 2023); RB (OV) and LSU (OV) mean [Se] < Aquatic Life GL in all years (except 2015, 2017, 2019 for RB); RB (OV) mean [Se] > Effects threshold in 2015, but otherwise < threshold in all years Spatial and Temporal Analysis: [As] in RB (MU, OV, LI, KI) and LSU (MU, LI, KI) in 2024 > ref but = 2018 or earlier; [Cu] in RB (OV, KI) and LSU (LI) in 2024 > ref but = first year of monitoring; [Fe] in RB (LI, KI) and LSU (LI) in 2024 > ref but temporally stable except for LSU (LI) in 2024 > all prior years; [Se] in RB (MU, OV, KI) and LSU (MU, OV, LI) in 2024 > ref but ≤ first year of post-breach monitoring; Concentration of most secondary analytes in RB and LSU tissues in 2024 ≤ ref. Analytes > ref in 2024 for two or more tissues within a fish species (RB and LSU) included Ca, Co, Mn,, Mo, Ni, P, Na, Sr, Ti, V, Zn. For these analyte-tissue combinations, concentrations were either temporally stable or did not exhibit sustained temporal increases in more than one tissue type. [Co] in LSU (LI, KI) was the only analyte in multiple fish tissues in 2024 > all prior years.
Deep	POL-P1 (North Basin)	**2024** Analytes of Interest = As, Cu Mean [Cu] > upper BCWSQG, and ref and pre-breach 95th; Mean [As] > lower BCWSQG, and ref and pre-breach 95th; TOC < ref **Temporal Evaluation (2014 to 2024)** [As] in 2024 < from 2014 to 2018, = 2021; [Cu] in 2024 < 2014, = from 2016 to 2021; TOC in 2024 = from 2014 to 2021	***C. dilutus* (10-day)** **2024** No unacceptable response (109% of Control; 98% of Reference); **Temporal Evaluation (2014 to 2024)** No unacceptable response	***C. dilutus* (10-day)** **2024** No unacceptable response (132% of Control; 114% of Reference); **Temporal Evaluation (2014 to 2024)** No unacceptable response (2014, 2016, 2021 to 2024); No unacceptable / Moderate response (2018)	-	-	-	**2024** Density = ref, > pre-breach, > POL-P2; Richness = ref, = pre-breach, = POL-P2 **Temporal Evaluation (2014 to 2024)** Density < ref in 2014 (Highly) and 2016 (Slightly), > ref in 2018 and 2021 (Slightly to Moderately), = ref in 2024; Density < pre-breach in 2014 = pre-breach in 2016, > pre-breach from 2018 to 2024; Density > POL-P2 in 2014 and 2024, = POL-P2 from 2016 to 2021; Richness = ref and POL-P2 from 2016 to 2024; Richness < pre-breach 2014, 2018, and 2021, = pre-breach in 2016 and 2024		
	POL-P2 (South Basin)	**2024** Mean [Cu] > upper BCWSQG, and ref and pre-breach 95th; Mean [As] > lower BCWSQG, and ref and pre-breach 95th; TOC < ref **Temporal Evaluation (2014 to 2024)** [As] in 2024 < 2014 to 2016, = 2018 to 2021; [Cu] in 2024 = 2014, and 2016 to 2021, < 2015; TOC in 2024 = from 2014 to 2021	***C. dilutus* (10-day)** **2024** No unacceptable response (102% of Control; 92% of Reference); **Temporal Evaluation (2014 to 2024)** No unacceptable response	***C. dilutus* (10-day)** **2024** No unacceptable response (131% of Control; 113% of Reference); **Temporal Evaluation (2014 to 2024)** No unacceptable response	**Phytoplankton** **2024** Chl-a < ref (Moderately); Classified as oligotrophic **Temporal Evaluation (2019 to 2024)** Chl-a = ref in 2019 and 2020, < ref in 2021 and 2024 (Moderately), > ref in 2022 and 2023 (Moderately) **Zooplankton** **2024** Biomass (dry) > ref (Moderately) **Temporal Evaluation (2019 to 2024)** Biomass (dry) > ref in 2019 and 2024 (Moderately), = ref from 2020 to 2022, < ref in 2023 (Slightly)	**Phytoplankton** **2024** Density < ref (Slightly); Richness < ref (Moderately) **Temporal Evaluation (2019 to 2024)** Density = ref in 2019, < ref in 2020 and 2024 (Slightly to Moderately); > ref from 2021 to 2023 (Moderately) Richness < ref in 2019 (Slightly), = ref in 2020, > ref 2021 to 2024 (Moderately) **Zooplankton** **2024** Density < ref (Slightly); Richness = ref **Temporal Evaluation (2019 to 2024)** Density > ref in 2019 (Slightly), = ref in 2020 and 2022, < ref in 2021, 2023, and 2024 (Slightly to Moderately) Richness = ref in 2019, 2021, 2022 and 2024, < ref in 2020 (Slightly), > ref in 2023 (Slightly)	**2024** Mean [Se] > BCWQG Aquatic Life GL; Primary and secondary analyte concentrations ≤ ref **Temporal Evaluation (2019 to 2024)** Mean [Se] > BCWQG Aquatic Life GL in 2021, 2023, and 2024; For primary analytes, [Se] > ref from 2019 to 2021 and 2023, = ref 2022 and 2024; For secondary analytes, [Cd] > ref in 2020, 2021, and 2023, = ref in 2019, 2022, and 2024; Concentrations of remaining primary and secondary analytes ≤ ref from 2022 to 2024	**2024** Density < ref (Moderately), = pre-breach; Richness = ref, = pre-breach **Temporal Evaluation (2014 to 2024)** Density < ref in 2014 (Highly), < ref in 2015 and 2024 (Moderately), > ref in 2018 (Slightly), = ref in 2016 and 2021; Density < pre-breach in 2014 and 2015, = pre-breach in 2016 and 2024, > pre-breach in 2018 and 2021; Richness = ref from 2015 to 2024; Richness < pre-breach in 2014, = pre-breach from 2015 to 2024		

Notes: **"-"** = no data available. CEMP = Comprehensive Environmental Monitoring Program. BCWSQG = British Columbia Working Sediment Quality Guidelines. BCWQG = British Columbia Water Quality Guideline. TOC = total organic carbon. Chl-a = Chlorophyll-a. ref = reference. 95th = 95th Percentile (applicable to sediment quality evaluation). [ ] = concentration. CPUE = catch-per-unit-effort. YOY = young-of-the-year. RB = rainbow trout. LSU = longnose sucker. MU = muscle tissue. OV = ovary tissue. KI = kidney tissue. LI = liver tissue. GL = guideline. Temporal changes presented for sediment quality, zooplankton tissue quality, and fish tissue quality refer to changes in the relative (exposed-reference) difference over time as evaluated using a 2-way Analysis of Variance (ANOVA). For sediment quality, results are presented for Analytes of Interest (see Section 3.1.3.1 for details of Analyte of Interest selection). For zooplankton and fish tissue quality, results are presented for primary and secondary analytes (Table 2.4) with a significant positive exposed - reference difference in 2024 or in all monitoring years.

[a] Findings from 2022 to 2024 are included at minimum. Additional years are displayed (as available) to support temporal comparisons.

[b] BCWSQG Lower = Lower BC Working Sediment Guideline; BCWSQG Upper = Upper BC Working Sediment Quality Guideline (BCMOWLRS 2024, 2025).

[c] Toxicity tests were completed using *Hyalella azteca* (14-day test) for shallow monitoring areas and using *Chironomus dilutus* (10-day test) for deep monitoring areas. Significant reductions in survival and growth are classed as high response (>50% reduction compared to control/reference); moderate response (20-50% reduction compared to control/reference, and significantly different than control and reference); low response (20-50% reduction compared to control/reference, and not significantly different than control and reference), and no unacceptable response (< 20% reduction compared to control/reference). Results relative to control or reference are shown in parentheses.

[d] Magnitude of significant differences in organism density and taxonomic richness relative to reference areas classed as highly different (> 5x SD), moderately different (5x to 2x SD), and slightly different (< 2x SD), where SD is the absolute value of the pooled standard deviation.

[e] BCWQG Aquatic Life GL = British Columbia Water Quality Guideline for the protection of aquatic life: interim selenium guideline for benthic invertebrates (4 mg/kg dw; BCMOE 2014).

[f] Human Health guideline for Hg in muscle tissue of fish (0.5 mg/kg dw; CFIA 2015); Human Health guideline for Se in fish muscle (moderate consumption; 14.5 mg/kg dw; BCMOE 2014); Guideline for the protection of aquatic life: Se in muscle tissue or whole body of fish (4 mg/kg dw; BCMOE 2014); Guideline for the protection of aquatic life: Se in fish ovary tissue (11 mg/kg dw; BCMOE 2014).

  - Arsenic, copper, and iron concentrations in shallow Polley Lake sediments in 2022 were higher than BCWSQG and reference conditions while TOC content was lower than reference. Copper concentrations in all shallow Polley Lake sediment samples in 2022 were greater than the reference 95th percentile value, indicating a continued requirement for sediment toxicity testing of these shallow sediments every three years (i.e., next in 2025) in accordance with Condition 9 of the CEMP approval letter dated February 10, 2021 (BCMOECCS 2021). Arsenic, copper, and iron concentrations and TOC content were stable between 2019 (the initiation of monitoring) and 2022.

- Sediment Toxicity (shallow areas: 2022; deep areas: 2024):
  - Sediments from the deep areas of Polley Lake (POL-P1 and POL-P2) showed no unacceptable survival or growth responses of *C. dilutus* relative to both field reference and laboratory controls.
  - Sediments from the shallow area of Polley Lake (POL-S) showed no unacceptable survival or growth responses of *H. azteca* relative to both field reference and laboratory controls.
- Plankton Community and Productivity (2022, 2023, 2024):
  - Phytoplankton productivity (chlorophyll-a) in Polley Lake (POL-P2) in 2024 was significantly lower than reference and most prior years (except 2021). Chlorophyll-a measures in 2024 resulted in the classification of Polley Lake (and the reference area) as oligotrophic, similar to 2020 and 2021, but differing from the remaining years when the lakes were classified as mesotrophic. The phytoplankton community in 2024 had significantly lower density and taxon richness, and significantly higher Simpson's Diversity and Evenness compared to reference. Temporally, density has been variable, richness has been significantly lower (in most years), and Simpson's Diversity and Evenness have been similar to or significantly higher than reference. Phytoplankton community composition was similar to reference in most years for the dominant taxa (Cyanobacteria) and had relatively consistent differences to relative to reference for less dominant taxa.
  - Zooplankton productivity (biomass) in Polley Lake (POL-P2) in 2024 was significantly higher than reference, and in prior years was similar to or significantly higher than reference (except 2023). The zooplankton community in 2024 had taxon richness that was similar to reference, but significantly lower density and

Simpson's Evenness and Diversity metrics than reference. These community metrics have varied temporally, both within Polley Lake and relative to the reference area, without obvious directional consistency. Zooplankton community composition differed from reference in terms of the dominant taxa, but these differences were relatively temporally consistent.

- Zooplankton Tissue Quality (2022, 2023, 2024):
    - Concentrations of primary and secondary analytes in zooplankton tissues from Polley Lake (POL-P2) were consistently similar to or lower than reference in 2024. The analyte concentrations of zooplankton tissue from Polley Lake have shown some temporal variability, but in 2024 were similar to or significantly lower than the first year of monitoring with replication (i.e., 2019). Between 2022 and 2024, mean selenium concentrations in Polley Lake zooplankton tissues were higher than the BC guideline for the protection of aquatic life by <1.1-times in 2023 and 2024.
- Benthic Invertebrate Community (2024):
    - Benthic invertebrate communities at the deep areas of Polley Lake (POL-P1 and POL-P2) in 2024 were similar to reference and/or pre-breach conditions, except for Simpson's Evenness at POL-P2 and Simpson's Diversity at both POL-P1 and POL-P2 which were significantly lower than reference and pre-breach. Community composition at both deep basins of Polley Lake in 2024 has largely recovered to pre-breach and/or reference conditions when considering major taxa. The benthic invertebrate community at the Northwest basin (POL-P1) has largely recovered to pre-breach and/or reference conditions while the recovery at the Southwest basin (POL-P2) was less advanced, consistent with its closer proximity to the location of the breach impact.
- Fish Usage and Population Health (2022, 2023, 2024):
    - The CPUE of rainbow trout in the spring in Polley Lake was higher from 2022 to 2024 than in 2017 to 2021, suggesting that rainbow trout cohorts from 2018 to 2020 have reached maturity (i.e., cohorts resulting from the reinstatement of fish access to Hazeltine Creek in 2018). Although rainbow trout CPUE in the fall was lower in 2024 than all prior years, the length frequency distribution in 2024 showed a more balanced distribution among size classes and more closely resembled that in 2016 (two years post-breach) than in all prior years. This more balanced distribution among size classes suggested ongoing recruitment success, and that

the lower CPUE observed from 2022 to 2024 (which was lowest in 2024) was likely related to greater representation of older age classes than in 2019 to 2021. For longnose sucker, CPUE in the spring has declined over the past four years, with 2024 marking the lowest since monitoring began (i.e., 2016), while CPUE in the fall of 2024 was the second lowest observed since 2016. Length frequency distributions for longnose sucker in the fall of 2024 showed fewer age-1 fish and more age-3 fish relative to 2023 with both years more closely resembling the size structure in 2016 than in prior years (i.e., 2020 to 2022).

- Fish Tissue Quality (2022, 2023, 2024):
    - Mercury and selenium concentrations in fish muscle samples from Polley Lake in 2024 were below applicable human health guidelines. Mean selenium concentrations in rainbow trout and longnose sucker muscle samples in 2024 were above the BC guideline for the protection of aquatic life (by 1.1- and 1.5-times, respectively). Selenium concentrations in the ovary tissues of both species were below the threshold for reproductive effects. Concentrations of primary and secondary analytes in fish tissues that were significantly higher than reference in 2024 have largely not shown a sustained increase over the post-breach period, while selenium concentrations have been stable or decreasing over the post-breach period. Cobalt was the only analyte that had significantly higher concentrations in multiple exposed fish tissues (longnose sucker liver and kidney) in 2024 compared to all prior years.

7.2 Quesnel Lake

7.2.1 Sediment Quality

Sediments from the deep areas of Quesnel Lake in 2024 remained clearly influenced by breach material, based on chemical and physical characteristics. In the deep near-field (QUL-PNF) and far-field (QUL-PFF1) areas in 2024, sediments were characterized by mean arsenic, copper, and manganese concentrations greater than 95th percentile pre-breach/reference concentrations and BCWSQG. Iron concentrations in deep near-field sediments (but not deep far-field sediments) were also greater than pre-breach/reference conditions and BCWSQG. Copper was the most substantially elevated analyte in 2024 (consistent with prior years), with mean concentrations 4.1- and 3.5-times the upper BCWSQG at the deep near-field and far-field areas, respectively. Temporal analyses of deep near-field sediments indicated concentrations of these four analytes have not changed significantly since at least 2019, with arsenic, copper, iron, and manganese concentrations in 2024 that were similar to or lower than

those in most prior years (i.e., at least 2015 to 2023). In sediments from the deep far-field area, arsenic concentrations have been stable since 2018. However, copper and manganese concentrations in the deep far-field sediments increased significantly between 2018 and 2021 and remained elevated in 2024 (i.e., did not differ significantly from 2021), with concentrations in 2024 that were significantly higher than those in 2016 and 2018. The increase in copper and manganese concentrations in deep far-field sediments, corresponded with changes in the physical characteristics of these sediments (i.e., clay content) which may be indicative of the mobilization of breach-related fines from the deep near-field area towards the deep far-field area of Quesnel Lake. There has been a steady increase in the TOC content of the deep exposed sediments, which was statistically significant at the near-field, but not the far-field, relative to immediate post-breach conditions (i.e., 2014), but the TOC content of the deep exposed sediments in 2024 (0.425 to 0.635%) remained significantly lower than reference.

Sediments from the shallow near-field area (QUL-LNF1) in 2024 had a very high sand content (96.8%), and were characterized by concentrations of arsenic, copper, iron, manganese, and silver that were greater than reference/pre-breach conditions as well as BCWSQG. Copper was the most substantially elevated analyte, with mean concentrations 8.7-times the upper BCWSQG. The exposed shallow sediments in 2024 had parameter concentrations that were similar to all prior years (2014 to 2023) in the case of TOC, arsenic, and iron, and similar to most prior years (2015 to 2023) in the case of manganese, relative to reference. Concentrations of copper and silver in 2024 were similar to 2023 and 2019 but were significantly higher than most (for copper) or all (for silver) remaining prior years, indicating no significant increase compared to when sampling stations in this area were relocated in 2019.

Toxicity testing of *C. dilutus* using sediments from the deep near-field area of Quesnel Lake (QUL-PNF) in 2024 resulted in a low to moderate response for survival (23 to 46% mortality) and growth showed no response or a low response (0 to 25% reduction). The survival response in 2024 was similar to 2018, but showed lower survival (i.e., greater mortality) than other prior years, while growth in 2024 was higher than in prior years. It is apparent that low TOC and high sediment copper concentrations in deep near-field sediments of Quesnel Lake continue to be effective descriptors of growth responses in sediment toxicity tests of *C. dilutus*.

Toxicity testing of *H. azteca* using sediments from the shallow near-field area of Quesnel Lake (QUL-LNF1) in 2024 resulted in a moderate survival response (31 to 38% mortality) and a moderate to high growth response (48 to 63% reduction). The responses of *H. azteca* in 2024 were similar or showed fewer effects than in prior years. Concentrations of dissolved copper in overlying waters of the toxicity test vessels for shallow near-field sediments in 2024 were 168-times higher than those documented in field-collected water from the same area and were

3.4-times higher than the acute BCWQG. A substantial difference in dissolved copper concentrations of the overlying water of toxicity test vessels compared to *in situ* field conditions has been consistently observed for these shallow near-field sediments, suggesting copper mobilization in the test setup that has either not occurred or has attenuated over time in the field. Under these conditions, the observed survival and growth responses are consistent with dissolved copper concentrations in overlying water, particularly given that *H. azteca* have been documented to derive little nutrition from sediment and respond primarily to contaminants in overlying water. This observation was corroborated by significant regression relationships that indicated lower *H. azteca* survival and growth at higher overlying water dissolved copper concentrations and higher sediment copper concentrations. Overall, the toxicity test results from the shallow near-field area cannot be reliably extrapolated to the field but suggested potential copper mobilization with disturbance to this area.

7.2.2 Aquatic Life

Phytoplankton community and productivity monitoring in Quesnel Lake indicated that productivity (in terms of chlorophyll-a concentrations) at the exposed area has been significantly different from the reference area throughout the monitoring period (2019 to 2024). However, the differences in chlorophyll-a concentrations between the areas have been slight in most years (including 2024), except in 2022 and 2023 when chlorophyll-a concentrations at the exposed area were significantly lower and higher, respectively, than at the reference area. Mean chlorophyll-a results in 2024 characterized both the exposed and reference areas of Quesnel Lake as ultraoligotrophic, which was similar to earlier post-breach years (i.e., 2016 to 2018) but differed from the classifications in more recent years (oligotrophic in 2019 to 2023, mesotrophic in 2022). The phytoplankton community at the exposed area of Quesnel Lake from 2019 to 2024 has been characterized by total density, taxon richness, and Simpson's Diversity that were similar to or significantly higher than at the reference area, with few exceptions (density in 2023, taxon richness in 2022 and 2023, and Simpson's Diversity in 2022). Simpson's Evenness of the phytoplankton community at the exposed area has consistently been similar to the reference area since 2021. The composition of the phytoplankton community at the exposed area has been consistently similar to the reference area from 2019 to 2024 in terms of the relative densities (%) of most taxa (i.e., Diatoms, Chlorophytes, and Cyanobacteria), and statistically significant differences between the areas for other taxa (i.e., Chrysophytes) have been small. The similarities between the phytoplankton communities at exposed and reference areas over time suggested an influence of local environmental factors on the phytoplankton community of Quesnel Lake.

Zooplankton community and productivity monitoring in Quesnel Lake indicated that biomass (dw) at the exposed area has been similar to the reference area throughout the monitoring period

(2019 to 2024). The zooplankton community at the exposed area of Quesnel Lake in 2024 was characterized by total density, taxon richness, and Simpson's Diversity that were similar to the reference area, and Simpson's Evenness that was only slightly higher than at the reference area. Throughout the monitoring period (2019 to 2024), total density and taxon richness at the exposed area have been similar to the reference area, while Simpson's Diversity has been similar to or significantly higher than reference. Simpson's Evenness at the exposed area has been slightly higher than at the reference area since 2021. The composition of the zooplankton community at the exposed area has been largely similar to the reference area from 2020 to 2024, except for consistent but slight differences in Copepod Nauplii (density and %) and Rotifera (%), which were significantly higher and lower, respectively, compared to the reference area. The similarity between the exposed and reference areas for most endpoints over the monitoring period (i.e., since at least 2020) suggested a lack of mine-related influence on the zooplankton community and productivity in Quesnel Lake.

Zooplankton tissue quality monitoring in Quesnel Lake in 2024 indicated that concentrations of the primary analyte copper and the secondary analytes molybdenum, tin, and titanium were significantly higher in tissues from the exposed area compared to reference. Analyte concentrations that were significantly higher in exposed zooplankton tissues compared to reference results have not been previously observed in Quesnel Lake. In 2024, concentrations of these four analytes in zooplankton tissues were significantly higher than most (molybdenum) or all (copper, tin, and titanium) prior years (i.e., 2019 to 2023), relative to reference; this change was driven at least in part by a decrease in concentrations in reference tissues. Continued monitoring will help to determine whether the observed results are part of a long-term trend or a single anomalous year. For most analytes, surface water quality data did not support the temporal increases observed in analyte concentrations of exposed zooplankton tissues, except for molybdenum. Increasing trends in the aqueous analyte concentrations in surface waters (from 2015 to 2024) were observed for total and dissolved molybdenum, total and dissolved selenium, and dissolved sodium. Although a significant increase in molybdenum concentrations in exposed zooplankton tissues was observed in 2024, aqueous total molybdenum concentrations were approximately 20,000-times lower than BCWQG (from 2015 to 2024). Combined, these results indicated little to no evidence that the increase in molybdenum concentrations in water and zooplankton tissues might present a risk to aquatic life. Despite the increasing trend in aqueous selenium concentrations, zooplankton tissue selenium concentrations were below the guideline for the protection of aquatic life at the exposed area in 2024 (similar to 2018 to 2023), and tissue selenium concentrations at the exposed area did not differ significantly from the reference area from 2019 to 2024.

The benthic invertebrate community at the deep near-field (QUL-PNF) and far-field (QUL-PFF1) areas of Quesnel Lake in 2024 were characterized by taxon richness, Simpson's Evenness, and Simpson's Diversity, that were similar to the reference area and similar between the two exposed areas. Total density at the two deep exposed areas in 2024 remained significantly lower than at the reference area and was also similar between the exposed areas. Although the benthic invertebrate communities at the deep near-field and far-field areas have shown recovery since 2014 (in terms of density, taxon richness, and Simpson's Evenness and Diversity), they remained similar to 2015 conditions. Despite this, some recovery towards reference conditions has occurred at both the exposed areas; taxon richness, Simpson's Evenness, and Simpson's Diversity have been similar to reference conditions since 2019 or earlier at the near-field area and since 2021 or 2024 at the far-field area. At the deep far-field area, recovery of the benthic invertebrate community towards reference conditions occurred despite the potential mobilization of breach-related fines to this area from the deep near-field area. Total density at both exposed areas was significantly lower in 2024 than in 2021 (at the far-field area this was due to a significant decrease in Chironomidae density) but remained similar to all other years since 2015, and density has remained significantly lower than reference in all post-breach years. The continued lower total density at the deep exposed areas compared to reference was consistent with the continued low TOC content of the deep exposed sediments (mean = 0.635% and 0.425% at the near-field and far-field areas, respectively) which is below the documented intolerance level of <1% sediment TOC for Chironomidae. The community composition at the exposed areas in 2024 (dominated by Chironomidae) was similar to all prior years (and has been stable since 2020) and has consistently shown significantly lower Oligochaeta (%) than at the reference area. Correlation results indicated that the differences in benthic invertebrate densities and communities between reference and exposed areas were related to sediment conditions at the exposed area that were less favourable the benthic invertebrates (especially to the dominant Chironomidae) such as lower TOC content, greater proportions of fines, and higher metal concentrations; sediment properties which were consistent with the presence of breach-impacted sediments at this deep exposed near-field area.

Fish tissue quality monitoring in 2024 included three species from Quesnel Lake (peamouth chub, northern pikeminnow, and lake trout) and rainbow trout from Quesnel River. Analyte concentrations in fish muscle samples from Quesnel Lake and Quesnel River in 2024 were below guidelines for the protection of human health (which exist for mercury and selenium), indicating that these fish were safe for human consumption. The mean selenium concentrations in fish muscle or whole-body samples in 2024 were also below the BC guideline for the protection of aquatic life. Evaluation of ovary tissue is recommended for the assessment of potential selenium-associated effects on fish. Mean selenium concentrations in rainbow ovary tissues in

2024 exceeded the BC guideline for the protection of aquatic life (by 2.5-times) and the threshold for potential reproductive effects (by 1.4-times). However, high variability in the selenium concentrations of these samples was observed in 2024, potentially related to the early development stage of the collected tissues (which is known to be related to higher selenium concentrations) and/or sample heterogeneity reported by the laboratory. Continued monitoring will help to determine whether the 2024 rainbow trout ovary selenium concentration results are part of a long-term trend. Despite the guideline and threshold exceedances in 2024 for selenium concentrations in ovary tissues, the selenium concentrations of rainbow trout tissues (muscle, ovary, and liver) in 2024 were similar to all prior years, or most prior years in the case of kidney (excluding 2015 and 2020). Selenium concentrations in the tissues of peamouth chub, northern pikeminnow, and lake trout in 2024 were similar to or significantly lower than the first year of monitoring. These results indicate that selenium concentrations in exposed fish tissues from Quesnel Lake and Quesnel River have not increased over time, when considering at least the last eight years (i.e., since 2017), which is consistent with the temporal stability of selenium concentrations in exposed zooplankton tissues (i.e., dietary exposure) from Quesnel Lake. Concentrations of all primary analytes and 13 secondary analytes were significantly higher in exposed tissues relative to reference in 2024 for at least one tissue type in at least one species or showed a significant temporal change (if reference data were not collected). However, the results for most of these analytes were inconsistent among tissues and species, and/or were temporally stable, indicating there has been no sustained increase of analyte concentrations in fish tissues from Quesnel Lake or Quesnel River since the initiation of post-breach monitoring.

7.2.3 Key Findings

Key findings of CEMP monitoring of Quesnel Lake from 2022 to 2024 (Table 7.2) were:

- Sediment Quality (shallow and deep areas: 2022, 2023, 2024 [2024 only for far-field and reference deep areas])
    - Concentrations of arsenic, copper, iron, and manganese in deep near-field (QUL-PNF) and far-field (QUL-PFF1) sediments of Quesnel Lake in 2024 were higher than BCWSQG and reference conditions (except for iron in the far-field area). At the deep near-field area, concentrations of these analytes have not changed significantly since at least 2019. At the deep far-field area, arsenic concentrations have been stable since 2018. Copper and manganese concentrations of deep far-field sediments increased significantly between 2018 and 2021 and remained elevated in 2024, which may indicate the mobilization of

Table 7.2: Summary of Mount Polley CEMP Sediment and Aquatic Life Results for Quesnel Lake, 2022 to 2024[a]

Area		Sediment			Plankton			Benthic Invertebrate	Fish	
		Quality[b]	Toxicity[c]		Productivity[d]	Community[d]	Zooplankton Tissue Quality[e]	Community[d]	Community and Catchability	Tissue Quality[f]
			Survival	Growth						
Shallow	QUL-LNF1 (Near-field)	**2024** Analytes of Interest = As, Cu, Fe, Mn, Ag Mean [As], [Cu], [Fe] > upper BCWSQG, and ref and pre-breach 95th; Mean [Mn] and [Ag] > lower BCWSQG and ref 95th, [Mn] > pre-breach 95th; TOC < ref **Temporal (2014 to 2024)** [Cu] in 2024 > from 2014 to 2016, 2020, 2022, = 2019, 2021, 2023; [As], [Fe], TOC in 2024 = from 2014 to 2023; [Mn] in 2024 > 2014, = from 2015 to 2023; [Ag] in 2024 > from 2014 to 2016 and 2020 to 2022, = 2019 and 2023	***H. azteca* (14-day)** **2024** Moderate response (62% of Control, 69% of Reference) **Temporal Evaluation (2014 to 2024)** No unacceptable response (2014); Moderate response (2016, 2020, 2021, 2022, 2024); High response (2019 and 2023)	***H. azteca* (14-day)** **2024** Moderate / High response (52% of Control, 38% of Reference) **Temporal Evaluation (2014 to 2024)** Low / Moderate response (2014); Moderate / High response (2020 and 2024); High response (2016, 2019, and 2021 to 2023)	-	-	-	-	**2024** CPUE for NSC and PCC > ref; CPUE for LT < ref **Temporal Evaluation (2018 to 2024)** CPUE for NSC > ref 2019, 2021 to 2024; CPUE for PCC > ref 2018, 2021, 2022, and 2024; CPUE for LT in < ref from 2018 to 2024 CPUE for RB (Quesnel River) in 2024 = 2020 and 2022, > 2019 and 2023, < 2021	**Temporal Evaluation (2015 to 2024)** Guidelines and Thresholds: LT, PCC, RB (MU) mean [Hg] > Human Health GL for ref LT in 2019, 2020, 2021, and > GL for exp LT in 2023, but otherwise < GL; LT, PCC, RB (MU) mean [Se] < Human Health GL in all years; LT, PCC, RB (MU) and NSC (WB) mean [Se] < Aquatic Life GL in all years; LT, PCC, RB (OV) mean [Se] > Aquatic Life GL for exp PCC in 2018, 2022, 2023, > GL for ref PCC in 2022, > GL for exp RB in 2019, 2021, 2022 to 2024, but otherwise < GL; RB (OV) mean [Se] > Effects threshold in 2024, but otherwise < threshold Spatial and Temporal Analysis: [As] in PCC (KI) and LT (MU, LI, KI) in 2024 > ref, but = first year of monitoring; [Cu] in PCC (KI) and [Fe] in PCC (KI, LI) in 2024 > ref, but temporally stable; Se in PCC (MU, OV, LI, KI) and NSC (WB) in 2024 > ref but temporally stable; [As], [Cu], [Fe], [Se] in RB (MU, OV, LI, KI) and LT (OV) in 2024 = first or second year of monitoring; Concentration of most secondary analytes in PCC, NSC, LT ≤ ref. Analytes > ref in 2024 for two or more tissues within a fish species included Ba, Cd, Ca, Mn, Hg (ww), Mo, P, Sr, V, Zn. Concentrations of these analytes were either temporally stable or inconsistent among tissues and species, indicating there has been no sustained increase over the post-breach period. Most secondary analytes in RB and LT (OV) in 2024 ≤ first or second year of monitoring
			Dissolved Cu concentrations in overlying water during laboratory testing were substantially higher in 2024 (168x) than *in situ* field-collected measures (compared to 74- to 175-times higher than *in situ* in 2019 to 2023). This indicated that toxicity test results cannot be reliably extrapolated to the field but also that there is a potential for copper mobilization in this area with disturbance.							
Deep	QUL-PNF (Near-field; QUL-ZOO-1 for plankton)	**2024** Analytes of Interest = As, Cu, Fe, Mn Mean [Cu] and [Mn] > upper BCWSQG and ref 95th; Mean [As] and [Fe] > lower BCWSQG and ref 95th; TOC < ref **Temporal (2014 to 2024)** [As] in 2024 = from 2014 to 2018 and 2021, < 2019; [Cu] and [Fe] in 2024 = from 2014 to 2021; [Mn] in 2024 > 2014, = from 2015 to 2021; TOC in 2024 > from 2014 to 2018 and 2021, = 2019	***C. dilutus* (10-day)** **2024** Low / Moderate response (54% of Control, 77% of Reference) **Temporal Evaluation (2014 to 2024)** No unacceptable response (2015, 2016, 2021); Moderate response (2018); Low/ Moderate response (2014, 2024)	***C. dilutus* (10-day)** **2024** No unacceptable / Low response (147% of Control, 75% of Reference) **Temporal Evaluation (2014 to 2024)** No unacceptable/ Low response (2024); No unacceptable / Moderate response (2021); Low / Moderate response (2014, 2015); Moderate response (2016); Moderate/High response (2018)	**Phytoplankton** **2024** Chl-a > ref (Slightly); Classified as ultraoligotrophic **Temporal Evaluation (2019 to 2024)** Chl-a > ref in 2019, 2020, 2024 (Slightly), < ref in 2021 and 2022 (Slightly to Moderately), > ref in 2023 (Moderately) **Zooplankton** **2024** Biomass (dry) = reference **Temporal Evaluation (2019 to 2024)** Biomass (dry) = ref from 2019 to 2024	**Phytoplankton** **2024** Density and richness = ref **Temporal Evaluation (2019 to 2024)** Density = ref from 2019 to 2021 and 2024, > ref in 2022 (Moderately), < ref in 2023 (Slightly); Richness = ref from 2019 to 2021 and 2024, < ref in 2022 (Moderately) and 2023 (Slightly) **Zooplankton** **2024** Density and richness = ref **Temporal Evaluation (2019 to 2024)** Density and richness = ref from 2019 to 2024	**2024** Mean [Se] in 2024 < BCWQG Aquatic Life GL; [Cu], [Mo], [Sn], [Ti] > ref **Temporal Evaluation (2019 to 2024):** Mean [Se] < BCWQG Aquatic Life GL in 2019 to 2024; Primary and secondary analyte tissue concentrations ≤ ref from 2019 to 2024 except Cu, Mo, Sn, Ti in 2024; [Cu], [Mo], [Sn], [Ti] in 2024 > all prior years due in part to decrease in ref analyte concentrations	**2024** Density < ref (Moderately), = QUL-PFF1; Richness = ref, = QUL-PFF1 **Temporal Evaluation (2014 to 2024)** Density < ref from 2014 to 2024 (Moderately to Highly); Density < QUL-PFF1 in 2014, = QUL-PFF1 from 2016 to 2024; Richness < ref 2014, 2016 (Slightly to Moderately), = ref 2015 and 2018 to 2024; Richness = QUL-PFF1 in 2014, 2016, 2024, < QUL-PFF1 from 2018 and 2021		
	QUL-PFF1 (far-field)	**2024:** Analytes of Interest = As, Cu, Mn Mean [Cu] and [Mn] > upper BCWSQG and ref 95th; Mean [As] > lower BCWSQG and ref 95th; TOC < ref **Temporal (2014 to 2024):** [As] in 2024 = 2014, 2018, 2021, > 2016; [Cu] in 2024 = 2014, 2021, > from 2016 to 2018; [Mn] in 2024 > from 2014 to 2016, = from 2018 to 2021; TOC in 2024 = 2014, > from 2016 to 2021	-	-	-	-	**2024** Density < ref (Moderately); Richness = ref **Temporal Evaluation (2014 to 2024)** Density < ref from 2014 to 2024 (Moderately to Highly); Richness < ref from 2014 to 2021 (Moderately), = ref in 2024		

Notes: "-" = no data available. CEMP = Comprehensive Environmental Monitoring Program. BCWSQG = British Columbia Working Sediment Quality Guidelines. BCWQG = British Columbia Water Quality Guideline. TOC = total organic carbon. Chl-a = Chlorophyll-a. ref = reference. exp = exposed. 95th = 95th Percentile (applicable to sediment quality evaluation). CPUE = catch-per-unit-effort. LT = lake trout. NSC = northern pikeminnow. PCC = peamouth chub. RB = rainbow trout. MU = muscle tissue. OV = ovary tissue. LI = liver tissue. KI = kidney tissue. WB = whole-body. GL = guideline. Temporal changes presented for sediment quality, zooplankton tissue quality, and fish tissue quality refer to changes in the relative (exposed-reference) difference over time as evaluated using a 2-way Analysis of Variance (ANOVA) except for LT (OV) and RB tissues, which were evaluated using a 1-way ANOVA. For sediment quality, results are presented for Analytes of Interest (see Section 3.1.3.1 for details of Analyte of Interest selection). For zooplankton and fish tissue quality, results are presented for primary and secondary analytes (Table 2.4) with a significant positive exposed - reference difference in 2024 or in all monitoring years.

[a] Data collected from 2022 to 2024 are included at minimum. Additional years are displayed (as available) to support temporal comparisons. Results of sampling completed for Environment Effects Monitoring in 2024 are excluded from this table; these results will be included in a separate report due in October 2025.

[b] Lower BCWSQG = Lower BC Working Sediment Guideline; Upper BCWSQG = Upper BC Working Sediment Quality Guideline (BCMOWLRS 2024, 2025).

[c] Toxicity tests were completed using *Hyalella azteca* (14-day test) for shallow monitoring areas and using *Chironomus dilutus* (10-day test) for deep monitoring areas. Significant reductions in survival and growth are classed as high response (>50% reduction compared to control/reference); moderate response (20-50% reduction compared to control/reference, and significantly different than control and reference); low response (20-50% reduction compared to control/reference, and not significantly different than control and reference), and no unacceptable response (< 20% reduction compared to control/reference). Results relative to control or reference are shown in parentheses.

[d] Magnitude of significant differences in organism density and taxonomic richness relative to reference areas classed as highly different (> 5x SD), moderately different (5x to 2x SD), and slightly different (< 2x SD), where SD is the absolute value of the pooled standard deviation.

[e] BCWQG Aquatic Life GL = British Columbia Water Quality Guideline for the protection of aquatic life: interim selenium guideline for benthic invertebrates (4 mg/kg dw; BCMOE 2014).

[f] Human Health guideline for Hg in muscle tissue of fish (0.5 mg/kg dw; CFIA 2015); Human Health guideline for Se in fish muscle (moderate consumption; 14.5 mg/kg dw; BCMOE 2014); Guideline for the protection of aquatic life: Se in muscle tissue or whole body of fish (4 mg/kg dw; BCMOE 2014); Guideline for the protection of aquatic life: Se in fish ovary tissue (11 mg/kg dw; BCMOE 2014); Effects Threshold indicates mean selenium concentration greater than DeForest et al. (2012) threshold for ovary tissue in fish (20 mg/kg dw) and the BCMOE guideline.

breach-related fines from the deep near-field area towards the deep far-field area. The TOC content of the deep near-field and far-field sediments in 2024

  - (0.425 to 0.635%) was significantly lower than reference, but the TOC content of these sediments has steadily increased over the post-breach period (i.e, compared to 2014). This increase was significant at the near-field but not the far-field area.
  - Concentrations of arsenic, copper, iron, manganese, and silver in shallow near-field (QUL-LNF1) sediments of Quesnel Lake in 2024 were higher than BCWSQG and reference/pre-breach conditions. Arsenic, iron, and manganese concentrations in these sediments in 2024 were similar to first or second year of monitoring (i.e., 2014 or 2015) and have been stable since 2020 or earlier. Copper and silver concentrations in these sediments in 2024 were similar to 2019 and 2023, but significantly higher than most (copper) or all (silver) remaining prior years. Mean TOC content (0.421%) of the shallow near-field sediments in 2024 were significantly lower than reference and temporally stable over the post-breach period.

- Sediment Toxicity (shallow areas: 2022, 2023, 2024; deep areas: 2024)
  - Sediments from the deep near-field (QUL-PNF) area of Quesnel Lake in 2024 showed a low to moderate response for survival (23 to 46% mortality) and showed no response or a low response for growth (0 to 25% reduction) of *C. dilutus* relative to field reference and laboratory controls. The responses of *C. dilutus* in 2024 had lower survival (i.e., greater mortality) than in prior years (except for 2018) and higher growth than in prior years.
  - Sediments from the shallow near-field (QUL-LNF1) area of Quesnel Lake in 2024 showed a moderate survival response (31 to 38% mortality) and a moderate to high growth response (48 to 63% reduction) of *H. azteca* relative to field and laboratory controls. The *H. azteca* responses in 2024 were similar to or showed fewer effects than in prior years. Concentrations of dissolved copper in overlying waters of the toxicity test vessels in 2024 were highly dissimilar (an average of 168-times greater) than in field-collected water from these sites, consistent with previous years of monitoring. This suggests that the sediment toxicity test results cannot be reliably extrapolated to the field and that copper mobilization in this area may occur with disturbance.

- Plankton Productivity and Community (2022, 2023, 2024):

- Phytoplankton productivity (measured as chlorophyll-a) in the exposed area of Quesnel Lake (QUL-ZOO-1) differed from reference throughout the post-breach period but the differences were mostly small. Chlorophyll-a measures resulted in the classification of Quesnel Lake as ultraoligotrophic (at exposed and reference areas), which was similar to earlier post-breach years but a lower classification than more recent years (i.e., 2019 to 2022). The phytoplankton community was similar to reference in terms of density, taxon richness, and Simpson's Diversity and Evenness metrics in 2024, and these metrics have been similar to or significantly higher than reference in prior years (with few exceptions). Phytoplankton community composition was similar to reference for most taxa over the post-breach period.
- Zooplankton productivity (biomass) in the exposed area of Quesnel Lake (QUL-ZOO-1) was similar to reference throughout the post-breach period. The zooplankton community had density, taxon richness, and Simpson's Diversity and Evenness metrics that were similar to or significantly higher than reference throughout the post-breach period. Zooplankton community composition was largely similar to reference from 2020 to 2024.

- Zooplankton Tissue Quality (2022, 2023, 2024):
  - Concentrations of primary and secondary analytes in zooplankton tissues from the exposed area of Quesnel Lake (QUL-ZOO-1) in 2024 were similar to or lower than reference except for copper, molybdenum, tin, and titanium, which was the first time in the post-breach period that analyte concentrations in exposed zooplankton tissues were significantly higher than reference. Concentrations of these four analytes in exposed zooplankton tissues were significantly higher in 2024 than all prior years (relative to reference) but this was related in part to decreased analyte concentrations in reference tissues. Mean selenium concentrations in exposed zooplankton samples throughout the post-breach period were below the BC guideline for the protection of aquatic life.
- Benthic Invertebrate Community (2022, 2023, 2024 [2024 only for far-field and reference areas):
  - The benthic invertebrate communities at the deep near-field (QUL-PNF) and far-field (QUL-PFF1) areas in 2024 were similar to reference and to each other in terms of taxon richness and Simpson's Evenness and Diversity, but had densities that remained significantly lower than reference. Excluding density, these metrics at the exposed areas have been similar to reference since 2019 or

earlier at the near-field area and since 2024 or earlier at the far-field area. Within each of the deep exposed areas there has been no significant change in communities since 2015. Community composition at the deep exposed areas has consistently been dominated by Chironomidae, with significantly lower dominance of Oligochaeta than reference.

- Fish Tissue Quality (2022, 2023, 2024):
    - Mean analyte concentrations in fish muscle samples from Quesnel Lake and Quesnel River in 2024 were below applicable human health guidelines (which exist for mercury and selenium), indicating that these fish were safe for human consumption. Mean selenium concentrations in fish muscle or whole-body tissues were also below the BC guideline for the protection of aquatic life in 2024. Mean selenium concentrations in ovary tissues of exposed rainbow trout were above the BC guideline for the protection of aquatic life and the threshold for reproductive effects. Despite these guideline/threshold exceedances, selenium concentrations in fish tissues from Quesnel Lake and Quesnel River have not increased significantly over at least the last eight years (i.e., since 2017). Concentrations of primary and secondary analytes in fish tissues that were significantly higher than reference in 2024 have not shown a sustained increase over the post-breach period.

7.3 Hazeltine Creek

7.3.1 Sediment Quality

Sediment quality in upper and lower Hazeltine Creek in 2024 was characterized by concentrations of several analytes that were greater than reference/pre-breach concentrations and BCWSQG values: copper, iron, manganese, and selenium in upper Hazeltine Creek, and arsenic, copper, iron, and selenium in lower Hazeltine Creek. Sediment analyte concentrations in 2024 were most elevated for copper and manganese in upper Hazeltine Creek (2.6- and 3.4-times the upper BCWSQG, respectively), and for arsenic and copper in lower Hazeltine Creek (1.6- and 1.5-times the upper BCWSQG, respectively). The TOC content of upper Hazeltine Creek sediments has been temporally stable from 2021 to 2024, following a period of temporal variability from 2018 to 2020. The TOC content of lower Hazeltine Creek sediments in 2024 was significantly lower than in 2021 and 2023, but similar to all other prior years. Iron concentrations in upper Hazeltine Creek sediments in 2024 were similar to or significantly lower than all previous years. Concentrations of copper, manganese, and selenium in upper Hazeltine Creek sediments did not change significantly from 2022 to 2024 but were significantly higher than two or more prior years.

In lower Hazeltine Creek sediments, arsenic, copper, and iron concentrations in 2024 were similar to or significantly lower than all prior years. Sediment selenium concentrations in lower Hazeltine Creek did not change significantly between 2022 and 2024 but were significantly higher in 2022 to 2024 than most prior years (i.e., 2018 to 2020). Analyte concentrations continued to be significantly correlated to the chemical and physical characteristics of these sediments, which is likely driven by a combination of required opportunistic sampling methods and continued sediment accumulation in upper and lower Hazeltine Creek. Collectively, results indicated a temporal increase in sediment concentrations of copper, selenium, and to a lesser extent manganese in upper Hazeltine Creek, and selenium in lower Hazeltine Creek, over the post-breach period. Benthic invertebrate community and tissue quality monitoring both provide more directly applicable approaches for evaluating the potential effects of increased analyte concentrations to aquatic life in these erosional creek habitats, compared to sediment monitoring (see Section 7.3.2 for the benthic invertebrate community and tissue quality monitoring summaries).

7.3.2 Aquatic Life

Periphyton monitoring indicated that primary productivity of upper Hazeltine Creek (Reaches 1 to 3), as assessed by mean chlorophyll-a concentrations, was below the BCWQG but above the threshold indicative of moderate enrichment in streams. Periphyton chlorophyll-a concentrations in upper Hazeltine Creek in 2024 were similar to reference and baseline/pre-breach conditions with few exceptions and decreased with increasing distance downstream (i.e., were lowest in Reach 3). This spatial gradient was likely related to differences in the amount of time since completion of remediation works in these areas. Periphyton productivity, as measured by AFDM in upper Hazeltine Creek 2024, was higher than reference, which was the first time this occurred at in Reach 3 of upper Hazeltine Creek (HAC-R3). Overall, periphyton productivity in upper Hazeltine Creek increased following remediation efforts and has largely remained greater than or similar to the reference area and baseline/ pre-breach productivity levels. *In situ* measures of dissolved oxygen in upper Hazeltine Creek in 2024 were consistently higher than the acute and long-term BCWQG indicating no potential adverse effects to aquatic life from dissolved oxygen depletion related to periphyton growth. The periphyton community of upper Hazeltine Creek (Reaches 1 and 2) was characterized by taxon richness, Diatom richness, and Simpson's Diversity and Evenness that were similar to or higher than reference conditions in most years since 2018 (and similar to reference in 2024). Periphyton densities in 2024 in upper Hazeltine Creek were lower than reference (due to an increase in density at the reference area) but have remained relatively stable since 2018. Periphyton community composition in upper Hazeltine Creek differed from the reference area in 2024 based on Phaeophytes (%) and Rhodophytes (%) only. Except for density, the periphyton communities in upper Hazeltine

Creek have recovered to reference conditions (or to conditions that are indicative of healthy periphyton communities).

Periphyton community and productivity monitoring in lower Hazeltine Creek (Reach 5), which was last completed in 2023, indicated that periphyton chlorophyll-a concentrations were below both the BCWQG and the threshold for moderately enriched streams. Mean chlorophyll-a concentrations in lower Hazeltine Creek were significantly lower than reference in most years since 2017 (except 2019), while AFDM was similar to reference in 2021 and 2023. Chlorophyll-a and AFDM results in 2023 indicated that recovery of periphyton productivity in the lower Hazeltine Creek area was ongoing following the completion of remediation works in this area in 2021. The periphyton community of lower Hazeltine Creek (HAC-D) in 2023 was characterized by total taxon richness, Diatom richness, Simpson's Diversity, and Simpson's Evenness that were similar to reference and total density that was higher than reference, which represented substantial recovery since 2021. The remaining differences in the periphyton community of lower Hazeltine Creek compared to the reference area in 2023 (i.e., higher Cyanobacteria [%] and lower Diatom and Chlorophyte [%]) suggested that recovery of community composition was still ongoing.

Benthic invertebrate community monitoring in the three areas of Upper Hazeltine Creek (HAC-R1 [Reach 1], HAC-U [Reach 2], and HAC-R3 [Reach 3]) in 2024 indicated that the communities of these areas were similar to reference (i.e., one or both reference areas) in terms of density and taxon richness, and similar to reference and pre-breach conditions in terms of Simpson's Evenness and Diversity (except for Simpson's Diversity at HAC-R3). The benthic invertebrate communities of HAC-R1 and HAC-U have been similar in terms of these four metrics in all post-breach years, while the community at HAC-R3 in 2024 had significantly lower density and Simpson's Evenness and Diversity than the upstream areas (although differences were small) consistent with the more recent completion of remediation works at this area. The most abundant taxa in 2024 were Chironomidae at HAC-R1 and HAC-U and Elmidae (riffle beetle) at HAC-R3. Sensitive EPT taxa (% and density) at the three exposed areas in 2024 were significantly lower than pre-breach. In addition, EPT taxa two of these exposed areas (HAC-R1 [% and density] and HAC-U [%]) were also significantly lower than both reference areas. Notable differences in EPT at all three Hazeltine Creek areas in 2024 relative to reference and pre-breach included a lack of Plecoptera and lower Ephemeroptera (%), while Trichoptera (%) were similar to reference and pre-breach. The occurrence of Ephemeroptera and Trichoptera families at the exposed areas that were of similar pollution tolerance to those at the reference areas suggested that chemical conditions (i.e., water quality) were not limiting the recovery of these taxa at the exposed areas. Benthic invertebrate productivity (as measured by dry and wet weight biomass) in upper Hazeltine Creek was similar to or significantly higher than at least one

(or both) reference areas throughout the post-breach period, indicating recovery to or exceedance of reference conditions. Correlation analysis indicated that physical characteristics of the upper Hazeltine Creek areas (mean water depth, velocity, temperature) were the primary influencing factors on benthic invertebrate community condition and composition in these exposed areas. Collectively, results indicated that the benthic invertebrate communities at the three areas of upper Hazeltine Creek have recovered since remediation efforts to a condition that was similar to at least one reference area based on density, taxon richness, and Simpson's Evenness and Diversity, and largely similar to pre-breach conditions for Simpson's Evenness and Diversity. However, there were some key remaining differences in the community composition of upper Hazeltine Creek compared to reference and/or pre-breach (particularly for the sensitive EPT taxa) that suggested ongoing recovery.

Benthic invertebrate community monitoring in lower Hazeltine Creek (HAC-D), which was last completed in 2023, indicated that the community was characterized by total density, richness, and Simpson's Evenness and Diversity that were similar to reference and pre-breach conditions. These results represented substantial recovery of the benthic invertebrate community in lower Hazeltine Creek compared to 2021 (immediately following remediation works). The benthic invertebrate community in lower Hazeltine Creek in 2023 was dominated by Chironomidae (%) and to a lesser extent EPT (%), which were significantly more and less prevalent, respectively, than reference. Although EPT (%) remained lower than reference, the difference from reference was smaller in 2023 than in 2021 owing to significant increases in Ephemeroptera and Trichoptera (% and density) from 2021 to 2023. In lower Hazeltine Creek in 2023, Ephemeroptera (%) were lower, Trichoptera (%) were higher, and Plecoptera (%) were similar to reference. Benthic invertebrate productivity (as measured by dry and wet weight biomass) was similar in lower Hazeltine Creek to reference, which indicated recovery from 2021. Correlation analyses indicated that physical characteristics were the primary influencing factors on the benthic invertebrate community of lower Hazeltine Creek rather than water quality parameters. Collectively, the results indicated that benthic invertebrate community and productivity (biomass) in lower Hazeltine Creek recovered substantially following remediation works to conditions that were similar to reference and/or pre-breach for several metrics, but that recovery of community composition was still ongoing.

Periphyton and benthic invertebrate (caddisfly and composite-taxa) tissue quality monitoring in upper and lower Hazeltine Creek in 2024 indicated that concentrations of the primary analytes arsenic, iron, copper, and selenium were higher than reference in at least one tissue type from at least one of the exposed monitoring areas. Copper concentrations in exposed periphyton and benthic invertebrate tissues in 2024 were also higher than pre-breach conditions (in at least one tissue type per area), however, these were not significantly higher in 2024 when compared to

2019 or earlier with one exception. The one exception was copper concentrations of caddisfly tissue from lower Hazeltine Creek which increased significantly between 2023 and 2024, representing a return to conditions similar to 2020 and 2021. Selenium concentrations in exposed periphyton and in benthic invertebrate tissues in 2024 were consistently higher than reference and pre-breach conditions in lower Hazeltine Creek (but not upper Hazeltine Creek). Mean selenium concentrations in benthic invertebrates from upper and lower Hazeltine Creek areas were higher than the BC guideline for the protection of aquatic life in 2024 (2.3- to 3.5-times the guideline [caddisfly] and 1.2- to 2.4-times the guideline [composite-taxa]) and were highest in benthic invertebrate tissues (particularly caddisflies) from HAC-U (Reach 2) of upper Hazeltine Creek. This is consistent with caddisflies being known as 'hyper-accumulators' of selenium. Selenium concentrations in periphyton and benthic invertebrate tissues from upper and lower Hazeltine Creek have increased over the post-breach period. Despite this, the selenium concentrations of most benthic invertebrate tissues from upper Hazeltine Creek have not increased since at least 2021, with the notable exception of caddisflies from Reach 2 in 2022 and 2023. Rather, the concentrations of selenium in tissues from upper Hazeltine Creek were lower in 2024 than at least one prior year. In lower Hazeltine Creek, the selenium concentrations of periphyton and benthic invertebrate tissues in 2024 were significantly higher than all prior years, except for caddisfly tissues in 2023. The temporal increases in tissue selenium concentrations in Hazeltine Creek over the post-breach period corresponded with increases in sediment selenium concentrations at these areas compared to reference, but not aqueous total or dissolved selenium concentrations in surface waters (which have not increased from 2015 to 2024). Evaluation of aqueous selenium speciation parameters in surface waters, which was initiated in 2024, indicated that mean selenate and selenite concentrations in Hazeltine Creek were highest in Reach 2, and below detection for all other aqueous selenium species. For the remaining primary analytes (arsenic and iron) and most secondary analytes, there were no increases in the concentrations compared to 2020 or earlier in more than one tissue type. Concentrations of four secondary analytes (calcium, manganese, mercury, and strontium) in 2024 were significantly higher than all prior years, but these increases were isolated to a single tissue-type for each analyte. A comparison of results between the two types of benthic invertebrate tissues collected (caddisfly and composite-taxa) indicated that monitoring of both tissue types may be required to fully capture the magnitude of potential changes in all analyte concentrations of benthic invertebrate tissues from Hazeltine Creek.

Tissue quality monitoring of juvenile whole-body fish was completed in creek habitats in 2024 in response to observed temporal increases in the selenium concentrations of benthic invertebrate tissues from Hazeltine Creek and to satisfy draft CEMP approval requirements. This monitoring showed that mean selenium concentrations in juvenile whole-body rainbow trout and coho salmon

from upper and lower Hazeltine Creek, respectively, exceeded the BC guideline for the protection of aquatic life in 2024 (1.6-times the guideline [upper Hazeltine Creek]; 1.1-times the guideline [lower Hazeltine Creek]). In upper Hazeltine Creek, concentrations of two primary analytes (copper and selenium) and three secondary analytes (barium, manganese, and strontium) in juvenile whole-body rainbow trout were significantly higher than those from the reference area in 2024. Of these five analytes, the concentrations selenium and manganese in juvenile whole-body rainbow trout increased significantly over the post-breach period (i.e., 2018 and 2024). In lower Hazeltine Creek, concentrations of two primary analytes (copper and selenium) and two secondary analytes (cobalt and manganese) in juvenile whole-body coho salmon were significantly higher than those from the reference area in 2024. Temporal analyses for lower Hazeltine Creek fish tissue quality results will be possible following continued data collections (i.e., 2024 represented the first year of post-breach monitoring at this area). Rainbow trout and coho salmon only reside in Hazeltine Creek during their juvenile life stages; rainbow trout typically return to Polley Lake within their first year of life and coho salmon return to coastal marine waters after 1 to 2 years of life via the Quesnel River to the Fraser River (which flows to the Pacific Ocean). Therefore, the period of exposure of rainbow trout and coho salmon exposure to selenium in Hazeltine Creek (via dietary exposure) is limited to the juvenile life stages before most tissue growth occurs, and before reproductive development and potential selenium transfer to ovary tissues occur (ovary tissues are recommended for assessing the effects of selenium on fish). This is supported by selenium concentrations in the tissues rainbow trout from Polley Lake which have not increased over the post-breach period or have decreased in some cases (see Section 7.1.2). Selenium concentrations in the tissues of fish from Quesnel Lake and Quesnel River have also not increased temporally, when considering at least the last eight years (see Section 7.2.2). Selenium concentrations in juvenile fish from Hazeltine Creek in 2024 were lower than those measured in benthic invertebrates from corresponding monitoring areas (i.e., dietary exposure), and this difference was larger for caddisfly tissues than for composite-taxa benthic invertebrate tissues. These results suggested that the selenium concentrations in juvenile whole-body fish from Hazeltine Creek were more reflective of dietary exposure to composite-taxa benthic invertebrates (i.e., a mix of benthic invertebrate taxa) than to caddisfly tissues.

To evaluate whether the operation of the Mount Polley Mine was the likely the source of the temporal increase in tissue selenium concentrations in Hazeltine Creek, WSP conducted an evaluation of groundwater results and provided the following interpretation of results for inclusion in the present report (WSP 2024, 2025). WSP evaluated data from the groundwater monitoring wells located between the Tailings Storage Facility (TSF) and Hazeltine Creek, the groundwater wells located along Hazeltine Creek and the Perimeter Embankment Till Borrow Pond (PETBP), which is a flow equalization pond feeding into the water treatment plant (WSP 2024, 2025).

Groundwater selenium chemistry in the wells outside of the TSF has been stable and concentrations low since shortly after the breach. The shallow (but not the deep) well at monitoring well 16-2 shows the presence of selenium at concentrations that are higher than all other wells around the TSF regardless of well depth. Monitoring well 16-2 is located near the PETBP where, although selenium concentrations are below the permit criteria, they are higher than the very low concentrations in the TSF wells. There is a positive gradient between the PETBP surface water level and well 16-2 with an elevation difference of approximately 8.5 m. The PETBP collects surface runoff water from the site. Although its concentrations of selenium are not high (well below the effluent permit limits), they are higher than the TSF groundwater. WSP inferred that this provided an explanation of the chemistry of that one shallow well (well 16-2). Groundwater data for these wells are provided in WSP (2025). In addition to the groundwater wells that are located between the TSF and Hazeltine Creek, there are several wells located along Hazeltine Channel. In those wells, the concentration of selenium in groundwater has been consistently below the BC Contaminated Sites Regulation (CSR) Fresh Water Aquatic Life (AW) standards, with the exception of a single sample. WSP indicated that single sample may have been an artefact of sampling as it returned to historical levels in the next sampling event. The monitoring data from the Hazeltine Creek wells are provided in WSP (2024). WSP concluded that the data reviewed suggested that operation of the Mount Polley Mine is not a source of selenium.

7.3.3 Key Findings

Key findings of CEMP monitoring of Hazeltine Creek from 2022 to 2024 (Table 7.3) were:

- Sediment Quality (upper and lower areas: 2022, 2023, 2024):
    - Concentrations of copper, iron, manganese, and selenium in upper Hazeltine Creek (HAC-U) sediments in 2024 were higher than BCWSQG and reference/pre-breach conditions. Iron concentrations in upper Hazeltine Creek sediments from 2021 to 2024 were similar to or significantly lower than those in the 2018, while copper, manganese, and selenium concentrations did not change significantly from 2022 to 2024 but were significantly higher than two or more prior years, and TOC content has been temporally stable from 2021 to 2024.
    - Concentrations of arsenic, copper, iron, and selenium in lower Hazeltine Creek (HAC-D) sediments in 2024 were higher than BCWSQG and reference/pre-breach conditions. Arsenic, copper, and iron concentrations in lower Hazeltine Creek sediments since 2022 (or earlier) were similar to or significantly lower than those in 2018, and TOC content was significantly lower than in 2023 but similar to most prior years. Selenium concentrations in lower

Table 7.3: Summary of Mount Polley CEMP Sediment and Aquatic Life Results for Hazeltine Creek, 2022 to 2024 [a]

Area	Sediment	Periphyton		Benthic Invertebrate		Periphyton and Benthic Invertebrate Tissue Quality[d]	Fish Tissue
	Quality[b]	Productivity	Community[c]	Productivity	Community[c]		
Upper (HAC-R1; Reach 1)	-	**2024** Mean Chl-a < BCWQG and > moderately enriched threshold; Chl-a = FPC-R3 ref, baseline (1996) and pre-breach, > EDC-U ref (Highly), > baseline (1995), > HAC-U and HAC-R3 (Highly); AFDM > FPC-R3 and EDC-U refs (Highly), = HAC-U and HAC-R3 **Temporal Evaluation (2017 to 2024)** Mean Chl-a < BCWQG from 2017 to 2024; Mean Chl-a < moderately enriched threshold in 2017 and 2018, > threshold from 2019 to 2024; Chl-a = FPC-R3 ref from 2017 to 2019 and 2021 to 2024, > FPC-R3 in 2020 (Highly), = EDC-U ref in 2018 and 2022, > EDC-U ref from 2019 to 2021 and 2023 to 2024 (Moderately to Highly); Chl-a = baseline (1995) in 2017 and 2018, > baseline (1995) from 2019 to 2024, > baseline (1996) in 2022, = pre-breach from 2017 to 2024; AFDM = FPC-R3 ref in 2017, = FPC-R3 and EDC-U refs in 2018 and 2023, > FPC-R3 and EDC-U refs from 2019 to 2022 and 2024 (Moderately to Highly)	**2024** Density < ref (Moderately), = HAC-U; Richness = ref, = HAC-U **Temporal Evaluation (2018 to 2024)** Density = ref from 2018 to 2022, < ref (Moderately) in 2023 and 2024; Richness = ref in 2018, 2019, 2022, 2024, > ref in 2020 and 2023 (Slightly to Moderately), and < ref in 2021 (Moderately)	**2024** Biomass (dry) = FPC-R3 and EDC-U refs, = HAC-U and HAC-R3 **Temporal Evaluation (2018 to 2024)** Biomass (dry) = FPC-R3 ref in 2018 and 2021 to 2024, > FPC-R3 ref from 2019 to 2020 (Moderately); Biomass (dry) = EDC-U ref in 2018, 2022, 2024, > EDC-U ref in 2019, 2021, 2023 (Slightly to Moderately)	**2024** Density = FPC-R3 and EDC-U refs, < pre-breach, = HAC-U and HAC-R3; Richness = FPC-R3 and EDC-U refs, < pre-breach, = HAC-U and HAC-R3 **Temporal Evaluation (2018 to 2024)** Density = FPC-R3 ref in 2018 and from 2021 to 2024, > FPC-R3 ref from 2019 to 2020 (Moderately), > EDC-U ref in 2018, 2019, 2021, 2023 (Slightly to Moderately), = EDC-U ref in 2022 and 2024; Density = pre-breach from 2018 to 2020, and 2022, 2023, < pre-breach in 2021 and 2024; Richness < FPC-R3 ref in 2018 (Moderately), = FPC-R3 ref from 2019 to 2024, = EDC-U ref from 2018 to 2024; Richness < pre-breach from 2018 to 2024	**Temporal Evaluation (2018 to 2024)** Mean [Se] in Caddis and BIC from HAC-R1 and HAC-U > BCWQG Aquatic Life GL since 2020, except Caddis from HAC-R1 (since 2021); [As] in BIC from HAC-R1 and HAC-U in 2024 > ref, but = first year of monitoring and = pre-breach; As TTFs for BIC > ref in all years, but in 2024 = first year of monitoring; As TTFs for BIC > pre-breach in all years for HAC-R1, > pre-breach in 2019 and 2021 to 2024 for HAC-U; [Cu] in BIC from HAC-R1 and Peri, Caddis, and BIC from HAC-U in 2024 > ref, but ≤ first year of monitoring; [Cu] in BIC > pre-breach since 2018 at HAC-R1 (except 2020), and > pre-breach in 2019 and 2021 to 2024 at HAC-U; Cu TTFs for BIC from HAC-R1 and HAC-U > ref in all years, but in 2024 = first year of monitoring; Cu TTFs for Caddis < ref in 2020 and 2022 to 2024 at HAC-R1, and < ref in all years at HAC-U; [Se] in Peri, Caddis, and BIC from HAC-R1 and HAC-U > ref but ≤ pre-breach in all years; [Se] in Caddis from HAC-R1 and Peri from HAC-U stable from 2021 to 2024 and > the first year of monitoring; [Se] in BIC from HAC-U stable from 2020 to 2024 and > first and second years of monitoring; [Se] in Peri from HAC-R1 in 2024 = 2023, > all remaining prior years; [Se] in Caddis from HAC-R2 in 2024 = 2021 and 2022, > all remaining prior years; [Se] in BIC from HAC-R1 in 2024 < 2023, = 2018, 2019, and 2022, > all remaining prior years; Se TTFs for Caddis and BIC > ref in all years (except BIC from HAC-R1 in 2023 and 2024), but in 2024 ≤ first year of monitoring Concentrations of secondary analytes that were > ref in 2024 were equal to the first or second year of monitoring (i.e., no sustained increase over the post-breach period)	-
Upper (HAC-U [HAC-R2]; Reach 2)	**2024** Analytes of Interest = Cu, Fe, Mn, Se; Mean [Cu] and [Mn] > upper BCWSQG, and ref and pre-breach 95th; Mean [Fe] and [Se] > lower BCWSQG, and ref and pre-breach 95th; TOC = ref **Temporal Evaluation (2018 to 2024)** [Cu] in 2024 > 2018 and 2019, = from 2020 to 2023; [Fe] in 2024 = 2018, 2019, 2021, and 2023, < 2020 and 2022; [Mn] in 2024 > 2018 and 2021, = 2019, 2020, 2022, 2023; [Se] in 2024 > from 2018 to 2021, = 2022 and 2023; TOC in 2024 > 2018 and 2020, = 2019 and 2021 to 2023	**2024** Mean Chl-a < BCWQG, < moderately enriched threshold; Chl-a = FPC-R3 and EDC-U refs, = baseline and pre-breach, and = HAC-R3; AFDM > FPC-R3 and EDC-U refs (Highly) and = HAC-R3 **Temporal Evaluation (2018 to 2024)** Mean Chl-a < BCWQG from 2018 to 2024; Mean Chl-a < moderately enriched threshold in 2018, 2020, 2024, > threshold in 2019 and 2021 to 2023; Chl-a = FPC-R3 ref from 2018 to 2024, = EDC-U ref from 2018 to 2020 and 2022 to 2024, > in 2021 (Moderately); Chl-a = baseline (1995) in 2018, 2020 and 2024, > in 2019, and 2021 to 2023; AFDM = FPC-R3 and EDC-U refs in 2018, > FPC-R3 and EDC-U refs from 2019 to 2024 (Moderately to Highly)	**2024** Density < ref (Slightly); Richness = ref **Temporal Evaluation (2018 to 2024)** Density = ref from 2018 to 2021, < ref from 2022 to 2024 (Slightly); Richness < ref in 2018 (Moderately) and 2021 (Slightly), = ref in 2019 and 2024, > ref in 2020, 2022, 2023	**2024** Biomass (dry) = FPC-R3 and EDC-U refs, = HAC-R3 **Temporal Evaluation (2018 to 2024)** Biomass (dry) = FPC-R3 ref in 2018 and 2021 to 2024, > FPC-R3 ref from 2019 to 2020 (Moderately); Biomass (dry) = EDC-U ref in 2018, 2022, 2024, > EDC-U ref in 2019, 2021, 2023 (Moderately)	**2024** Density = FPC-R3 and EDC-U refs, = pre-breach, > HAC-R3; Richness = FPC-R3 and EDC-U refs, < pre-breach, = HAC-R3 **Temporal Evaluation (2018 to 2024)** Density > FPC-R3 ref from 2018 to 2020, = FPC-R3 ref from 2021 to 2024, > EDC-U ref in 2018, 2019, 2021, and 2023, = EDC-U ref in 2022 and 2024; Density = pre-breach from 2018 to 2024; Richness < FPC-R3 ref in 2018 (Moderately), = FPC-R3 ref from 2019 to 2024, = EDC-U ref from 2018 to 2022 and 2024, > EDC-U ref in 2023 (Moderately); Richness < pre-breach from 2018 to 2024		**2024** RB (WB) mean [Se] in 2024 > Aquatic Life GL; [Cu], [Se], [Ba], [Mn], [Sr] in RB (WB) > ref; **Temporal Evaluation (2018 to 2024)** [Se] and [Mn] for RB (WB) > ref in 2018 and 2024, and in 2024 > 2018; [Cu], [Ba], [Sr] in RB (WB) > ref in 2018 and 2024 but temporally stable; Remaining primary and secondary analyte concentrations in 2024 < ref and ≤ 2018
Upper (HAC-R3; Reach 3)	-	**2024** Mean Chl-a < BCWQG and moderately enriched threshold; Chl-a < FPC-R3 ref (Moderately), = EDC-U ref, = baseline and pre-breach; AFDM > FPC-R3 and EDC-D refs (Highly) **Temporal Evaluation (2020 to 2024)** Mean Chl-a < BCWQG and moderately enriched threshold from 2020 to 2024; Chl-a = FPC-R3 ref in 2020, 2021, 2023, 2024, < FPC-R3 ref in 2022 (Highly), < EDC-U ref from 2020 to 2024 (Moderately to Highly); Chl-a > baseline (1996) from 2020 to 2022, = baseline (1996) in 2023 and 2024, = baseline (1995) and pre-breach from 2020 to 2024; AFDM < FPC-R3 ref from 2020 to 2022 (Slightly to Moderately), = FPC-R3 ref in 2023, > FPC-R3 ref in 2024 (Highly); AFDM < EDC-U ref in 2020 and 2022 (Slightly to Moderately),	-	**2024** Biomass (dry) < FPC-R3 ref (Highly), = EDC-U ref **Temporal Evaluation (2020 to 2024)** Biomass (dry) = FPC-R3 ref from 2020 to 2023, < FPC-R3 in 2024 (Highly); Biomass (dry) > EDC-U ref in 2021 and 2023 (Highly), = EDC-U ref in 2022 and 2024	**2024** Density and richness = FPC-R3 and EDC-U refs, < pre-breach; **Temporal Evaluation (2020 to 2024)** Density = FPC-R3 ref from 2020 to 2024, > EDC-U ref in 2021 (Moderately), = EDC-U ref from 2022 to 2024; Density < pre-breach in 2020, 2023, 2024, = pre-breach in 2021 and 2022; Richness < FPC-R3 ref from 2020 to 2022 (Slightly), = FPC-R3 ref in 2023 and 2024, = EDC-U ref in 2021 and 2024, < EDC-U ref in 2022 (Moderately), > EDC-U ref in 2023 (Moderately); Richness < pre-breach from 2020 to 2024	-	-

Notes: "-" = no data available. CEMP = Comprehensive Environmental Monitoring Program. BCWSQG = British Columbia Working Sediment Quality Guidelines. BCWQG = British Columbia Water Quality Guideline. TOC = total organic carbon. Chl-a = Chlorophyll-a. AFDM = Ash Free Dry Mass. RB = rainbow trout. CO = coho salmon. WB = whole-body. 95th = 95th Percentile (applicable to sediment quality evaluation). [ ] = concentration. BCF = Bioconcentration Factor. TTF = Trophic Transfer Factor. Peri = Periphyton. Caddis = Caddisfly. BIC = Composite-taxa benthic invertebrate. GL = guideline. ref = reference. Temporal changes presented for sediment quality and tissue quality (periphyton, benthic invertebrates, fish) within the post-breach period refer to changes in the relative (exposed-reference) difference over time as evaluated using a 2-way Analysis of Variance (ANOVA). For sediment quality, results are presented for Analytes of Interest (see Section 3.1.3.1 for details of Analyte of Interest selection). For tissue quality (periphyton, benthic invertebrates, fish) results are presented for primary and secondary analytes (Table 2.4) with a significant positive exposed - reference difference in 2024 or in all monitoring years.

[a] Data collected from 2022 to 2024 are included at minimum. Additional years are displayed (as available) to support temporal comparisons. Fish habitat and usage monitoring from 2022 to 2024 in Hazeltine Creek are summarized in a separate report (Minnow 2025) and are excluded from this table. HAC-R2 and HAC-R5 are the alternate names for HAC-U and HAC-R5, respectively, used for HRWG reporting (Minnow 2025).

[b] BCWSQG Lower = Lower BC Working Sediment Guideline; BCWSQG Upper = Upper BC Working Sediment Quality Guideline (BCMOWLRS 2024, 2025).

[c] Magnitude of significant differences in organism density and taxonomic richness relative to reference areas classed as highly different (> 5x SD), moderately different (5x to 2x SD), and slightly different (< 2x SD), where SD is the absolute value of the pooled standard deviation.

[d] BCWQG Aquatic Life GL = British Columbia Water Quality Guideline for the protection of aquatic life: interim selenium guideline for benthic invertebrates (4 mg/kg dw; BCMOE 2014).

Table 7.3: Summary of Mount Polley CEMP Sediment and Aquatic Life Results for Hazeltine Creek, 2022 to 2024 [a]

Area	Sediment	Periphyton		Benthic Invertebrate		Periphyton and Benthic Invertebrate Tissue Quality[d]	Fish Tissue
	Quality[b]	Productivity	Community[c]	Productivity	Community[c]		
Lower (HAC-D [HAC-R5])	**2024** Analytes of Interest = As, Cu, Fe, Se Mean [As] and [Cu] > upper BCWSQG, and ref and pre-breach 95th; Mean [Fe] and [Se] > lower BCWSQG, and ref and pre-breach 95th; TOC < ref **Temporal Evaluation (2018 to 2024)** [As] in 2024 = from 2018 to 2023; [Cu] in 2024 = from 2018 to 2020 and 2023, < 2021 and 2022; [Fe] in 2024 < 2018 and 2020, = 2019, and 2021 to 2023; [Se] in 2024 > from 2018 to 2021, = 2022 and 2023; TOC in 2024 = from 2018 to 2020 and 2022, < 2021 and 2023 Temporal changes in metal concentrations associated with variability in sediment texture and physical characteristics among years.	**2023** Mean Chl-a < BCWQG and moderately enriched threshold; Chl-a < ref (Slightly), = pre-breach; AFDM in 2023 = ref **Temporal Evaluation (2017 to 2023)** Mean Chl-a < BCWQG 2017 to 2023; Mean Chl-a < moderately enriched threshold in 2017, 2019, 2023, > threshold in 2019; Chl-a < ref in 2017 (Moderately), 2021 and 2023 (Slightly), = ref in 2019; Chl-a < pre-breach in 2017, = pre-breach from 2019 to 2023; AFDM < ref in 2017 (Moderately), > ref in 2019 (Moderately), = ref from 2021 to 2023	**2023** Density > ref (Slightly); Richness = ref **Temporal Evaluation (2019 to 2023)** Density > ref (Slightly) from 2019 to 2023; Richness < ref (Moderately) in 2019 and 2022, = ref in 2023	**2023** Biomass (dry) > ref (Slightly) **Temporal Evaluation (2017 to 2023)** Biomass (dry) < ref from 2017 to 2019 (Slightly to Moderately), < ref in 2021 (Highly) 2021, > ref in 2023 (Slightly)	**2023** Density = ref and pre-breach; Richness = ref and pre-breach **Temporal Evaluation (2017 to 2023)** Density < ref (Slightly to Moderately) in 2017 and 2021, = ref in 2019 and 2023; Density < pre-breach from 2017 to 2021, = pre-breach in 2023; Richness = ref in 2017 and 2023, < ref in 2019 and 2021 (Moderately); Richness = pre-breach in 2017 and 2023, < pre-breach in 2019 to 2021	**Temporal Evaluation (2015 to 2024)** Mean [Se] in Caddis and BIC > BCWQG Aquatic Life GL since 2021; [Cu] in Peri, Caddis, BIC in 2024 > ref, but ≤ first year of monitoring (except for Caddis); [Cu] in Caddis in 2024 = 2020 and 2021, > 2018, 2019, 2022, and 2023; [Cu] in Peri > pre-breach in all years, [Cu] in BIC > pre-breach in 2015 and 2019 to 2024; Cu TTFs for BIC ≤ ref in all years; [Fe] in BIC in 2024 > ref, but ≤ first year of monitoring; Fe TTFs for BIC in 2024 > ref, but = second year of monitoring; [Se] in Peri, Caddis, and BIC in 2024 > ref, and > all prior years except [Se] in Caddis < 2023; [Se] in Peri > pre-breach since 2023; [Se] in BIC > pre-breach since 2022; Se TTFs for Caddis and BIC in 2024 < ref and first year of monitoring, = pre-breach; Concentrations of secondary analytes that were > ref in 2024 largely showed no increases compared to 2020 or earlier, and secondary analyte concentrations in 2024 that were higher than all prior years (i.e., Ca, Mn, Hg, Sr) were limited to a single tissue-type.	**2024** CO (WB) mean [Se] in 2024 > Aquatic Life GL; [Cu], [Se], [Co], [Mn] in CO (WB) > ref; Remaining primary and secondary analyte concentrations ≤ ref; **Temporal Evaluation** (not yet possible)

Notes: "-" = no data available. CEMP = Comprehensive Environmental Monitoring Program. BCWSQG = British Columbia Working Sediment Quality Guidelines. BCWQG = British Columbia Water Quality Guideline. TOC = total organic carbon. Chl-a = Chlorophyll-a. AFDM = Ash Free Dry Mass. RB = rainbow trout. CO = coho salmon. WB = whole-body. 95th = 95th Percentile (applicable to sediment quality evaluation). [ ] = concentration. BCF = Bioconcentration Factor. TTF = Trophic Transfer Factor. Peri = Periphyton. Caddis = Caddisfly. BIC = Composite-taxa benthic invertebrate. GL = guideline. ref = reference. Temporal changes presented for sediment quality and tissue quality (periphyton, benthic invertebrates, fish) within the post-breach period refer to changes in the relative (exposed-reference) difference over time as evaluated using a 2-way Analysis of Variance (ANOVA). For sediment quality, results are presented for Analytes of Interest (see Section 3.1.3.1 for details of Analyte of Interest selection). For tissue quality (periphyton, benthic invertebrates, fish) results are presented for primary and secondary analytes (Table 2.4) with a significant positive exposed - reference difference in 2024 or in all monitoring years.

[a] Data collected from 2022 to 2024 are included at minimum. Additional years are displayed (as available) to support temporal comparisons. Fish habitat and usage monitoring from 2022 to 2024 in Hazeltine Creek are summarized in a separate report (Minnow 2025) and are excluded from this table. HAC-R2 and HAC-R5 are the alternate names for HAC-U and HAC-R5, respectively, used for HRWG reporting (Minnow 2025).

[b] BCWSQG Lower = Lower BC Working Sediment Guideline; BCWSQG Upper = Upper BC Working Sediment Quality Guideline (BCMOWLRS 2024, 2025).

[c] Magnitude of significant differences in organism density and taxonomic richness relative to reference areas classed as highly different (> 5x SD), moderately different (5x to 2x SD), and slightly different (< 2x SD), where SD is the absolute value of the pooled standard deviation.

[d] BCWQG Aquatic Life GL = British Columbia Water Quality Guideline for the protection of aquatic life: interim selenium guideline for benthic invertebrates (4 mg/kg dw; BCMOE 2014).

Hazeltine Creek sediments have been stable since 2022, and in 2023 and 2024 were significantly higher than all prior years. The temporal changes in analyte concentrations in sediments from upper and lower Hazeltine Creek were related to the physical and chemical sediment characteristics, factors which are likely

  - influenced by a combination of required opportunistic sampling methods and continued sediment accumulation in upper and lower Hazeltine Creek.

- Periphyton Community and Productivity (upper areas: 2022, 2023, 2024; lower areas: 2023):
  - Periphyton productivity (measured as chlorophyll-a) in the three upper Hazeltine Creek areas (HAC-R1, HAC-U, HAC-R3) was below the BCWQG in all post-breach years and in 2024 was similar to reference and baseline/pre-conditions with few exceptions. Periphyton chlorophyll-a in decreased significantly with increasing distance downstream in Hazeltine Creek in most years (including 2024). Periphyton community metrics of taxon richness, Diatom richness, and Simpson's Evenness and Diversity were similar to or higher than reference conditions in most post-breach years, including 2024. Periphyton densities were significantly lower than reference since 2022 or earlier but have remained relatively stable over the post-breach period. The periphyton community composition in 2024 was indicative of a healthy community (relative to reference).
  - Periphyton productivity (measured as chlorophyll-a) in lower Hazeltine Creek (HAC-D) was below the BCWQG in all years and significantly lower than reference but similar to pre-breach conditions in most years (including 2023). Periphyton community density taxon richness, Diatom richness, and Simpson's Evenness and Diversity were similar to or higher than reference in 2023. Some remaining differences in periphyton community composition in 2023 compared to reference suggested ongoing community recovery.
- Benthic Invertebrate Community and Productivity (upper areas: 2022, 2023, 2024; lower areas: 2023):
  - Benthic invertebrate communities in upper Hazeltine Creek (HAC-R1, HAC-U, HAC-R3) were similar to one or both references in terms of density and taxon richness and were also similar to pre-breach conditions in terms of Simpson's Evenness and Diversity (excluding Diversity at HAC-R3). Some key differences in the benthic community structure remained compared to pre-breach

and reference conditions, particularly in terms of lower prevalence of sensitive taxa (% and density), which suggested ongoing recovery. The benthic invertebrate communities in Reaches 1 and 2 of upper Hazeltine Creek (HAC-R1 and HAC-U) were similar to each other in 2024, indicating similar recovery, while the community in Reach 3 (HAC-R3) differed from the upstream reaches.

- Benthic invertebrate community in lower Hazeltine Creek (HAC-D) in 2023 was similar to reference and pre-breach conditions in terms of density, richness, Simpson's Evenness and Diversity. Benthic invertebrate productivity (biomass) in 2023 was similar to or significantly higher than reference. Some remaining differences in the benthic community composition compared to reference and pre-breach and reference conditions suggested ongoing community recovery.

- Periphyton and Benthic Invertebrate Tissue Quality (2022, 2023, 2024):
  - Concentrations of copper in most and selenium in all periphyton and benthic invertebrate tissues from upper and lower Hazeltine Creek (HAC-R1, HAC-U, HAC-D) in 2024 were higher than reference. Copper concentrations in benthic invertebrate (composite-taxa) tissues from all areas and in periphyton tissues from HAC-D in 2024 were significantly higher than pre-breach, as were selenium concentrations in periphyton and benthic invertebrate (composite-taxa) tissues from lower (but not upper) Hazeltine Creek in 2024. There was no sustained increase of copper concentrations in tissues from Hazeltine Creek over the post-breach period, except for copper in caddisfly tissues from HAC-D, which increased in 2024 to concentrations similar to 2020 and 2021. Selenium concentrations in periphyton and benthic invertebrate tissues from upper and lower Hazeltine Creek have increased significantly over the post-breach period but have not increased since at least 2021 in most benthic invertebrate tissues from upper Hazeltine Creek (except for caddisfly tissues from HAC-U in 2022 and 2023). In lower Hazeltine Creek, the selenium concentrations of periphyton and benthic invertebrate tissues in 2024 were significantly higher than all prior years, except for caddisfly tissues in 2023. Mean selenium concentrations in benthic invertebrates from upper and lower Hazeltine Creek areas were higher than the BC guideline for the protection of aquatic life in 2024 (1.2- to 2.4-times guideline [composite-taxa]; 2.3- to 3.5-times guideline [caddisfly]) and were highest in benthic invertebrate tissues (particularly caddisflies) from HAC-U. This is consistent with caddisflies being known as 'hyper-accumulators' of selenium. Concentrations of the remaining

primary and secondary analytes largely showed no increases compared to 2020 or earlier, and analyte concentrations in 2024 that were higher than all prior years were limited to a single tissue-type.

- Juvenile Fish Tissue Quality (2024):
    - Concentrations of the primary analytes copper and selenium, and the secondary analytes barium, manganese, and strontium in juvenile whole-body rainbow trout from upper Hazeltine Creek (HAC-U) in 2024 were significantly higher than reference. Of these, selenium and manganese concentrations increased significantly between 2018 and 2024. Concentrations of the primary analytes copper and selenium, and the secondary analytes cobalt, and manganese in juvenile whole-body coho salmon from lower Hazeltine Creek (HAC-D) in 2024 were also significantly higher than reference; temporal analyses for this area are not yet possible. Mean selenium concentrations in juvenile whole-body rainbow trout and coho salmon from Hazeltine Creek exceeded the BC guideline for the protection of aquatic life in 2024 (by 1.6- and 1.1-times). Selenium concentrations in juvenile whole-body fish tissues from Hazeltine Creek were lower than those in benthic invertebrates from corresponding areas (i.e., dietary exposure), and this difference was larger for caddisfly compared to composite-taxa benthic invertebrate tissues. Rainbow trout and coho salmon only reside in Hazeltine Creek during rearing, so the dietary exposure to selenium in Hazeltine Creek is limited to juvenile life stages only. Selenium concentrations in the tissues of fish from waterbodies connected to Hazeltine Creek (i.e., Polley Lake, Quesnel Lake, and Quesnel River) have not increased when considering at least the last eight years.

7.4 Edney Creek

7.4.1 Aquatic Life

Periphyton monitoring completed in lower Edney Creek (E1), which was last completed in 2023, indicated that primary productivity (as measured by chlorophyll-a) was lower than reference, below the BCWQG, and below the threshold for moderately enriched streams. Primary productivity (as measured by both chlorophyll-a and AFDM) was significantly lower at E1 than reference from 2017 to 2023. The continued lower periphyton productivity at E1 compared to reference indicated that recovery was ongoing which was likely related to a combination of the remediation efforts that concluded in 2021 (after 2021 biological sampling) and substrate transport that occurred in most years due to high spring freshet flows. The periphyton community

of the exposed area of lower Edney Creek (E1) in 2023 was characterized by significantly lower total density, significantly higher total taxon richness, and similar Diatom richness and Simpson's Diversity and Evenness, compared to reference. Simpson's Diversity and Evenness, and the dominance of taxa at the exposed area, were consistently similar to the reference area from 2019 to 2023 indicating similar community composition to reference. Combined, these results indicated the periphyton community composition at the exposed area of lower Edney Creek had largely recovered to reference conditions; however, the consistently lower density and productivity metrics compared to reference suggested that recovery of periphyton productivity was ongoing.

Benthic invertebrate community monitoring in lower Edney Creek (E1), which was last completed in 2023, indicated that total density and Simpson's Diversity were similar to the reference area (EDC-D), while taxon richness and Simpson's Evenness were slightly higher and lower, respectively, than reference. The occurrence of these metrics at E1 in 2023 at values that were similar to or higher than at the reference area represented recovery in the benthic invertebrate community at this area compared to 2021. Benthic invertebrate community composition at E1 differed from reference in terms of higher Chironomidae (%) and lower Arachnida (%) in most years, while sensitive EPT taxa (%) at E1 were similar to reference from 2016 to 2023. Within the EPT taxa, Plecoptera (%) were similar to reference from 2016 to 2023, Trichoptera (%) were consistently higher than reference from 2017 to 2023, and Ephemeroptera (%) were lower than reference in 2023 but not in prior years (i.e., 2017 to 2021). Lower Ephemeroptera (%) at E1 than reference in 2023 was not due to a decrease in the prevalence of Ephemeroptera (% and density) in 2023, but rather due to an increase in non-Chironomidae Diptera (%) from 2022 to 2023 (from lower than to higher than reference). Benthic invertebrate productivity (as measured by dry and wet weight biomass) at E1 was similar to reference from 2017 to 2023. These results indicated that recovery of the benthic invertebrate community at E1 had occurred following the completion of final remediation works in this area in 2020 and 2021, including similar dominance of sensitive EPT taxa at E1 to reference. However, the differences in community composition that remained relative to reference suggested that recovery of the community was still ongoing.

Periphyton and benthic invertebrate tissue quality monitoring in lower Edney Creek in 2024 indicated that concentrations of two primary analytes (copper and iron) and eight secondary analytes were significantly higher at the exposed area compared to the reference area in at least one tissue type. However, there was no sustained increase in the concentrations of these primary or secondary analytes in the tissues since the first (i.e., 2019) or second (i.e., 2020) year of post-breach monitoring. Selenium concentrations in exposed tissues (periphyton and benthic invertebrates) were similar to reference, indicating no potential mine-related influence, and remained below the BC guideline for the protection of aquatic life in benthic invertebrate

tissues. A comparison of results between the two types of benthic invertebrate tissues collected in 2024 (i.e., caddisfly and composite-taxa) indicated that composite-taxa tissue sampling detected all changes occurring in caddisflies, suggesting that monitoring of composite-taxa may be sufficient to determine potential changes in analyte concentrations of benthic invertebrate tissues from lower Edney Creek.

7.4.2 Key Findings

Key findings of CEMP monitoring of Edney Creek from 2022 to 2024 (Table 7.4) were:

- Periphyton Community and Productivity (2023):
    - Periphyton productivity (measured as chlorophyll-a) in lower Edney Creek (E1) from 2017 to 2023 was consistently lower than reference, below the BCWQG, and temporally stable. The periphyton community in 2023 was characterized by significantly lower total density, higher taxon richness, and similar Diatom richness and Simpson's Diversity and Evenness compared to the reference area. Taxon richness and Diatom richness were significantly higher in 2023 than in 2021 which reflected recovery after the completion of remediation works in 2020 and 2021. Similarity in the relative densities of major taxa from 2019 to 2023 to the reference area indicated that community composition had recovered to reference conditions, while recovery of periphyton density and productivity was still ongoing.
- Benthic Invertebrate Community and Productivity (2023):
    - Benthic invertebrate community in lower Edney Creek (E1) in 2023 was characterized by slightly higher richness, slightly lower Simpson's Evenness, and similar density, Simpson's Diversity, and productivity (biomass) to the reference area. The similar or higher results for most of these metrics were indicative of community recovery, while differences remaining in community composition (relative to the reference area) suggested ongoing recovery of the community.
- Periphyton and Benthic Invertebrate Tissue Quality (2022, 2023, 2024):

Periphyton and benthic invertebrate tissues from lower Edney Creek (E1) in 2024 had concentrations of copper (in all tissue types) and iron (in composite-taxa benthic invertebrate tissues only) that were significantly higher than at the reference area. However, there was no increase in tissue concentrations of these primary analytes compared to the first or second year of post-breach monitoring (2019 or 2020). Mean selenium concentrations in periphyton and

Table 7.4: Summary of Mount Polley CEMP Sediment and Aquatic Life Results for Lower Edney Creek, 2022 to 2024 [a]

Periphyton		Benthic Invertebrate		Periphyton and Benthic Invertebrate Tissue Quality[c]
Productivity	**Community** [b]	**Productivity**	**Community** [b]	
2023 Mean Chl-a < BCWQG and moderately enriched threshold; Chl-a < ref (Slightly); AFDM < ref (Slightly) **Temporal Evaluation (2017 to 2023)** Mean Chl-a < BCWQG and moderately enriched threshold; Chl-a < ref from 2017 to 2023 (Slightly to Moderately); Mean AFDM < ref from 2017 to 2023 (Slightly)	**2023** Density < ref (Slightly); Richness > ref (Slightly) **Temporal Evaluation (2019 to 2023)** Density < ref from 2019 to 2023 (Slightly); Richness = ref in 2019, < ref in 2021 (Slightly), > ref in 2023 (Slightly)	**2023** Biomass (dry) = ref; **Temporal Evaluation (2017 to 2023)** Biomass (dry) = ref from 2017 to 2023	**2023** Density = ref; Richness > ref (Slightly) **Temporal Evaluation (2016 to 2023)** Density = ref from 2016 to 2023; Richness < ref from 2016 to 2021 (Slightly), > ref in 2023 (Slightly)	**Temporal Evaluation (2019 to 2024)** Mean [Se] < BCWQG Aquatic Life GL in all years; [Cu] in Peri, Caddis, and BIC in 2024 > ref, but ≤ first year of monitoring; Cu TTFs < ref in all years; [Fe] in BIC in all years > ref, but temporally stable; Fe TTFs for BIC > ref in all years, but temporally stable; [Ba], [Na], [Ti], [V] in Peri and BIC in 2024 > ref, but = first or second year of monitoring; Ba, Na, Ti, V TTFs for Peri and BIC in 2024 ≤ ref, or > ref but temporally stable (Ti and V for BIC); [Cd], [Ca], [Co], [U] in BIC in 2024 > ref, but = first or second year or monitoring; Cd, Ca, Co, U TTFs for BIC in 2024 ≤ ref, or > ref but temporally stable (Cd, Co, U); Primary and secondary analytes concentrations showed no sustained increase in tissue concentrations.

Notes: "-" = no data available. CEMP = Comprehensive Environmental Monitoring Program. BCWQG = British Columbia Water Quality Guideline. Chl-a = Chlorophyll-a. AFDM = Ash Free Dry Mass. [ ] = concentration. BCF = Bioconcentration Factor. TTF = Trophic Transfer Factor. Peri = Periphyton. Caddis = Caddisfly. BIC = Composite-taxa benthic invertebrate. GL = guideline. ref = reference. Temporal changes presented for periphyton and benthic invertebrate tissue quality within the post-breach period refer to changes in the relative (exposed-reference) difference over time as evaluated using a 2-way Analysis of Variance, and are presented for primary and secondary analytes (Table 2.4) with a significant positive exposed - reference difference in 2024 or in all monitoring years.

[a] Data collected from 2022 to 2024 are included at minimum. Additional years are displayed (as available) to support temporal comparisons. Fish habitat characterization and fish usage monitoring (for spawning and rearing purposes) from 2022 to 2024 in lower Edney Creek is summarized in a separate report (Minnow 2024). EDC-EXP and EDC-REF are the alternate names for E1 and EDC-D, respectively, used for HRWG reporting (Minnow 2025).

[b] Magnitude of significant differences in organism density and taxonomic richness relative to reference areas classed as highly different (> 5x SD), moderately different (5x to 2x SD), and slightly different (< 2x SD), where SD is the absolute value of the pooled standard deviation.

[c] BCWQG Aquatic Life GL = British Columbia Water Quality Guideline for the protection of aquatic life: interim selenium guideline for benthic invertebrates (4 mg/kg dw; BCMOE 2014).

benthic invertebrate tissues in 2024 were significantly lower than at the reference area, and were well below the BC guideline for the protection of aquatic life in benthic invertebrate tissues. Concentrations of secondary analytes in exposed tissues that were significantly higher than reference in 2024 have not increased compared to the first or second year of post-breach monitoring.

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APPENDIX A
SAMPLING LOCATIONS AND SUPPORTING INFORMATION

APPENDIX A.1

LAKES

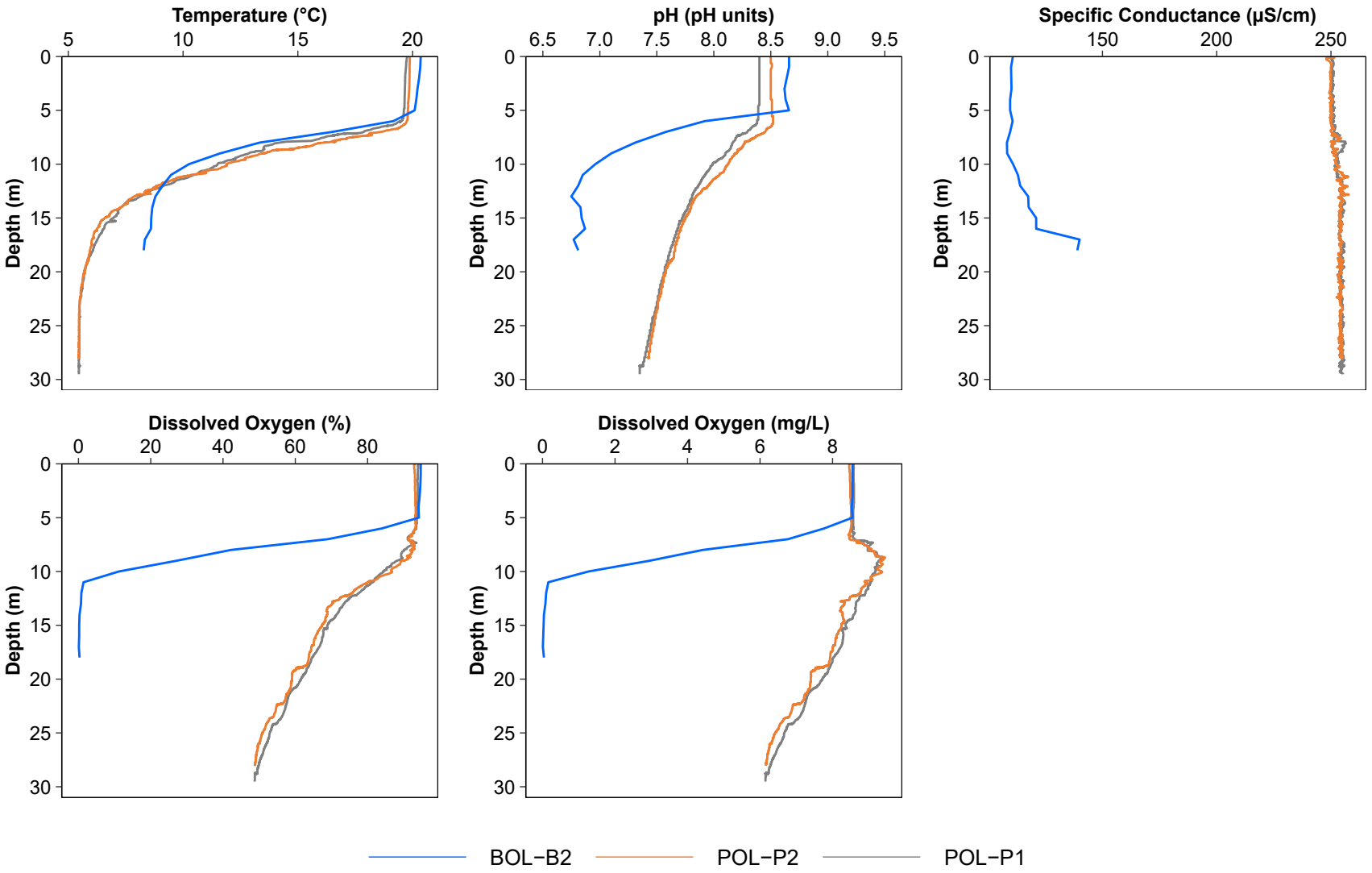
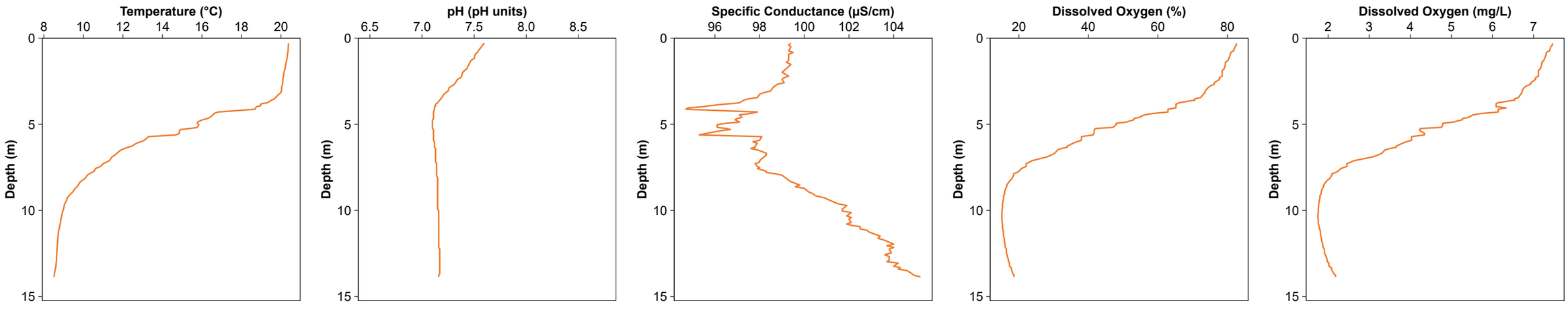


Figure A.1.1: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Sediment Quality and Benthic Invertebrate Community Monitoring at the Polley Lake (POL-P2, POL-P1; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, August 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent.

Bootjack Lake (BOL−B2; Reference)



Polley Lake (POL−P2; Exposed)

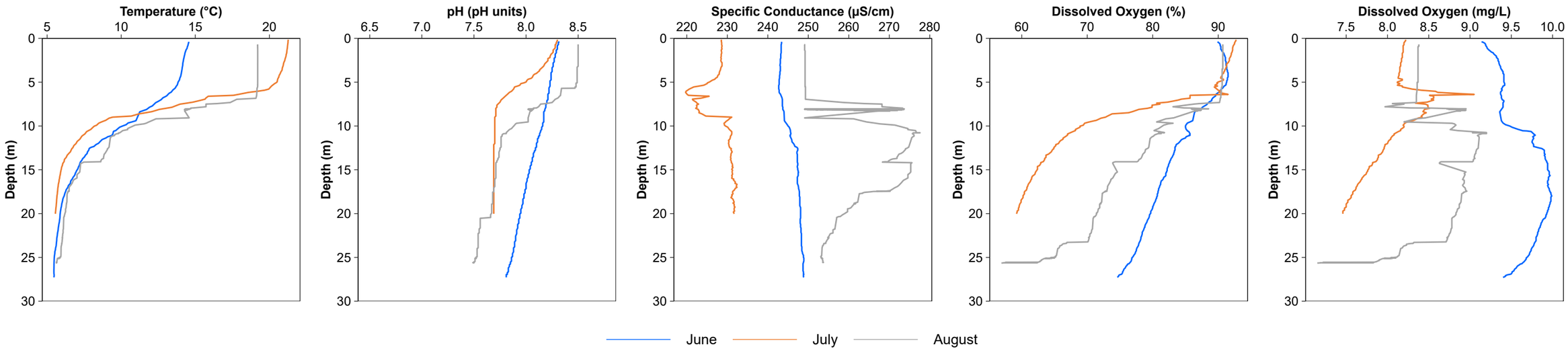


Figure A.1.2: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Plankton Monitoring at the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, June to August, 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent. Vertical profiles were not collected for Bootjack Lake in June and August due to equipment malfunction.

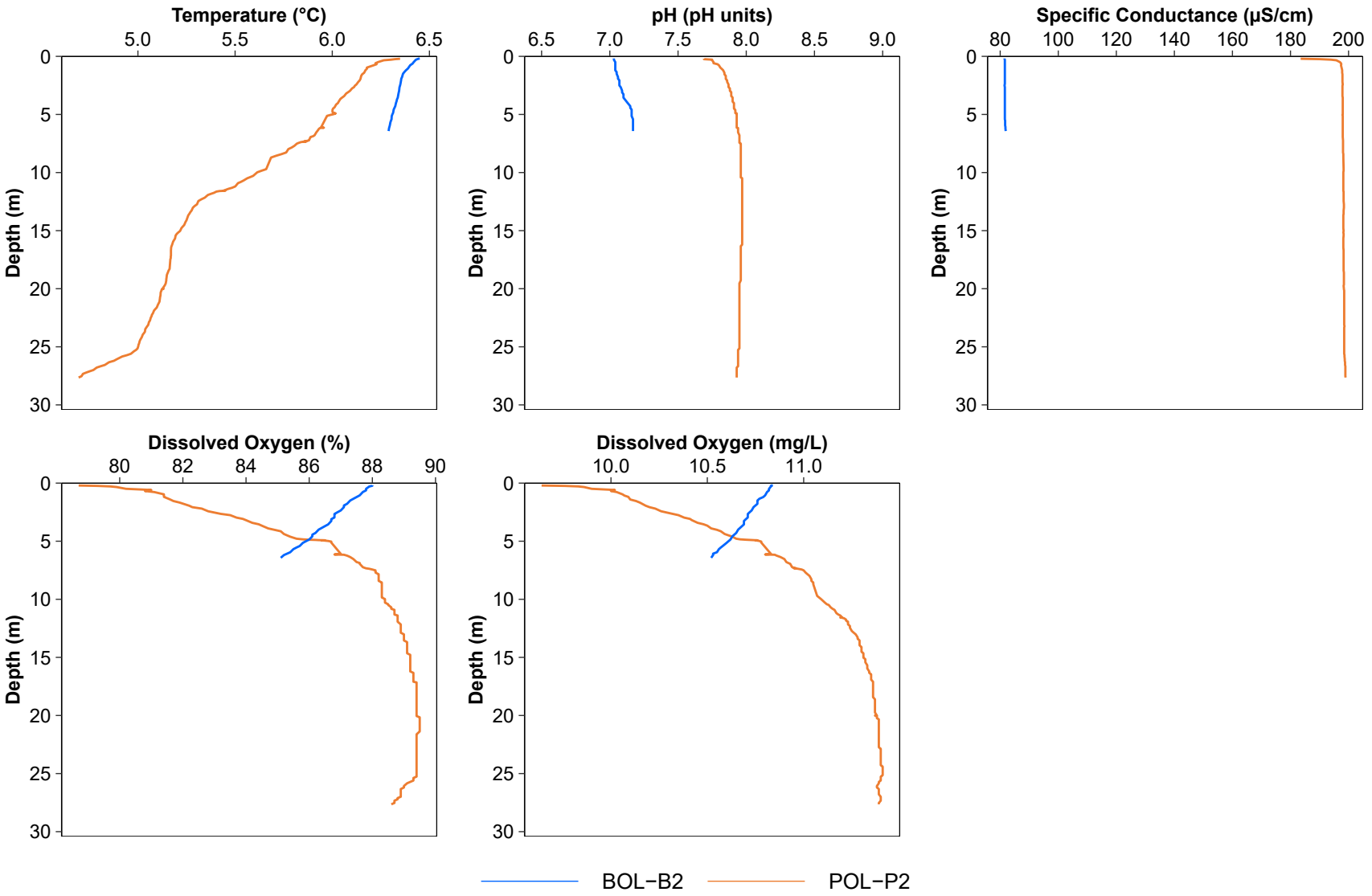


Figure A.1.3: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Fish Monitoring at the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, Spring 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent. Due to equipment malfunction, the vertical profile for Bootjack Lake was only partially completed.

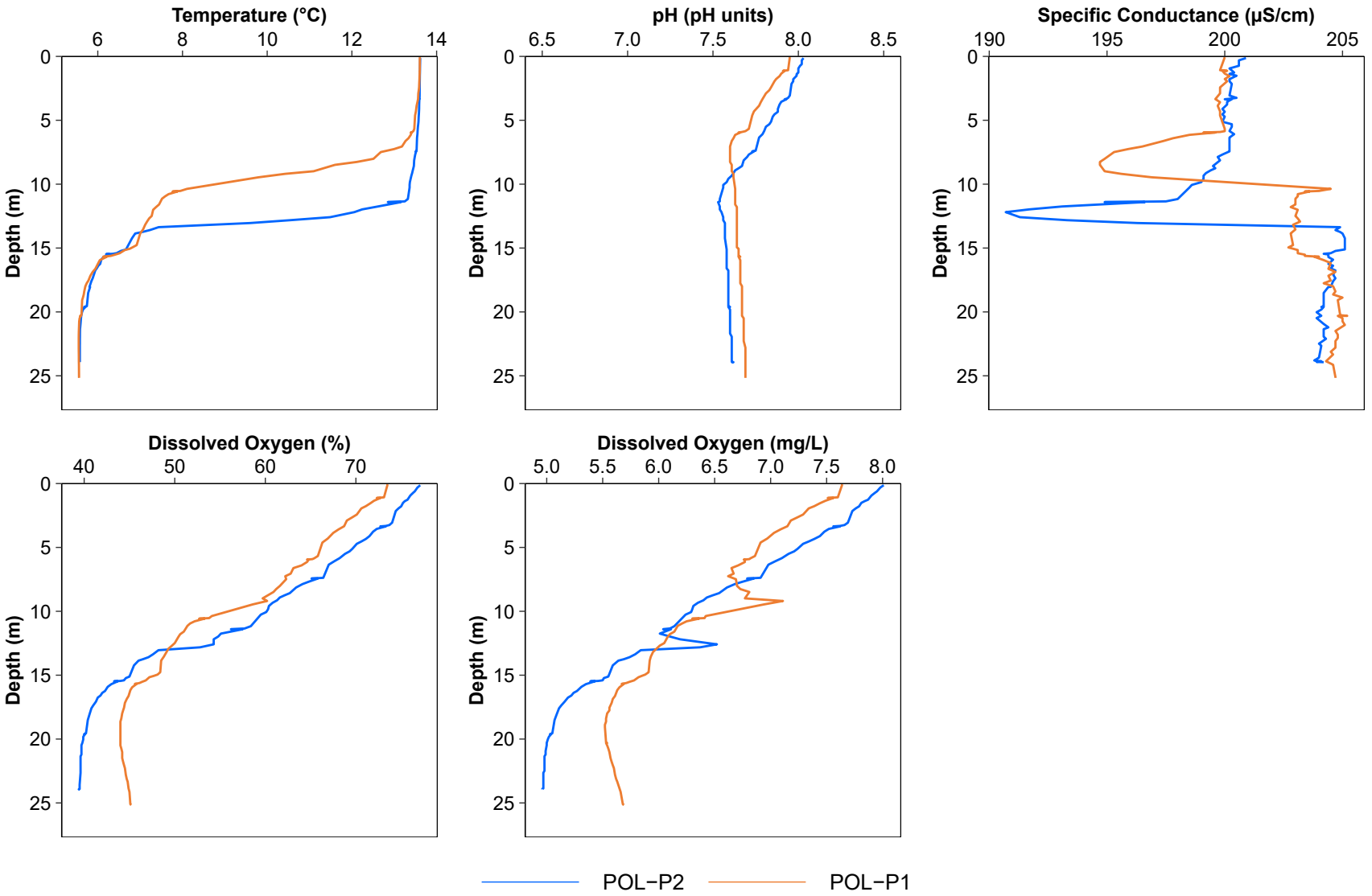


Figure A.1.4: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Fish Monitoring for Polley Lake (POL−P2 and POL−P1; Exposed), September 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent.

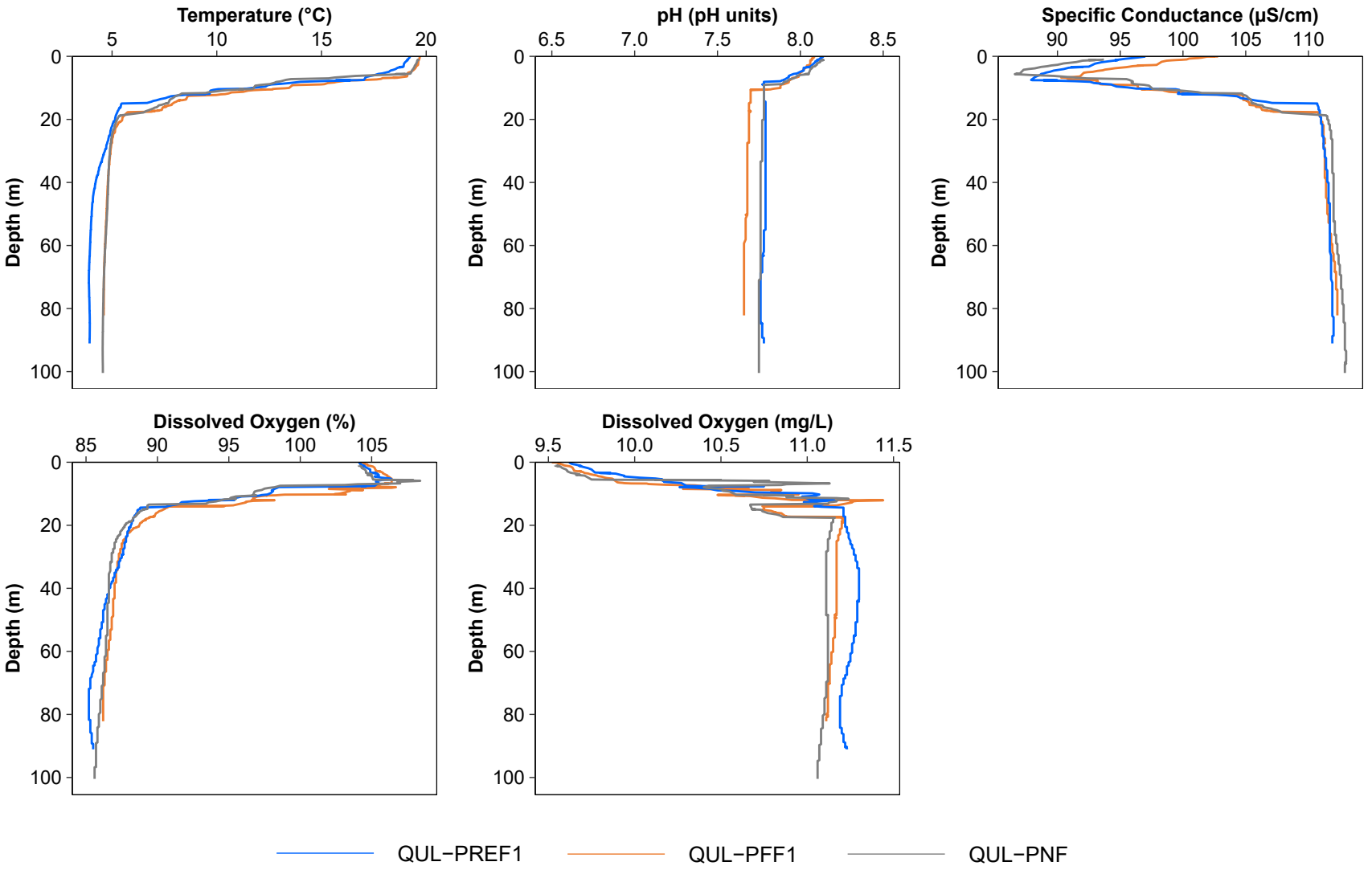
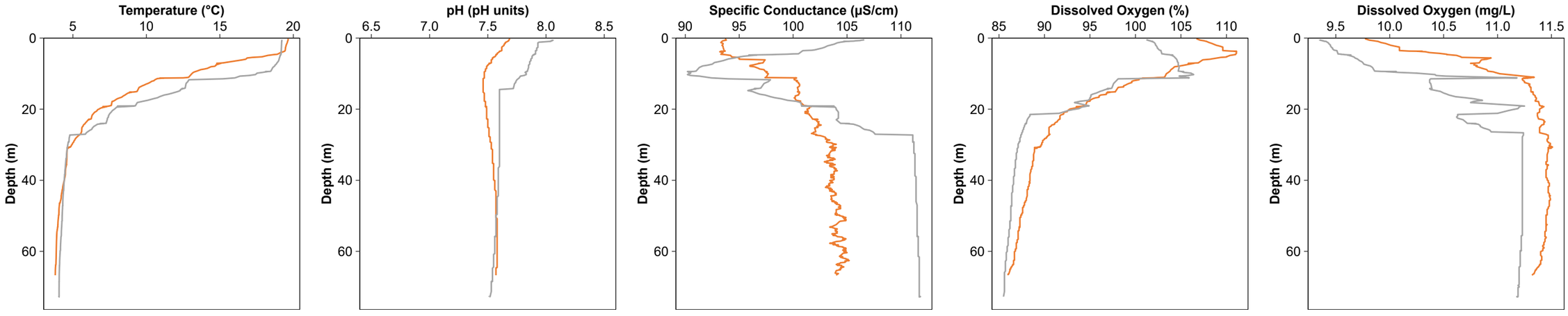


Figure A.1.5: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Sediment Quality and Benthic Invertebrate Monitoring at the Quesnel Lake (QUL−PNF, QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, August 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent.

Quesnel Lake (QUL−ZOO−7; Reference)



Quesnel Lake (QUL−ZOO−1; Exposed)

Figure A.1.6: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Plankton Monitoring at the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, June to August, 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent. Vertical profiles were not collected in June due to equipment malfunction.

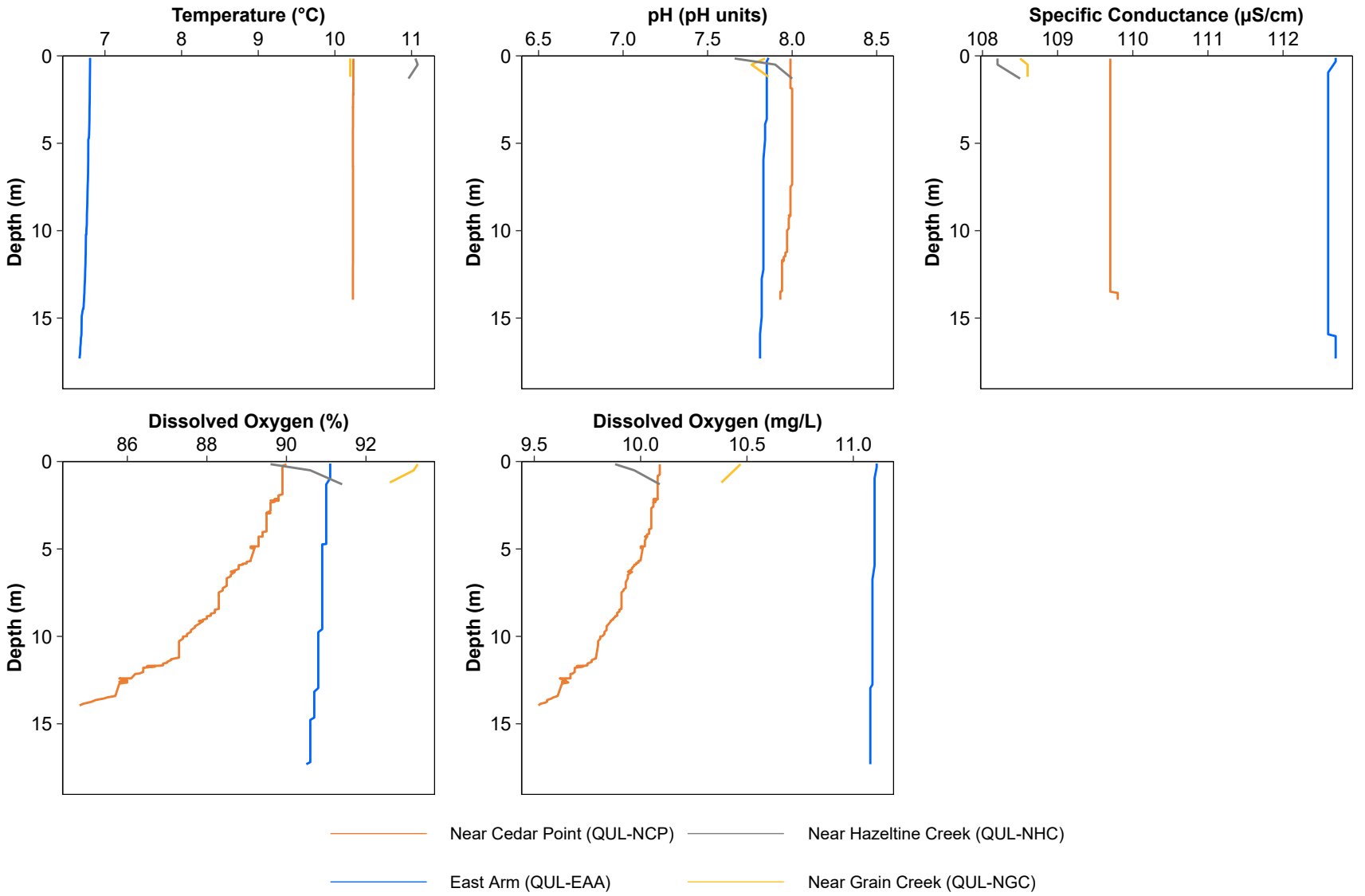


Figure A.1.7: Vertical Profiles of Temperature, Dissolved Oxygen, pH, and Specific Conductance during Fish Monitoring at the Quesnel Lake (QUL-NCP, QUL-NHC; Exposed and QUL-EAA, QUL-NGC; Reference) Monitoring Areas, October 2024

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent.

Table A.1.1: Sediment and Benthic Invertebrate Community Monitoring Methods and Locations at the Polley Lake (POL-P1, POL-P2; Exposed), Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas and the Quesnel Lake Deep (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) and Shallow (QUL-LNF1; Exposed and QUL-LREF1; Reference) Monitoring Areas, August 2024

Location		Type	Area Code	Replicate	UTM (NAD 83, Zone 10U)		Water Samples	Sediment Samples	Sediment Samples (Core Collection)		Sediment Samples (Ponar Collection)		Benthic Invertebrate Community Sample[a]				
					Easting	Northing	Date	Date	Sampling Method	Number of Cores per Sample	Sampling Method	Grabs per Sample	Date	Sampling Method	Sieve Size (µm)	Macrophytes	Algae
Bootjack Lake Deep	Bootjack Lake (South)	Reference	BOL-B2	1	591259	5821644	NA	19-Aug-24	Ball Corer	5	Petite Ponar	5	19-Aug-24	Petite Ponar	250	None	None
				2	591297	5821657		19-Aug-24		4		5	20-Aug-24			None	None
				3	591239	5821694		20-Aug-24		4		5	20-Aug-24			None	None
				4	591268	5821598		20-Aug-24		3		5	20-Aug-24			None	None
				5	591211	5821642		20-Aug-24		6		5	20-Aug-24			None	None
Polley Lake Deep	Polley Lake (North Basin)	Exposed	POL-P1	1	593701	5824731	NA	22-Aug-24		3		5	22-Aug-24			None	None
				2	593755	5824748		22-Aug-24		6		5	22-Aug-24			None	None
				3	593646	5824709		23-Aug-24		3		5	23-Aug-24			None	None
				4	593690	5824661		23-Aug-24		3		5	23-Aug-24			None	None
				5	593744	5824705		23-Aug-24		3		5	23-Aug-24			None	None
	Polley Lake (South Basin)		POL-P2	1	595166	5822178	NA	21-Aug-24		3		5	21-Aug-24			None	None
				2	595137	5822146		21-Aug-24		3		5	21-Aug-24			None	None
				3	595191	5822207		21-Aug-24		3		5	22-Aug-24			None	None
				4	595158	5822228		24-Aug-24		3		5	24-Aug-24			None	None
				5	595134	5822204		24-Aug-24		3		5	24-Aug-24			None	None
Quesnel Lake Shallow	Reference (Horsefly Bay)	Reference	QUL-LREF1	1	610136	5813949	21-Aug-24	21-Aug-24	NA		Petite Ponar	6	NA	NA	NA	NA	NA
				2	610003	5813958	21-Aug-24	21-Aug-24				6					
				3	610097	5813939	21-Aug-24	21-Aug-24				7					
				4	610164	5813960	21-Aug-24	21-Aug-24				7					
				5	610031	5813948	21-Aug-24	21-Aug-24				-					
	Near-field	Exposed	QUL-LNF1	1	601431	5818141	19-Aug-24	20-Aug-24	NA			5	NA	NA	NA	NA	NA
				2	601468	5818105	19-Aug-24	20-Aug-24				6					
				3	601420	5818165	19-Aug-24	20-Aug-24				5					
				4	601491	5818072	19-Aug-24	20-Aug-24				6					
				5	601518	5818017	19-Aug-24	19-Aug-24				6					
Quesnel Lake Deep	Reference (Horsefly Bay)	Reference	QUL-PREF1	1	610452	5814826	NA	22-Aug-24	NA			5	22-Aug-24	Petite Ponar	250	None	None
				2	610294	5814639		22-Aug-24				5	22-Aug-24			None	None
				3	610608	5814904		22-Aug-24				5	22-Aug-24			None	None
				4	610533	5814593		23-Aug-24				5	23-Aug-24			None	None
				5	610714	5814799		23-Aug-24				5	23-Aug-24			None	None
	Near-field	Exposed	QUL-PNF	1	601814	5818205	NA	23-Aug-24	NA			5	23-Aug-24			None	None
				2	601666	5818294		23-Aug-24				5	23-Aug-24			None	None
				3	601909	5818117		24-Aug-24				5	24-Aug-24			None	None
				4	601545	5818372		24-Aug-24				5	24-Aug-24			None	None
				5	601489	5818469		24-Aug-24				5	24-Aug-24			None	None
	Far-Field		QUL-PFF1	1	600001	5822025	NA	21-Aug-24	NA			5	21-Aug-24			None	None
				2	600054	5822165		21-Aug-24				5	21-Aug-24			None	None
				3	600055	5821871		21-Aug-24				5	21-Aug-24			None	None
				4	600032	5821992		21-Aug-24				5	21-Aug-24			None	None
				5	600101	5821772		22-Aug-24				5	22-Aug-24			None	None

Notes: "-" = no data available. NA = not applicable.

[a] Benthic invertebrate community samples were sieved using 250 µm mesh. No macrophytes or algae were documented in the samples collected.

Table A.1.2: Supporting Measures Collected during Sediment and Benthic Invertebrate Community Monitoring for the Polley Lake (POL-P1, POL-P2; Exposed), Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas and Quesnel Lake Deep (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) and Shallow (QUL-LNF1; Exposed and QUL-LREF1; Reference) Monitoring Areas, August 2024

Location		Type	Area Code	Date	Replicate	Station Depth	Secchi Depth	Surface						Bottom					
								Temperature	Dissolved Oxygen		pH	Specific Conductance	ORP	Temperature	Dissolved Oxygen		pH	Specific Conductance	ORP
						(m)	(m)	°C	mg/L	%	pH units	µS/cm	mV	°C	mg/L	%	pH units	µS/cm	mV
Bootjack Lake Deep	Bootjack Lake (South Basin)	Reference	BOL-B2	19-Aug-24	1	16.6	6.05	20.353	8.55	94.70	8.66	110.8	25.4	8.600	0.02	0.20	6.87	121.0	-72.0
				20-Aug-24	2	14.3	5.81	19.954	8.70	95.6	8.60	110.1	-3.1	8.710	0.22	1.9	7.02	120.0	-77.2
				20-Aug-24	3	16.7	6.11	19.930	8.75	96.2	8.62	110.4	1.5	8.447	0.29	2.4	7.04	123.9	-84.3
				20-Aug-24	4	16.1	5.57	20.071	8.75	96.3	8.64	110.0	6.1	8.485	0.29	2.4	7.04	123.1	-64.7
				20-Aug-24	5	16.7	5.32	20.095	8.77	96.6	8.62	110.7	6.9	8.496	0.30	2.6	7.07	123.5	-73.9
Polley Lake Deep	Polley Lake (North Basin)	Exposed	POL-P1	22-Aug-24	1	31.2	7.59	19.732	8.57	94.7	8.40	250.8	22.6	5.480	6.18	49.0	7.36	254.2	50.2
				22-Aug-24	2	29.4	7.37	20.196	8.58	94.8	8.39	251.6	22.0	5.511	6.55	52.0	7.39	255.0	47.4
				23-Aug-24	3	31.4	7.61	19.800	8.53	93.5	8.40	250.2	23.0	5.638	6.12	48.8	7.55	253.7	50.7
				23-Aug-24	4	31.0	6.74	19.990	8.50	93.4	8.36	249.8	28.2	5.488	6.00	47.6	7.39	254.8	53.5
				23-Aug-24	5	31.2	6.93	20.309	8.49	94.0	8.36	251.4	32.8	5.453	5.98	47.4	7.26	255.3	40.7
	Polley Lake (South Basin)		POL-P2	21-Aug-24	1	29.7	7.55	19.899	8.46	93.1	8.53	250.1	21.2	5.457	6.14	48.6	7.41	254.7	44.1
				21-Aug-24	2	29.2	7.47	20.153	8.56	94.5	8.54	250.9	22.1	5.570	6.22	49.5	7.50	255.7	47.6
				22-Aug-24	3	30.2	7.18	19.555	8.54	93.1	8.41	250.8	14.2	5.480	6.14	48.8	7.45	254.7	27.9
				24-Aug-24	4	30.2	7.72	19.503	8.47	92.3	8.34	250.0	5.9	5.481	6.38	49.8	7.41	254.1	7.5
				24-Aug-24	5	29.3	7.13	19.556	8.43	92.0	8.39	249.3	22.1	5.501	6.20	49.0	7.42	254.0	45.3
Quesnel Lake Shallow	Reference (Horsefly Bay)	Reference	QUL-LREF1	21-Aug-24	1	1.3	TSB	20.008	8.77	96.4	8.25	89.7	239.0	19.938	9.38	102.3	8.48	89.3	228.0
				21-Aug-24	2	1.4	TSB	20.275	10.22	113.3	8.68	88.1	170.2	20.231	10.02	110.6	8.60	88.5	180.6
				21-Aug-24	3	1.2	TSB	20.087	9.26	101.9	8.41	89.0	196.1	20.097	9.41	103.7	8.47	88.8	188.2
				21-Aug-24	4	1.4	TSB	20.061	8.73	96.1	8.08	89.5	179.7	19.623	10.92	118.9	8.92	89.1	156.5
				21-Aug-24	5	1.2	TSB	20.222	10.20	112.6	8.68	88.2	178.1	20.160	13.55	145.9	8.88	88.1	124.1
	Near-field	Exposed	QUL-LNF1	20-Aug-24	1	1.6	TSB	20.332	8.94	99.0	8.08	105.3	181.8	20.316	8.96	99.2	8.08	105.3	182.0
				20-Aug-24	2	1.9	TSB	20.267	8.85	97.7	8.07	105.3	181.1	20.190	8.89	98.1	8.08	105.3	179.8
				20-Aug-24	3	1.2	TSB	20.218	8.90	98.3	8.01	105.7	174.2	20.263	8.92	98.7	8.07	105.3	177.5
				20-Aug-24	4	1.7	TSB	20.194	8.84	97.7	7.98	105.3	177.2	20.361	8.90	98.6	8.05	105.3	170.8
				19-Aug-24	5	1.9	TSB	20.375	8.92	98.8	8.10	105.4	182.9	20.233	8.87	98.1	8.10	105.2	185.2
Quesnel Lake Deep	Reference (Horsefly Bay)	Reference	QUL-PREF1	22-Aug-24	1	115	8.80	19.654	9.45	103.2	8.14	101.9	193.4	3.888	11.30	85.9	7.71	111.5	197.7
				22-Aug-24	2	96	10.30	18.404	9.94	105.4	7.95	93.8	200.8	3.950	11.25	85.7	7.72	111.5	204.4
				22-Aug-24	3	118	9.40	19.869	9.44	103.5	8.14	99.9	180.9	3.884	11.24	85.5	7.78	111.4	183.4
				23-Aug-24	4[a]	100	5.90	-	-	-	-	-	-	3.852	11.28	85.7	7.67	111.9	150.7
				23-Aug-24	5	100	8.90	19.229	9.62	104.1	8.14	97.0	191.4	3.926	11.23	85.5	7.78	111.9	192.1
	Near-field	Exposed	QUL-PNF	23-Aug-24	1	110	8.90	19.419	9.45	102.7	8.19	102.7	181.8	4.578	11.09	86.0	7.78	112.8	183.7
				23-Aug-24	2	110	10.90	19.686	9.53	104.1	8.15	94.2	162.7	4.561	11.06	85.6	7.75	112.9	163.0
				24-Aug-24	3	104	-	19.551	9.59	104.5	8.11	90.8	169.3	4.600	11.10	86.0	7.75	112.6	171.4
				24-Aug-24	4	100	6.70	19.488	9.61	104.6	8.12	92.2	174.1	4.531	11.12	86.0	7.75	113.1	176.8
				24-Aug-24	5	100	9.90	19.356	9.69	105.1	8.12	91.9	177.8	4.546	11.09	85.9	7.76	113.0	180.5
	Far-Field		QUL-PFF1	21-Aug-24	1	92	5.50	19.765	9.46	103.6	8.09	104.9	172.0	4.563	11.16	86.4	7.54	112.6	173.4
				21-Aug-24	2	85	10.80	19.714	9.19	100.5	8.09	17.5	196.9	4.601	11.11	86.1	7.66	112.3	202.8
				21-Aug-24	3	92	10.80	19.824	9.45	103.6	8.12	20.8	205.2	4.556	11.09	85.9	7.66	112.6	211.9
				21-Aug-24	4	89	-	17.788	9.43	99.2	7.98	2.8	204.1	4.569	10.99	85.1	7.63	112.7	210.8
				22-Aug-24	5[a]	89	10.00	-	-	-	-	-	-	4.615	11.12	86.2	7.67	112.2	111.5

Notes: TSB = to substrate bed material. m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent. mV = millivolts. ORP = oxidation-reduction potential. "-" = data not available.

[a] Supporting surface water quality measures for QUL-PNF-4 and QUL-PFF1-5 were not collected due to sonde malfunction.

Table A.1.3: Plankton Monitoring Methods and Locations for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference), and Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, June to August 2024

Location	Type	Area Code	Station ID	Date	Time (24 hr)	UTM (NAD 83, 10U)		Station Total Depth (m)	Secchi Depth (m)	Temperature	Dissolved Oxygen		Conductivity	Specific Conductance	pH	Phytoplankton Community and Productivity	Zooplankton					Water Quality
																	Community	Tissue				
						Easting	Northing			°C	mg/L	%	µS/cm	µS/cm	pH units	DI Sampler Depth (m)	Tow Depth (m)	Haul Type	Tow Depth (m)	# of Hauls	Time (min)	DI Sample (Y/N)
Bootjack Lake	Reference	BOL-B2	BOL-B2-1	19-Jun-24	16:40	591263	5821665	16.5	5.5	14.0	8.35	83.1	72.7	77.3	7.73	12.0	13	Vertical	13	2	-	Y
			BOL-B2-1	25-Jul-24	10:30	591252	5821630	17.0	3.5	16.1	7.68	78.0	81.0	94.9	7.45	11.5	13	Vertical	13	2	-	Y
			BOL-B2-2	25-Jul-24	12:15	591239	5821692	15.5	-	16.0	7.20	73.1	83.4	100.4	7.31	11.0	12	Vertical	12	2	-	N
			BOL-B2-3	25-Jul-24	12:50	591259	5821749	13.5	-	16.3	7.55	77.0	82.7	99.3	7.36	11.5	10	Vertical	10	2	-	N
			BOL-B2-4	25-Jul-24	13:30	591312	5821796	12.0	-	16.3	7.76	79.1	82.3	98.7	7.42	11.0	10	Vertical	10	2	-	N
			BOL-B2-5	25-Jul-24	14:20	591333	5821568	14.8	-	15.8	7.60	76.6	81.4	99.1	7.45	11.5	12	Vertical	12	4		N
			BOL-B2-1	26-Aug-24	13:15	591263	5821665	17.5	-[a]	16.0	6.93	70.4	-	109.4	7.73	12.0	15	Vertical	15	3	-	Y
Polley Lake	Exposed	POL-P2	POL-P2-1	19-Jun-24	10:44	595172	5822161	29.5	5.5	14.7	9.23	91.8	56.3	67.2	8.23	11.5	27	Vertical	27	2	-	Y
			POL-P2-1	23-Jul-24	10:15	595173	5822030	29.6	6.0	16.3	8.77	89.5	187.1	223.5	8.09	11.5	26	Vertical	26	2	-	Y
			POL-P2-2	23-Jul-24	11:50	595377	5822077	24.9	-	19.6	8.39	91.2	141.3	162.1	8.37	11.5	23	Vertical	23	2	-	N
			POL-P2-3	23-Jul-24	12:45	595436	5821798	26.4	-	20.3	8.39	92.6	105.3	118.7	8.36	11.5	24	Vertical	24	2	-	N
			POL-P2-4	23-Jul-24	14:15	594869	5822411	22.1	-	18.5	8.67	91.9	173.4	188.7	8.32	11.5	20	Vertical	20	2	-	N
			POL-P2-5	23-Jul-24	15:00	595134	5821976	25.9	-	17.5	8.74	91.5	195.4	228.1	8.29	11.5	24	Vertical	24	2	-	N
			POL-P2-1	26-Aug-24	8:55	595172	5822161	29.2	-[a]	16.3	8.56	87.3	-	249.0	8.29	12.0	27	Vertical	27	2	-	Y
Quesnel Lake	Reference	QUL-ZOO-7	QUL-ZOO-7-1	20-Jun-24	8:10	612448	5816654	77.5	5.5	11.3	10.49	95.7	36.2	49.2	7.50	11.5	31	Horizontal	31	2	5	Y
			QUL-ZOO-7-1	24-Jul-24	8:00	612427	5816677	72.4	5.25	17.9	9.41	99.1	82.9	95.5	8.16	11.0	31	Horizontal	31	1	5	Y
			QUL-ZOO-7-2	24-Jul-24	9:00	612087	5816568	82.3	-	17.5	9.56	100.0	82.8	96.1	8.11	11.0	31	Horizontal	31	1	5.5	N
			QUL-ZOO-7-3	24-Jul-24	10:00	612568	5816302	160	-	17.4	9.48	99.0	79.9	92.7	8.13	11.0	31	Horizontal	31	1	5.25	N
			QUL-ZOO-7-4	24-Jul-24	10:50	612621	5816968	42.8	-	17.6	9.57	100.1	81.1	95.0	8.12	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-7-5	24-Jul-24	11:30	612220	5816796	65	-	17.9	9.55	100.7	82.0	94.7	8.14	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-7-1	25-Aug-24	7:30	612448	5816654	76	7.5	18.5	8.74	93.2	-	106.5	8.15	11.5	31	Horizontal	31	4	5	Y
	Exposed	QUL-ZOO-1	QUL-ZOO-1-1	20-Jun-24	10:00	601053	5819934	105	5.25	10.7	10.94	98.7	43.5	59.5	7.88	11.5	31	Horizontal	31	2	5.25	Y
			QUL-ZOO-1-1	24-Jul-24	12:30	601062	5819924	98.1	7.0	17.3	9.65	100.4	83.8	98.4	8.14	11.0	31	Horizontal	31	1	5	Y
			QUL-ZOO-1-2	24-Jul-24	14:25	601282	5819755	59	-	17.6	9.68	100.8	83.7	97.1	8.15	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-1-3	24-Jul-24	15:04	600975	5819623	114	-	17.9	9.62	101.4	85.4	99.1	8.16	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-1-4	24-Jul-24	15:50	600786	5819932	113	-	17.7	9.62	101.0	84.1	97.7	8.17	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-1-5	24-Jul-24	16:30	600945	5820229	85.5	-	17.6	9.67	101.4	83.5	97.1	8.18	11.0	31	Horizontal	31	1	5	N
			QUL-ZOO-1-1	25-Aug-24	13:30	601053	5819934	103	-[a]	18.4	8.85	94.00	-	106.7	8.11	11.5	31	Horizontal	31	4	5	Y

Notes: m = metres. mg/L = milligrams per litre. µS/cm = microSiemens per centimeter. °C = degrees Celsius. % = percent. "-" = no data available or not applicable. Y = Yes. N = No. DI = Depth-Integrated.

[a] Secchi depth could not be recorded due to windy weather.

Table A.1.4: Habitat Information Associated with Fish Population Monitoring in Polley Lake, September 2024

Station ID		Exposed
		Polley Lake
Date Sampled		19-Sep-24
UTM (NAD83, Zone 10U)	Easting	595166
	Northing	5822183
Habitat Characteristics		
Surrounding Land Use		Mining, forest, recreation
Riparian Vegetation (decreasing dominance)		Coniferous (cedar, spruce), alder, aspen
Evidence of Anthropogenic Disturbances		TSF breach 2014, recreation site with boat launch, cabins at north end of lake
Aquatic Vegetation	% Emergent	5
	% Submergent	20
	% Floating	5
	% Attached Algae	0
Shoreline (% area coverage)	% Bedrock	0
	% Boulder	0
	% Cobble	10
	% Gravel	20
	% Sand / Finer	50
	% Organic Debris	20
Littoral Substrate (% area coverage)	% Bedrock	-
	% Boulder	-
	% Cobble	-
	% Gravel	-
	% Sand / Finer	-
	% Organic Debris	-
Comments	Emergent vegetation: Typha and sedges at south end of lake. Floating vegetation: Polygonum (water smartweed) in multiple areas. Submerged vegetation: Ranunculus (water-crowfoot) in multiple areas and Chara (muskgrass) at the south end of lake.	

Notes: " - " indicates no data available. Littoral assessment omitted as majority of lake could not be observed.

Table A.1.5: Habitat Information Associated with Fish Tissue Collections in Quesnel Lake, October 2024

Station ID		Reference		Exposed	
		East Arm	Near Grain Creek	Near Hazeltine Creek	Near Cedar Point
Date Sampled		21-Oct-24	17-Oct-24	17-Oct-24	22-Oct-24
UTM (NAD83, Zone 10U)	Easting	677510	633218	602383	599399
	Northing	5832643	5828886	5817428	5821965
Habitat Characteristics					
Surrounding Land Use		Seasonal recreation lodge	Cabins, recreation	Forestry, recreation (minimal)	Forestry, recreation, natural forest
Riparian Vegetation (decreasing dominance)		Shrubs, mixed forest	Deciduous, shrubs, mosses	Mature mixed forest, willows	Conifers, poplars
Evidence of Anthropogenic Disturbances		Boating/launch area	None	Quad tracks on beach	Recreation (fishing, boating), houses along shore. Hazeltine Creek enters Quesnel Lake south of area and current carries water through to Quesnel River (north of area)
Aquatic Vegetation	% Emergent	0	0	0	0
	% Submergent	0	0	0	0
	% Floating	0	0	0	0
	% Attached Algae	0	0	0	0
Shoreline (% area coverage)	% Bedrock	0	0	0	5
	% Boulder	0	0	0	70
	% Cobble	0	5	0	20
	% Gravel	40	60	30	5
	% Sand / Finer	50	25	65	0
	% Organic Debris	10	10	5	0
Littoral Substrate (% area coverage)	% Bedrock	0	0	0	5
	% Boulder	0	0	0	70
	% Cobble	5	5	0	20
	% Gravel	45	50	65	5
	% Sand / Finer	50	30	30	0
	% Organic Debris	0	15	5	0

APPENDIX A.2

CREEKS

Figure A.2.1: Representative Periphyton Coverage at the Frypan Creek (FPC-R3; Reference; top panel) and Upper Edney Creek (EDC-U; Reference; bottom panel) Monitoring Areas, August 2024

Figure A.2.2: Representative Periphyton Coverage at the Upper Hazeltine Creek Reach 1 (HAC-R1; Exposed; top panel) and Reach 2 (HAC-U [HAC-R2]; Exposed; bottom panel) Monitoring Areas, August 2024[a]

[a] HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

Figure A.2.3: Representative Periphyton Coverage at the Upper Hazeltine Creek Reach 3 (HAC-R3; Exposed; top panel) and Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed; bottom panel) Monitoring Areas, August 2024[a]

[a] HAC-R5 is the alternate name used for the HAC-D sampling area for HRWG reporting.

Figure A.2.4: Representative Periphyton Coverage at the Lower Edney Creek (EDC-D [EDC-REF]; Reference; top panel and E1 [EDC-EXP]; Exposed; bottom panel) Monitoring Areas, August 2024[a]

[a] EDC-REF and EDC-EXP are alternate names used for the EDC-D and E1 sampling areas, respectively, for HRWG reporting.

Table A.2.1: Supporting Measures and Sampling Locations for Sediment Monitoring for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, August 2024 [a]

Station ID		Upper Creek Areas									
		Reference					Exposed				
		Edney Creek					Hazeltine Creek (Reach 2)				
		EDC-U					HAC-U (HAC-R2)				
		EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	HAC-U-1	HAC-U-2	HAC-U-3	HAC-U-4	HAC-U-5
Date Sampled		11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	12-Aug-24	12-Aug-24
UTM (NAD83, 10U)	Easting	597985	598008	597995	597996	597994	596331	596397	596471	596578	596616
	Northing	5814582	5814642	5814664	5814688	5814704	5819543	5819501	5819443	5819327	5819295
Sediment Quality Measures											
Sampling Device		Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon
Grabs in Composite		>30	>30	>30	>30	>30	>30	>30	>50	>30	>30
Sample Stratum (cm)		0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3
Water Quality											
Water Colour / Clarity		Brown/ clear	Brown/ clear	Brown/ clear	Brown/ clear	Brown/ clear	Colourless/ clear	Colourless/ clear	Colourless/ clear	Colourless/ clear	-
Temperature (°C)		16.4	14.8	13.4	14.1	13.0	12.5	18.3	16.5	16.2	-
Dissolved Oxygen	(mg/L)	4.89	2.15	1.70	1.68	2.66	10.13	10.44	10.45	10.35	-
	(% sat)	49.4	21.5	16.5	16.7	25.4	109.8	111.0	107.3	105.4	-
pH		7.02	6.92	6.79	6.98	7.23	8.54	8.46	8.33	8.20	-
Specific Conductance (µS/cm)		147.2	151.4	149.4	151.8	153.0	278.4	280.6	284.3	287.6	-

Notes: "-" = data not collected. UTM = Universal Transverse Mercator. NAD = North American Datum. mg/L = milligrams per litre. cm = centimeters. % sat. = percent saturation.
°C = degree Celsius. µS/cm = microSiemens per centimeter.
[a] HAC-R2, EDC-REF, and HAC-R5 are alternate are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

Table A.2.1: Supporting Measures and Sampling Locations for Sediment Monitoring for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, August 2024 [a]

Station ID		Lower Creek Areas									
		Reference					Exposed				
		Edney Creek					Hazeltine Creek (Reach 5)				
		EDC-D (EDC-REF)					HAC-D (HAC-R5)				
		EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	HAC-D-1	HAC-D-2	HAC-D-3	HAC-D-4	HAC-D-5
Date Sampled		9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24
UTM (NAD83, 10U)	Easting	601026	601016	601060	601110	601113	600780	600880	601074	601175	601289
	Northing	5816588	5816686	5816760	5816765	5816752	5817296	5817290	5817225	5817167	5817139
Sediment Quality Measures											
Sampling Device		Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon	Spoon
Grabs in Composite		>20	>20	>20	>20	>20	>20	>20	>20	>20	>20
Sample Stratum (cm)		0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3	0-3
Water Quality											
Water Colour / Clarity		Clear	Clear	Clear	Brown/ clear	Brown/ clear	Clear	Clear	Clear	Clear	Clear
Temperature (°C)		14.4	14.8	14.9	12.5	12.7	18.3	17.0	15.6	14.2	21.4
Dissolved Oxygen	(mg/L)	8.31	9.15	8.47	9.41	9.52	8.09	8.55	7.85	8.01	7.61
	(% sat)	80.7	90.2	83.9	88.3	89.4	85.4	87.6	79.6	79.2	85.7
pH		8.02	8.14	8.12	8.14	7.63	8.20	8.15	7.97	7.89	8.14
Specific Conductance (µS/cm)		342.1	358.9	338.9	352.1	345.2	306.2	326.1	334.2	333.1	314.7

Notes: "-" = data not collected. UTM = Universal Transverse Mercator. NAD = North American Datum. mg/L = milligrams per litre. cm = centimeters. % sat. = percent saturation.
°C = degree Celsius. µS/cm = microSiemens per centimeter.
[a] HAC-R2, EDC-REF, and HAC-R5 are alternate are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

Table A.2.2: Habitat Information Associated with Biological Monitoring for Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference), August 2024 [a]

Station ID		Upper Creek Areas					Lower Creek Areas		
		Reference		Exposed			Reference	Exposed	
		Frypan Creek (Reach 3)	Edney Creek	Hazeltine Creek (Reach 1)	Hazeltine Creek (Reach 2)	Hazeltine Creek (Reach 3)	Edney Creek	Edney Creek	Hazeltine Creek (Reach 5)
		FPC-R3	EDC-U	HAC-R1	HAC-U (HAC-R2)	HAC-R3	EDC-D (EDC-REF)[a]	E1 (EDC-EXP)	HAC-D (HAC-R5)
Date Sampled		14-Aug-24	12-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	10-Aug-24	8-Aug-24	9-Aug-24
UTM (NAD83, 10U)	Easting	592265	597935	595747	596331	598539	601027	601436	601189
	Northing	5826883	5814447	5820309	5819543	5817486	5816766	5817078	5817168
Length of Reach Assessed (m)		20	30	50	42	25	54	60	33
Channel Measurements	Bankfull Width (m)	3.00	5.20	4.90	7.00	4.30	6.90	10.80	5.42
	Wetted Width (m)	0.82	2.90	3.80	3.12	3.12	4.71	5.64	3.85
	Mean depth (cm)	14	10	42	45	25	15	15	40
	Maximum depth (cm)	20.5	37	81	81	65	43	45	60
	Gradient (%)	2	1	1	2	4	1.5	3	2
Residual (refuge) pool depth (cm)		15	34	25	64	57	30	45	-
Anthropogenic Disturbances		None apparent. Forest service road adjacent to creek (downstream)	Bridge, logging in area	Mining, TSF breach upstream (2014)	Mining, TSF breach upstream (2014)	Mining, TSF breach upstream (2014)	None apparent	TSF breach upstream (2014)	TSF breach upstream (2014)
Weather notes		Partially cloudy, Hot	Clear, Hot	Drizzle, 15 °C	-	Smoky, mix of sun & cloud	-	Clear, sunny, few clouds 25 degree C	Sunny
Comments		None	None	None	Ranunculus and water smartweed	Six fish holding in pool tailout. Sparse green algae, no macrophytes.	None	None	None
Bank Stability		Unstable	-	Moderate	-	-	Unstable; substantial bank erosion	Stable; no bank erosion (rock armoured)	Stable; no bank erosion (rock armoured)
Water Colour & Clarity		Clear, tea stained	Clear, tea stained	Clear, colourless	-	Clear, colourless	Clear, colourless	Clear, tea stained	Clear
General Morphology	% Pool / Back Eddy	0	10	85	70	30	30	0	0
	% Riffle	10	10	15	20	50	40	50	40
	% Run	90	80	0	10	20	30	50	60
Substrate	% Bedrock	0	0	0	0	0	0	5	0
	% Boulder	0	0	5	5	5	5	50	5
	% Cobble	5	30	20	15	75	70	30	30
	% Gravel	15	60	75	65	15	20	10	40
	% Sand / Finer	80	10	0	15	5	5	5	25
	% Organic	0	0	0	0	0	0	0	0
Instream Cover	% Undercut banks	10	15	0	0	0	5	0	0
	% Boulder	0	0	<5	5	5	<5	5	5
	% Woody debris	30	5	15	10	10	<5	10	10
	% Deep pool	0	<5	35	65	10	10	10	20
	% Macrophytes	0	0	5	30	0	0	0	0
	% Other	0	0	0	0	0	0	0	0
Riparian Vegetation (most dominant first)		Alder, twinberry, grasses, ferns, devil's club	Alder, dogwood, roses	Willow, dogwood, alder, grasses	Willow, dogwood, alder, grasses	-	Alders, willow, pine, spruce	Dogwood, alder, white sweet clover, grasses	-
Aquatic Vegetation	% Emergent	<5	0	30	10	0	0	0	0
	% Submergent	0	0	5	25	0	0	0	5
	% Floating	0	0	<5	5	0	0	0	0
	% Attached algae	0	20	5	<5	5	80	25	0
Canopy Coverage (%)	Dense	15	15	-	-	-	30	-	-
	Partially Open	25	20	-	-	-	10	-	-
	Open	60	65	100	100	100	60	100	100
Surrounding land use		Forestry in area, adjacent to mine	Forestry	Mining	Mining	Mining	Forestry upstream	Mining, Forestry	Mining, Forestry

Notes: m = meters. cm = centimeters. °C = degrees Celsius. "-" = no data available. Pool depth may exceed mean channel depth.
[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Reference				
			Frypan Creek				
			FPC-R3				
			FPC-R3-1	FPC-R3-2	FPC-R3-3	FPC-R3-4	FPC-R3-5
Biological Sampling		Date	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24
UTM (NAD83, 10U)		Easting	592265	592351	592400	592419	592466
		Northing	5826883	5826829	5826751	5826720	5826708
Periphyton	**Productivity & Community**						
	Sample Collection Type		AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a
	Surface Area Sampled (m^2)		0.002	0.002	0.002	0.002	0.002
	Water Depth (cm)		8.0	6.0	6.0	7.0	6.0
	Water Velocity (m/s)[b]		0.16	0.12	0.10	0.16	0.17
Benthic Invertebrate	**Productivity & Community**						
	Sampling Device (and size)		Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)
	Mesh Size (µm)		250	250	250	250	250
	Grabs in Composite		3	3	3	3	3
	Mean Water Depth (cm)		5.0	4.7	5.0	5.3	4.7
	Mean Water Velocity (m/s)		0.13	0.16	0.17	0.16	0.17
	Average Depth Sampler is Pushed into Substrate (cm)		2	2	2	2	1
	Average Depth Which Substrate is Sampled (cm)		6	6	6	4	5
	Average Sampling Time per Grab (min)		5	6	6	5	5
	Sample Texture	% Cobble	30	40	30	50	40
		% Gravel	50	45	60	40	50
		% Sand and Finer	15	10	10	10	10
		% Organic	5	5	0	0	0
	Macrophytes		None	None	None	None	None
	Algae		None	None	None	None	None
	Macrophyte / Algae Type / Species		-	-	-	-	-
	Tissue Chemistry						
	Taxa (Composite Samples)		-	-	-	-	-
	Taxa (Single-Taxon Samples)		-	-	-	-	-
Water Quality Measures	Temperature	°C	16.8	15.8	15.0	14.5	13.9
	Dissolved Oxygen	mg/L	4.54	5.42	7.76	7.95	7.45
		%	46.5	55.0	77.2	77.2	71.8
	pH	pH units	7.11	7.39	7.57	7.54	7.47
	Specific Conductance	µS/cm	152.1	173.6	177.2	177.4	177.0

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Reference							
			Upper Edney Creek							
			EDC-U[b]							
			EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-6	EDC-U-7	EDC-U-8
Biological Sampling		Date	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
UTM (NAD83, 10U)		Easting	597935	597948	597941	597965	597986	598008	597996	597994
		Northing	5814447	5814503	5814556	5814574	5814601	5814642	5814688	5814704
Periphyton	**Productivity & Community**									
	Sample Collection Type		AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		0.002	0.002	0.002	0.002	0.002	-	-	-
	Water Depth (cm)		10.0	9.0	12.0	9.0	13.0	-	-	-
	Water Velocity (m/s)[b]		0	0	0	0	0	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)	Surber (0.093 m^2)	-	-	-
	Mesh Size (µm)		250	250	250	250	250	-	-	-
	Grabs in Composite		3	3	3	3	3	-	-	-
	Mean Water Depth (cm)		8.7	9.7	10.3	9.3	9.7	-	-	-
	Mean Water Velocity (m/s)		0	0	0	0	0	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		3	3	10	2	3	-	-	-
	Average Depth Which Substrate is Sampled (cm)		10	10	3	5	5	-	-	-
	Average Sampling Time per Grab (min)		4	4	5	4	5	-	-	-
	Sample Texture	% Cobble	40	50	50	40	30	-	-	-
		% Gravel	50	45	50	55	65	-	-	-
		% Sand and Finer	10	5	0	5	5	-	-	-
		% Organic	0	0	0	0	0	-	-	-
	Macrophytes		None	None	None	None	None	-	-	-
	Algae		None	None	None	None	None	-	-	-
	Macrophyte / Algae Type / Species		-	-	-	-	-	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Mayfly, Megaloptera, stonefly	Stonefly, Megaloptera, mayfly	Tipulidae, Megaloptera, mayfly, stonefly	Megaloptera, mayfly, stonefly	Megaloptera, stonefly, mayfly	Dragonfly	Mayfly, stonefly, caddisfly	Tipulidae, caddisfly, mayfly
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	12.7	14.0	19.9	16.4	14.8	13.4	14.1	13.0
	Dissolved Oxygen	mg/L	7.54	3.72	5.60	4.98	2.15	1.70	1.68	2.66
		%	69.5	36.0	61.0	49.4	21.5	16.5	16.7	25.4
	pH	pH units	7.47	7.19	7.26	7.02	6.92	6.79	6.98	7.23
	Specific Conductance	µS/cm	152.5	154.5	154.8	147.2	151.4	149.4	151.8	153.0

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Exposed							
			Upper Hazeltine Creek (Reach 1)							
			HAC-R1							
			HAC-R1-1[c]	HAC-R1-2[c]	HAC-R1-3[c]	HAC-R1-4[c]	HAC-R1-5	HAC-R1-6	HAC-R1-7	HAC-R1-8
Biological Sampling		Date	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24
UTM (NAD83, 10U)		Easting	595754	595747	595758	595697	595737	595798	595835	595862
		Northing	5820341	5820309	5820282	5820186	5820098	5820033	5820022	5820015
Periphyton	**Productivity & Community**									
	Sample Collection Type		AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		0.002	0.002	0.002	0.002	0.002	-	-	-
	Water Depth (cm)		29.0	34.0	32.0	26.0	23.0	-	-	-
	Water Velocity (m/s)[b]		0.20	0.20	0.21	0.25	0.20	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	-	-	-
	Mesh Size (µm)		250	250	250	250	250	-	-	-
	Grabs in Composite		3	3	3	3	3	-	-	-
	Mean Water Depth (cm)		27.0	33.3	34.0	28.3	27.3	-	-	-
	Mean Water Velocity (m/s)		0.21	0.21	0.22	0.20	0.17	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		3	3	3	3	3	-	-	-
	Average Depth Which Substrate is Sampled (cm)		5	5	6	5	5	-	-	-
	Average Sampling Time per Grab (min)		6	6	6	6	6	-	-	-
	Sample Texture	% Cobble	70	25	80	80	80	-	-	-
		% Gravel	25	70	15	15	15	-	-	-
		% Sand and Finer	5	5	5	5	5	-	-	-
		% Organic	0	0	0	0	0	-	-	-
	Macrophytes		None	None	None	Sparse	None	-	-	-
	Algae		None	None	None	None	None	-	-	-
	Macrophyte / Algae Type / Species		-	-	-	Bryophyte	-	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Amphipod, mayfly	Amphipod, mayfly	Amphipod, mayfly	Mayfly, amphipod, caddisfly	Tipulidae, stonefly, caddisfly, mayfly	Tipulidae, stonefly, caddisfly, mayfly	Stonefly, mayfly, caddisfly	Mayfly, caddisfly, stonefly
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	16.8	16.6	16.4	16.2	18.5	16.7	16.5	15.6
	Dissolved Oxygen	mg/L	8.27	8.14	8.14	7.55	9.38	9.58	9.65	9.49
		%	75.2	83.5	83.5	76.8	100.2	98.9	99.1	95.4
	pH	pH units	7.91	7.83	7.82	7.54	8.20	8.13	8.12	7.96
	Specific Conductance	µS/cm	242.0	243.6	243.3	240.1	244.0	243.8	244.8	245.6

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Exposed							
			Upper Hazeltine Creek (Reach 2)							
			HAC-U (HAC-R2)							
			HAC-U-1	HAC-U-2	HAC-U-3	HAC-U-4	HAC-U-5	HAC-U-6	HAC-U-7	HAC-U-8
Biological Sampling		Date	13-Aug-24	13-Aug-24	13-Aug-24	12-Aug-24	12-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24
UTM (NAD83, 10U)		Easting	596331	596397	596480	596578	596624	596687	596717	596744
		Northing	5819543	5819501	5819433	5819323	5819290	5819230	5819203	5819194
Periphyton	**Productivity & Community**									
	Sample Collection Type		AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	AFDM, Chlorophyll-a, Community, Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		0.002	0.002	0.002	0.002	0.002	-	-	-
	Water Depth (cm)		27.0	23.0	21.0	25.0	21.0	-	-	-
	Water Velocity (m/s)[b]		0.16	0.19	0.16	0.17	0.12	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	-	-	-
	Mesh Size (µm)		250	250	250	250	250	-	-	-
	Grabs in Composite		3	3	3	3	3	-	-	-
	Mean Water Depth (cm)		26.0	27.0	30.3	29.0	37.7	-	-	-
	Mean Water Velocity (m/s)		0.23	0.19	0.17	0.18	0.15	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		3	3	3	3	3	-	-	-
	Average Depth Which Substrate is Sampled (cm)		6	5	5	7	6	-	-	-
	Average Sampling Time per Grab (min)		6	6	5	6	5	-	-	-
	Sample Texture	% Cobble	15	20	40	30	30	-	-	-
		% Gravel	80	75	55	65	70	-	-	-
		% Sand and Finer	5	5	5	5	0	-	-	-
		% Organic	0	0	0	0	0	-	-	-
	Macrophytes		None	None	Sparse	Sparse	Sparse	-	-	-
	Algae		None	None	None	None	None	-	-	-
	Macrophyte / Algae Type / Species		-	-	Ranunculus sp.	Ranunculus sp.	Ranunculus sp.	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Caddisfly, mayfly	Mayfly, caddisfly	Caddisfly, mayfly	Mayfly, caddisfly, Tipulidae	Dragonfly, Diptera, mayfly	Mayfly, caddisfly, leech, snail	Caddisfly, mayfly, snails	Dragonfly, mayfly, amphipod
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	12.5	18.3	16.5	16.2	-	20.3	19.5	18.7
	Dissolved Oxygen	mg/L	10.13	10.44	10.45	10.35	-	10.38	10.56	10.58
		%	109.8	111.0	107.3	105.4	-	114.8	115.1	113.1
	pH	pH units	8.54	8.46	8.33	8.20	-	8.66	8.54	8.38
	Specific Conductance	µS/cm	278.4	280.6	284.3	287.6	-	183.1	184.2	185.3

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Exposed				
			Upper Hazeltine Creek (Reach 3)				
			HAC-R3				
			HAC-R3-1	HAC-R3-2	HAC-R3-3	HAC-R3-4	HAC-R3-5
Biological Sampling		Date	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
UTM (NAD83, 10U)		Easting	597347	597476	598065	598142	598539
		Northing	5818760	5818516	5817735	5817684	5817486
Periphyton	**Productivity & Community**						
	Sample Collection Type		AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a	AFDM, Chlorophyll-a
	Surface Area Sampled (m^2)		0.002	0.002	0.002	0.002	0.002
	Water Depth (cm)		20.0	20.0	20.0	20.0	22.0
	Water Velocity (m/s)[b]		0.15	0.20	0.15	0.15	0.17
Benthic Invertebrate	**Productivity & Community**						
	Sampling Device (and size)		Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)	Hess (0.1 m^2)
	Mesh Size (µm)		250	250	250	250	250
	Grabs in Composite		3	3	3	3	3
	Mean Water Depth (cm)		21.3	22.7	20.7	20.0	21.7
	Mean Water Velocity (m/s)		0.18	0.22	0.16	0.18	0.17
	Average Depth Sampler is Pushed into Substrate (cm)		3	3	5	3	3
	Average Depth Which Substrate is Sampled (cm)		5	5	3	5	5
	Average Sampling Time per Grab (min)		5	5	5	5	5
	Sample Texture	% Cobble	80	70	90	80	75
		% Gravel	15	20	5	15	20
		% Sand and Finer	5	10	5	5	5
		% Organic	0	0	0	0	0
	Macrophytes		None	None	None	None	None
	Algae		None	Sparse	Sparse	Sparse	None
	Macrophyte / Algae Type / Species		-	Green algae	Green algae	Green and filamentous algae	-
	Tissue Chemistry						
	Taxa (Composite Samples)		-	-	-	-	-
	Taxa (Single-Taxon Samples)		-	-	-	-	-
Water Quality Measures	Temperature	°C	19.1	18.8	18.8	18.4	18.2
	Dissolved Oxygen	mg/L	9.92	9.54	9.37	9.05	9.30
		%	107.3	103.2	101.2	97.1	99.5
	pH	pH units	8.91	8.93	8.51	8.03	7.52
	Specific Conductance	µS/cm	297.7	299.3	311.2	315.4	319.2

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Reference							
			Lower Edney Creek							
			EDC-D (EDC-REF)							
			EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-6	EDC-D-7	EDC-D-8
Biological Sampling		Date	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24
UTM (NAD83, 10U)		Easting	601033	601016	601024	601027	601058	601119	601139	601169
		Northing	5816610	5816686	5816731	5816766	5816766	5816735	5816761	5816817
Periphyton	**Productivity & Community**									
	Sample Collection Type		Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		-	-	-	-	-	-	-	-
	Water Depth (cm)		-	-	-	-	-	-	-	-
	Water Velocity (m/s)[b]		-	-	-	-	-	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		-	-	-	-	-	-	-	-
	Mesh Size (µm)		-	-	-	-	-	-	-	-
	Grabs in Composite		-	-	-	-	-	-	-	-
	Mean Water Depth (cm)		-	-	-	-	-	-	-	-
	Mean Water Velocity (m/s)		-	-	-	-	-	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		-	-	-	-	-	-	-	-
	Average Depth Which Substrate is Sampled (cm)		-	-	-	-	-	-	-	-
	Average Sampling Time per Grab (min)		-	-	-	-	-	-	-	-
	Sample Texture	% Cobble	-	-	-	-	-	-	-	-
		% Gravel	-	-	-	-	-	-	-	-
		% Sand and Finer	-	-	-	-	-	-	-	-
		% Organic	-	-	-	-	-	-	-	-
	Macrophytes		-	-	-	-	-	-	-	-
	Algae		-	-	-	-	-	-	-	-
	Macrophyte / Algae Type / Species		-	-	-	-	-	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Stonefly	Stonefly, caddisfly	Stonefly, caddisfly, mayfly, worm	Stonefly, mayfly	Stonefly	Stonefly	Stonefly	Stonefly, mayfly
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	14.4	14.8	14.9	12.5	12.7	12.8	12.9	13.0
	Dissolved Oxygen	mg/L	8.31	9.15	8.47	9.41	9.52	9.56	9.27	9.80
		%	80.7	90.2	83.9	88.3	89.4	90.4	86.6	94.0
	pH	pH units	8.02	8.14	8.12	8.14	7.63	8.14	8.20	8.28
	Specific Conductance	µS/cm	342.1	358.9	338.9	352.1	345.2	344.1	343.5	341.2

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Exposed							
			Lower Edney Creek							
			E1 (EDC-EXP)							
			E1-1	E1-2	E1-3	E1-4	E1-5	E1-6	E1-7	E1-8
Biological Sampling		Date	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	7-Aug-24	7-Aug-24
UTM (NAD83, 10U)		Easting	601315	601338	601399	601436	601466	601537	601561	601586
		Northing	5817002	5817014	5817070	5817078	5817121	5817137	5817176	5817227
Periphyton	**Productivity & Community**									
	Sample Collection Type		Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		-	-	-	-	-	-	-	-
	Water Depth (cm)		-	-	-	-	-	-	-	-
	Water Velocity (m/s)[b]		-	-	-	-	-	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		-	-	-	-	-	-	-	-
	Mesh Size (µm)		-	-	-	-	-	-	-	-
	Grabs in Composite		-	-	-	-	-	-	-	-
	Mean Water Depth (cm)		-	-	-	-	-	-	-	-
	Mean Water Velocity (m/s)		-	-	-	-	-	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		-	-	-	-	-	-	-	-
	Average Depth Which Substrate is Sampled (cm)		-	-	-	-	-	-	-	-
	Average Sampling Time per Grab (min)		-	-	-	-	-	-	-	-
	Sample Texture	% Cobble	-	-	-	-	-	-	-	-
		% Gravel	-	-	-	-	-	-	-	-
		% Sand and Finer	-	-	-	-	-	-	-	-
		% Organic	-	-	-	-	-	-	-	-
	Macrophytes		-	-	-	-	-	-	-	-
	Algae		-	-	-	-	-	-	-	-
	Macrophyte / Algae Type / Species		-	-	-	-	-	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Stonefly, Tipulidae	Mayfly, stonefly	Stonefly, mayfly, Tipulidae	Tipulidae, stonefly, mayfly	Tipulidae, stonefly, mayfly, caddisfly	Stonefly, Tipulidae, mayfly	Stonefly, Tipulidae, mayfly, caddisfly	Tipulidae, dragonfly
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	13.2	14.2	14.4	14.1	14.1	14.2	20.7	20.5
	Dissolved Oxygen	mg/L	10.05	10.01	10.11	8.73	8.38	8.10	8.46	6.74
		%	95.9	97.8	98.9	84.9	81.6	78.9	94.8	75.0
	pH	pH units	8.04	8.02	7.92	7.74	7.66	7.62	8.08	8.24
	Specific Conductance	µS/cm	328.7	327.9	230.7	328.3	327.9	334.8	353.0	350.7

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.3: Supporting Measures and Locations for Biological Monitoring at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024 [a]

Station ID			Exposed							
			Lower Hazeltine Creek							
			HAC-D (HAC-R5)							
			HAC-D-1	HAC-D-2	HAC-D-3	HAC-D-4	HAC-D-5	HAC-D-6	HAC-D-7	HAC-D-8
Biological Sampling		Date	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24
UTM (NAD83, 10U)		Easting	600800	600906	601083	601189	601292	601391	601428	601517
		Northing	5817300	5817298	5817223	5817168	5817131	5817130	5817133	5817189
Periphyton	**Productivity & Community**									
	Sample Collection Type		Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry	Tissue Chemistry
	Surface Area Sampled (m^2)		-	-	-	-	-	-	-	-
	Water Depth (cm)		-	-	-	-	-	-	-	-
	Water Velocity (m/s)[b]		-	-	-	-	-	-	-	-
Benthic Invertebrate	**Productivity & Community**									
	Sampling Device (and size)		-	-	-	-	-	-	-	-
	Mesh Size (µm)		-	-	-	-	-	-	-	-
	Grabs in Composite		-	-	-	-	-	-	-	-
	Mean Water Depth (cm)		-	-	-	-	-	-	-	-
	Mean Water Velocity (m/s)		-	-	-	-	-	-	-	-
	Average Depth Sampler is Pushed into Substrate (cm)		-	-	-	-	-	-	-	-
	Average Depth Which Substrate is Sampled (cm)		-	-	-	-	-	-	-	-
	Average Sampling Time per Grab (min)		-	-	-	-	-	-	-	-
	Sample Texture	% Cobble	-	-	-	-	-	-	-	-
		% Gravel	-	-	-	-	-	-	-	-
		% Sand and Finer	-	-	-	-	-	-	-	-
		% Organic	-	-	-	-	-	-	-	-
	Macrophytes		-	-	-	-	-	-	-	-
	Algae		-	-	-	-	-	-	-	-
	Macrophyte / Algae Type / Species		-	-	-	-	-	-	-	-
	Tissue Chemistry									
	Taxa (Composite Samples)		Caddisfly, mayfly	Stonefly, mayfly	Stonefly, mayfly, Tipulidae	Mayfly	Mayfly, caddisfly	Tipulidae, mayfly	Stonefly, mayfly	Caddisfly, mayfly
	Taxa (Single-Taxon Samples)		Caddisfly	Caddisfly	Caddisfly	Caddisfly	Caddisfly (1 large Hydropsychidae)	Caddisfly	Caddisfly	Caddisfly
Water Quality Measures	Temperature	°C	18.3	17.0	15.6	14.2	21.4	21.0	20.3	19.1
	Dissolved Oxygen	mg/L	8.09	8.55	7.85	8.01	7.61	8.54	8.13	8.87
		%	85.4	87.6	79.6	79.2	85.7	95.8	91.9	96.1
	pH	pH units	8.20	8.15	7.97	7.89	8.14	8.06	8.16	8.07
	Specific Conductance	µS/cm	306.2	326.1	334.2	333.1	314.7	335.8	335.0	330.0

Notes: "-" = no data available or not applicable. µS = micrometer. cm = centimeters. m = meters. mg/L = milligrams per liter. µS/cm = micro Siemens per centimeter. m^3/s = metres cubed per second.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[b] Water flows of 0 m/s were recorded throughout the EDC-U monitoring area. Low flow at EDC-U was likely related to drought conditions in the Cariboo Region: Severe Drought (Level D2) from August 2023 through April 2024, and either Moderate Drought (Level D1) or Abnormally Dry (Level D0) from May to August 2024 (Agriculture and Agri-Foods Canada 2025). Flow conditions should be considered in data interpretation.

[c] Hazeltine Reach 1 stations 1 through 4 were relocated in 2024 due to disturbances to riffle crest substrate from electrofishing monitoring.

Table A.2.4: ***In Situ*** **Water Quality Measures Collected during Spot Water Quality Sampling at the Upper (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek, Upper (EDC-U; Reference) and Lower (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Edney Creek, and Frypan Creek (FPC-R3; Reference) Monitoring Areas, August 2024** [a]

Area			Area ID	Sampling Date	Temperature	Dissolved Oxygen		Specific Conductance	Conductivity	pH
					°C	mg/L	%	µS/cm	µS/cm	pH units
Upper Creek Areas	Reference	Frypan Creek	FPC-R3	12-Aug-24	13.1	8.20	78.6	166.7	128.5	7.48
		Edney Creek	EDC-U	12-Aug-24	13.9	3.77	34.8	150.9	118.9	7.40
	Exposed	Hazeltine Creek	HAC-R1	12-Aug-24	16.9	9.22	-	249.4	210.8	8.24
			HAC-U (HAC-R2)	12-Aug-24	19.9	-	-	288.3	260.0	8.32
			HAC-R3	12-Aug-24	19.6	-	-	289.1	259.4	8.31
Lower Creek Areas	Reference	Edney Creek	EDC-D (EDC-REF)	12-Aug-24	15.0	9.73	96.3	328.4	265.4	8.23
			E1 (EDC-EXP)	12-Aug-24	18.4	-	-	323.5	282.6	8.32
	Exposed	Hazeltine Creek	HAC-D (HAC-R5)	12-Aug-24	21.4	-	-	324.5	302.4	8.61

Notes: °C = degrees Celsius. mg/L = milligrams per litre. µS/cm = microSiemens per centimetre. "-" indicates no data available. Dissolved oxygen readings were not displayed due to water quality meter malfunction.

[a] HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table A.2.5: Substrate Size and Embeddedness Measures Associated with Biological Monitoring for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, August 2024

Cobble Number	Upper Creek Areas														
	Reference						Exposed								
	Frypan Creek			Edney Creek			Hazeltine Creek								
	FPC-R3			EDC-U			HAC-R1			HAC-U (HAC-R2)[a]			HAC-R3		
	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]
1	FPC-R3-1	3.5	-	EDC-U-1	11.1	-	HAC-R1-1	4.9	-	HAC-U-1	6.1	-	HAC-R3-1	6.1	-
2		6.4	-		9.9	-		2.7	-		3.3	-		7.0	-
3		10.1	-		8.5	-		1.9	-		4.0	-		7.3	-
4		4.5	-		6.4	-		7.7	-		8.2	-		9.5	-
5		4.7	-		6.7	-		5.3	-		2.2	-		7.5	-
6		4.3	-		5.9	-		3.5	-		4.5	-		7.3	-
7		9.4	-		7.0	-		3.2	-		5.1	-		9.2	-
8		6.8	-		7.3	-		4.7	-		4.5	-		4.2	-
9		4.8	-		7.2	-		5.3	-		4.1	-		6.5	-
10		8.5	25		7.0	25		5.8	25		3.6	25		6.5	50
11		6.3	-		6.0	-		3.3	-		6.5	-		11.5	-
12		3.2	-		5.0	-		4.7	-		10.3	-		13.7	-
13		2.8	-		4.3	-		4.3	-		4.0	-		4.4	-
14		5.8	-		3.4	-		2.8	-		3.3	-		7.2	-
15		4.1	-		5.6	-		4.5	-		4.5	-		6.5	-
16		3.6	-		5.3	-		4.2	-		1.8	-		5.4	-
17		5.5	-		5.1	-		2.3	-		3.6	-		3.9	-
18		4.1	-		5.0	-		3.2	-		5.0	-		6.2	-
19		6.9	-		4.7	-		4.8	-		3.8	-		6.5	-
20		4.0	0		4.6	50		4.2	25		6.8	50		5.4	50
Minimum		**2.8**	**0**		**3.4**	**25**		**1.9**	**25**		**1.8**	**25**		**3.9**	**50**
Maximum		**10.1**	**25**		**11.1**	**50**		**7.7**	**25**		**10.3**	**50**		**13.7**	**50**
Mean		**5.5**	**13**		**6.3**	**38**		**4.2**	**25**		**4.8**	**38**		**7.1**	**50**
Median		**4.8**	**13**		**6.0**	**38**		**4.3**	**25**		**4.3**	**38**		**6.5**	**50**
Standard Deviation		**2.1**	**-**		**1.9**	**-**		**1.4**	**-**		**2.0**	**-**		**2.4**	**-**
1	FPC-R3-2	3.1	-	EDC-U-2	6.2	-	HAC-R1-2	2.6	-	HAC-U-2	3.8	-	HAC-R3-2	6.3	-
2		5.1	-		6.5	-		3.4	-		2.4	-		9.4	-
3		3.2	-		7.7	-		3.4	-		3.9	-		7.0	-
4		6.0	-		4.5	-		5.8	-		6.7	-		5.8	-
5		3.1	-		3.4	-		2.3	-		4.1	-		4.8	-
6		6.2	-		6.0	-		2.2	-		3.7	-		3.5	-
7		8.9	-		9.5	-		4.7	-		3.9	-		5.6	-
8		4.1	-		5.9	-		2.8	-		2.6	-		5.0	-
9		3.1	-		2.0	-		2.3	-		3.4	-		5.2	-
10		5.2	0		4.5	50		5.8	75		4.8	75		3.7	25
11		3.1	-		3.0	-		5.5	-		3.8	-		3.7	-
12		3.7	-		3.3	-		3.0	-		3.7	-		7.3	-
13		8.4	-		3.8	-		4.0	-		4.5	-		3.6	-
14		8.1	-		7.3	-		3.7	-		3.3	-		7.4	-
15		4.9	-		3.1	-		3.3	-		2.3	-		6.4	-
16		7.6	-		4.2	-		2.5	-		5.6	-		5.2	-
17		2.7	-		2.5	-		4.6	-		5.5	-		5.6	-
18		3.2	-		2.0	-		3.3	-		5.7	-		3.5	-
19		2.5	-		5.8	-		3.1	-		2.6	-		5.1	-
20		4.0	0		7.0	25		6.7	50		5.8	50		4.1	100
Minimum		**2.5**	**0**		**2.0**	**25**		**2.2**	**50**		**2.3**	**50**		**3.5**	**25**
Maximum		**8.9**	**0**		**9.5**	**50**		**6.7**	**75**		**6.7**	**75**		**9.4**	**100**
Mean		**4.8**	**0**		**4.9**	**38**		**3.8**	**63**		**4.1**	**63**		**5.4**	**63**
Median		**4.1**	**0**		**4.5**	**38**		**3.4**	**63**		**3.9**	**63**		**5.2**	**63**
Standard Deviation		**2.1**	**-**		**2.1**	**-**		**1.3**	**-**		**1.2**	**-**		**1.6**	**-**
1	FPC-R3-3	8.6	-	EDC-U-3	8.0	-	HAC-R1-3	3.0	-	HAC-U-3	8.0	-	HAC-R3-3	12.1	-
2		3.2	-		6.5	-		3.2	-		6.3	-		8.2	-
3		5.1	-		7.6	-		4.5	-		4.1	-		7.4	-
4		3.6	-		5.5	-		4.3	-		3.7	-		7.6	-
5		7.7	-		7.8	-		6.8	-		4.6	-		8.4	-
6		4.6	-		6.8	-		3.0	-		3.1	-		9.3	-
7		5.4	-		7.5	-		5.8	-		2.8	-		8.0	-
8		8.4	-		6.3	-		3.5	-		3.7	-		7.2	-
9		5.9	-		8.6	-		3.8	-		3.3	-		3.5	-
10		9.9	25		7.8	50		5.5	50		5.2	25		3.9	0
11		4.6	-		8.0	-		7.0	-		5.4	-		9.2	-
12		3.7	-		7.6	-		3.1	-		5.8	-		7.5	-
13		10.7	-		6.0	-		3.0	-		2.2	-		5.1	-
14		4.2	-		4.1	-		4.2	-		3.3	-		4.6	-
15		4.5	-		6.0	-		5.0	-		5.0	-		5.1	-
16		3.2	-		4.6	-		3.5	-		4.4	-		3.3	-
17		4.7	-		4.7	-		7.3	-		4.7	-		5.2	-
18		4.1	-		4.8	-		8.5	-		6.2	-		4.1	-
19		4.4	-		4.7	-		4.5	-		4.1	-		3.7	-
20		3.2	0		4.2	25		3.0	75		5.3	50		5.2	25
Minimum		**3.2**	**0**		**4.1**	**25**		**3.0**	**50**		**2.2**	**25**		**3.3**	**0**
Maximum		**10.7**	**25**		**8.6**	**50**		**8.5**	**75**		**8.0**	**50**		**12.1**	**25**
Mean		**5.5**	**13**		**6.4**	**38**		**4.6**	**63**		**4.6**	**38**		**6.4**	**13**
Median		**4.6**	**13**		**6.4**	**38**		**4.3**	**63**		**4.5**	**38**		**6.2**	**13**
Standard Deviation		**2.3**	**-**		**1.5**	**-**		**1.7**	**-**		**1.4**	**-**		**2.4**	**-**

Note: "-" = not applicable or data not collected.

[a] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

[b] Intermediate axis length is measured perpendicular to the longest axis.

[c] Embeddedness measured for every tenth rock.

Table A.2.5: Substrate Size and Embeddedness Measures Associated with Biological Monitoring for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, August 2024

Cobble Number	Upper Creek Areas														
	Reference						Exposed								
	Frypan Creek			Edney Creek			Hazeltine Creek								
	FPC-R3			EDC-U			HAC-R1			HAC-U (HAC-R2)[a]			HAC-R3		
	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]	Station	Intermediate Axis Length (cm) [b]	Embeddedness (%) [c]
1	FPC-R3-4	5.1	-	EDC-U-4	7.3	-	HAC-R1-4	6.2	-	HAC-U-4	8.2	-	HAC-R3-4	15.5	-
2		4.9	-		7.2	-		2.6	-		8.7	-		8.2	-
3		4.3	-		7.1	-		6.0	-		5.8	-		5.6	-
4		3.2	-		10.4	-		6.8	-		5.1	-		5.5	-
5		4.1	-		5.4	-		5.5	-		4.4	-		4.7	-
6		11.7	-		4.9	-		3.7	-		5.2	-		5.3	-
7		2.1	-		9.9	-		6.0	-		5.1	-		11.1	-
8		2.7	-		6.0	-		5.5	-		6.6	-		4.4	-
9		3.7	-		4.6	-		15.7	-		7.4	-		4.8	-
10		2.1	0		5.3	75		3.7	75		7.1	50		3.5	50
11		7.4	-		6.0	-		8.7	-		4.8	-		5.0	-
12		3.5	-		5.0	-		4.8	-		3.9	-		3.6	-
13		4.1	-		6.3	-		4.0	-		5.1	-		5.3	-
14		7.6	-		5.5	-		9.5	-		6.8	-		3.8	-
15		7.4	-		4.9	-		3.2	-		6.8	-		4.9	-
16		6.9	-		5.9	-		2.3	-		4.7	-		4.6	-
17		4.2	-		6.0	-		3.3	-		6.7	-		4.0	-
18		3.3	-		5.0	-		3.7	-		4.6	-		2.7	-
19		2.9	-		5.7	-		4.0	-		4.6	-		6.0	-
20		2.9	0		4.5	25		4.0	50		5.0	75		3.6	25
Minimum		**2.1**	**0**		**4.5**	**25**		**2.3**	**50**		**3.9**	**50**		**2.7**	**25**
Maximum		**11.7**	**0**		**10.4**	**75**		**15.7**	**75**		**8.7**	**75**		**15.5**	**50**
Mean		**4.7**	**0**		**6.1**	**50**		**5.5**	**63**		**5.8**	**63**		**5.6**	**38**
Median		**4.1**	**0**		**5.8**	**50**		**4.4**	**63**		**5.2**	**63**		**4.9**	**38**
Standard Deviation		**2.4**	**-**		**1.6**	**-**		**3.1**	**-**		**1.4**	**-**		**3.0**	**-**
1	FPC-R3-5	3.1	-	EDC-U-5	8.4	-	HAC-R1-5	6.5	-	HAC-U-5	8.1	-	HAC-R3-5	10.5	-
2		3.4	-		9.5	-		5.0	-		6.5	-		3.2	-
3		5.2	-		8.6	-		3.8	-		5.0	-		3.5	-
4		2.7	-		3.6	-		6.2	-		3.7	-		3.7	-
5		2.3	-		7.2	-		4.0	-		6.0	-		5.4	-
6		2.2	-		6.1	-		6.0	-		6.5	-		4.5	-
7		2.4	-		4.5	-		4.8	-		5.7	-		15.9	-
8		6.4	-		5.4	-		5.5	-		5.3	-		6.5	-
9		8.5	-		6.2	-		3.5	-		6.2	-		5.3	-
10		3.1	25		5.3	50		5.0	75		5.2	25		6.4	0
11		12.8	-		6.9	-		5.5	-		6.7	-		5.5	-
12		2.7	-		5.6	-		6.5	-		4.9	-		4.7	-
13		5.8	-		5.5	-		11.5	-		5.6	-		3.8	-
14		5.9	-		5.6	-		5.5	-		5.1	-		2.2	-
15		2.1	-		4.7	-		5.5	-		4.7	-		4.0	-
16		5.0	-		5.2	-		11.3	-		5.9	-		3.3	-
17		7.5	-		5.3	-		7.5	-		5.7	-		4.5	-
18		2.1	-		4.0	-		4.8	-		4.6	-		4.5	-
19		3.8	-		2.9	-		3.5	-		4.3	-		2.9	-
20		5.7	0		4.8	25		3.8	25		3.7	50		1.8	0
Minimum		**2.1**	**0**		**2.9**	**25**		**3.5**	**25**		**3.7**	**25**		**1.8**	**0**
Maximum		**12.8**	**25**		**9.5**	**50**		**11.5**	**75**		**8.1**	**50**		**15.9**	**0**
Mean		**4.6**	**13**		**5.8**	**38**		**5.8**	**50**		**5.5**	**38**		**5.1**	**0**
Median		**3.6**	**13**		**5.5**	**38**		**5.5**	**50**		**5.5**	**38**		**4.5**	**0**
Standard Deviation		**2.7**	**-**		**1.7**	**-**		**2.2**	**-**		**1.1**	**-**		**3.2**	**-**

Note: "-" = not applicable or data not collected.

[a] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

[b] Intermediate axis length is measured perpendicular to the longest axis.

[c] Embeddedness measured for every tenth rock.

APPENDIX B
DATA QUALITY REVIEW
(DQR)

APPENDIX B DATA QUALITY REVIEW

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B1 INTRODUCTION

B1.1 Background

A variety of factors can influence the physical, chemical, and biological measurements made in an environmental study and thus affect the accuracy and/or precision of the data. Depending on their magnitude, inaccuracy and/or imprecision have the potential to affect the reliability of conclusions made from data; therefore, it is important to ensure that programs incorporate appropriate steps to control non-natural sources of data variability (i.e., minimize variability that does not reflect authentic spatial and temporal variability in the environment) and thus assure the quality of the data. Data quality as a concept is meaningful only when it relates to the intended use of the data. That is, one must know the context in which the data will be interpreted in order to establish a relevant basis for judging whether or not the data set is adequate. A data quality review (DQR) involves the comparison of field and laboratory measurement performance to Data Quality Objectives (DQOs) established for a particular study, such as evaluation of Laboratory Reporting Limits (LRL), blank sample data, data precision (based on field and laboratory duplicate samples), and data accuracy (based on matrix spike recoveries and/or analysis of standards or certified reference materials). Trusted analytical laboratories certified by the Canadian Association for Laboratory Accreditation (CALA) or the National Environmental Laboratory Accreditation Program (NELAP), with a rigorous internal quality assurance program, were selected to ensure the highest possible data quality. Data quality objectives were established a priori to reflect reasonable and achievable performance expectations. Programs involving many samples and analytes may sometimes yield results that exceed DQOs, which is particularly true for multi-element scans, as the analytical conditions are not necessarily optimal for every element included in the scan. Generally, scan results may be considered acceptable if no more than 20% of the parameters fail to meet DQOs. Overall, the intent of a DQR is not to reject any measurement that did not meet a DQO, but to ensure that any questionable data received more scrutiny to determine what effect, if any, this had on interpretation of results within the context of the project.

B1.2 Quality Control Samples

A DQR was conducted on all laboratory data collected as part of the Mount Polley Mine Comprehensive Environmental Monitoring Program (CEMP) 2024 and involves the examination of analytical results associated with several types of Quality Control (QC) samples collected (or prepared) in the field and laboratory. General QC samples collected for this project, and a description of each, include the following:

- **Blanks** are samples of de-ionized water and/or appropriate reagent(s) that are handled and analyzed in the same way as regular samples. These samples will reflect any contamination of samples occurring in the field (in the case of field or trip blanks) or in the laboratory (in the case of laboratory or method blanks). Analyte concentrations should be non-detectable.
- **Laboratory Duplicates** are replicate sub-samples created in the laboratory from randomly selected field samples which are sub-sampled and then analyzed independently using identical analytical methods. The laboratory duplicate sample results reflect any variability introduced during laboratory sample handling and analysis and thus provide a measure of laboratory precision.
- **Field Duplicates** are samples collected from a randomly selected field station that are homogenized to the extent possible, split and analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the laboratory.
- **Spike Recovery Samples** are created in the laboratory by adding a known amount/concentration of a given analyte (or mixture of analytes) to a randomly selected test sample previously divided to create two sub-samples. The spiked and regular sub-samples are then analyzed in an identical manner. The spike recovery represents the difference between the measured spike amount (total amount in the spiked sample minus the amount in the original sample) relative to the known spike amount (as a percentage). Two types of spike recovery samples are commonly analyzed. Spiked blanks (or blank spikes) are created by adding a known concentration of analytes to an uncontaminated blank (e.g. resin gel, distilled water) whereas matrix spikes (MS) are created using field-collected samples. The analysis of spiked samples provides an indication of the accuracy of analytical results.
- **Certified Reference Materials (CRM) or Reference Materials (RM)** are commercially prepared (or commercially homogenized) samples containing known chemical concentrations that are processed and analyzed along with batches of environmental samples. The sample results are then compared to target results to provide a measure of analytical accuracy. The results are reported as the percent of the known concentration that was recovered in the analysis.
- **Laboratory Control Samples** are created in the laboratory to have a known analyte concentration in a matrix free of interferences, such as deionized water or reference sand. The sample results are compared to the target results to confirm that the analytical method is accurate in a purified reference sample. The results are reported as the percent of the known concentration that was recovered in the analysis.

- **Reference Toxicant Tests** are toxicity tests run concurrent to the sediment toxicity test where a reference toxicant with laboratory-developed limits are used. The results of the reference toxicant testing should fall within the developed limits. This testing ensures that internal test systems are in check and that the sensitivity of the test organisms are within an expected range.

- **Laboratory Sorting Duplicates** are randomly selected grabs of the initially sorted community material from benthic invertebrate, zooplankton, or phytoplankton samples. These samples are recounted to determine the number (benthic invertebrates) or density (zooplankton, phytoplankton, and periphyton) of organisms that were not recovered during the initial sort. In order to reduce bias, the recount was conducted by an analyst uninvolved in the initial sample processing. This check was performed on 10% of samples and measures laboratory accuracy through assessment of recovery (sorting) efficiency and quantifies any under-estimation of organism enumeration.

- **Taxonomic Quality Control Samples** were measured on 10% of community (benthic invertebrate, plankton, and periphyton) samples, which were assessed by the laboratory through an internal quality control audit. A blind re-enumeration and re-identification of random samples is performed by an analyst uninvolved in the original sample processing. This assessment quantifies taxonomic misidentification among laboratory analysts and ensures accurate organism identities are reported.

- **Laboratory Subsamples** are community samples prepared by the laboratory to ensure that the fraction of the total sample examined was an accurate representation of the total number of organisms. By comparing the amount recovered between at least two sub-samples, one can assess the analytical precision. In addition, comparisons of the sub-samples from the whole community sample allows for an evaluation of sub-sampling accuracy.

B2 WATER QUALITY

B2.1 Laboratory Reporting Limits

The analytical reports for water quality from ALS Environmental (ALS; VA24B4763, VA24B8050, VA24B8516, VA24C0557, VA24C1387, VA24C1718, VA24C2066, and VA24C2329; Appendix G) were examined to determine which analytes had results below the LRL. The LRLs for water quality analytes were assessed relative to existing British Columbia water quality guidelines (BCWQG; BCMOWLRS 2024, 2025). For analytes with results <LRL, all reported LRLs were lower than applicable BCWQG guidelines (Appendix Table B.1).[1] Overall, the achieved LRLs were appropriate for this study.

B2.2 Laboratory and Field Blanks

Method blank (MB) samples were analyzed in the ALS laboratory reports (VA24B4763, VA24B8050, VA24B8516, VA24C0557, VA24C1387, VA24C1718, VA24C2066, and VA24C2329; Appendix G). Of the 638 reported MB results, only one result for dissolved sodium (VA24C2329; Appendix G) exceeded the laboratory DQO and had detectable concentrations. However, results for these analytes were considered reliable by the laboratory, as they were greater than five-times the detected MB result. As a relatively low number of MBs exceeded the laboratory DQO (0.157%), and the MB results were not likely to impact the reliability of the results, these laboratory flags had a negligible impact on data reliability.

One field blank (VA24B8516; Appendix G) and one trip blank (VA24B8050; Appendix G) sample were submitted to ALS for water quality analyses to assess the potential for field sampling and shipping/transport contamination. Field and trip blanks were subject to the same laboratory DQOs as were used for MBs (i.e., concentrations should be <LRL). All analytes in the field and trip blank samples were below detection, indicating no discernible field sampling or shipping/transportation contamination.

B2.3 Data Precision

A total of 15 laboratory duplicate samples were used to evaluate precision within the ALS laboratory reports (VA24B4763, VA24B8050, VA24B8516, VA24C0557, VA24C1387, VA24C1718, VA24C2066, and VA24C2329; Appendix G). All 634 individual analyte results

[1] Tables only include constituents with at least one result below the LRL or where the LRL was above guidelines. This applies to all other LRL tables for this report.

Table B.1: Laboratory Reporting Limit (LRL) Evaluation for Water Quality Results Relative to BCWQG, MPMC CEMP, 2024

Constituent	Units	British Columbia Water Quality Guidelines[a]		Range of LRLs	No. Sample Results < LRL
		Long-term	Short-term		
Anions, Organics, Nutrients, and Physical Properties					
Total Suspended Solids	mg/L	-	-	1.00 to 1.10	12 (34%)
Ammonia, Total (as N)[b]	mg/L	0.131	0.681	0.005	12 (34%)
Chloride (Cl)	mg/L	150	600	0.5	22 (63%)
Nitrate (as N)	mg/L	3.00	32.8	0.005	10 (29%)
Nitrite (as N)	mg/L	0.0200	0.0600	0.001	35 (100%)
Orthophosphate	mg/L	-	-	0.001	25 (71%)
Phosphorus (P)-Dissolved	mg/L	-	-	0.002	11 (31%)
Phosphorus (P)-Total	mg/L	-	-	0.002	5 (14%)
Sulphate	mg/L	218	-	0.3	1 (3%)
Total Metals					
Antimony	mg/L	0.0740	0.250	0.0001	32 (91%)
Beryllium	mg/L	0.000130	-	0.0001	35 (100%)
Bismuth	mg/L	-	-	0.00005	35 (100%)
Boron	mg/L	1.20	-	0.01	22 (63%)
Cadmium	mg/L	-	-	0.000005 to 0.00001	19 (54%)
Chromium	mg/L	0.00100	-	0.0005 to 0.001	32 (91%)
Cobalt	mg/L	0.00400	0.110	0.0001	32 (91%)
Iron	mg/L	-	1.00	0.03	14 (40%)
Lead	mg/L	0.00448	0.0300	0.00005	29 (83%)
Lithium	mg/L	-	-	0.001	32 (91%)
Nickel	mg/L	-	-	0.0005	27 (77%)
Silver	mg/L	0.0000500	0.000100	0.00001	32 (91%)
Tin	mg/L	-	-	0.0001	35 (100%)
Titanium	mg/L	-	-	0.01	35 (100%)
Vanadium	mg/L	-	-	0.0005	22 (63%)
Zinc	mg/L	-	-	0.003	27 (77%)
Dissolved Metals					
Antimony	mg/L	-	-	0.0001	33 (94%)
Arsenic	mg/L	-	-	0.0001	2 (6%)
Beryllium	mg/L	-	-	0.0001	35 (100%)
Bismuth	mg/L	-	-	0.00005	35 (100%)
Boron	mg/L	-	-	0.01	22 (63%)
Cadmium[c]	mg/L	0.000119	0.000262	0.000005 to 0.0000150	23 (66%)
Chromium	mg/L	-	-	0.0005	33 (94%)
Cobalt	mg/L	-	-	0.0001	32 (91%)
Copper	mg/L	0.00140	0.00140	0.0005	5 (14%)
Iron	mg/L	-	0.350	0.03	31 (89%)
Lead[c]	mg/L	-	-	0.00005	35 (100%)
Lithium	mg/L	-	-	0.001	32 (91%)
Nickel	mg/L	0.000800	0.0186	0.0005	29 (83%)
Silver	mg/L	-	-	0.00001	35 (100%)
Thallium	mg/L	-	-	0.00001	35 (100%)
Tin	mg/L	-	-	0.0001	35 (100%)
Titanium	mg/L	-	-	0.01	35 (100%)
Vanadium	mg/L	-	-	0.0005	22 (63%)
Zinc[c]	mg/L	0.00330	0.0240	0.003	29 (83%)

Notes: LRL = Laboratory Reporting Limit. '-' indicates no applicable guideline exists. Only constituents with one or more result <LRL or LRLs above applicable guidelines are displayed. The total number of samples assessed (n) was 35 including 5 duplicate samples.

[a] British Columbia Water Quality Guidelines (BCWQG; BCMOWLRS 2024, 2025).

[b] Ammonia guidelines used tables in BCMOWLRS 2025, based on most conservative guideline (Temperature = 6, pH = 9).

[c] Hardness - Hardness-based guidelines calculated using the minimum hardness observed for all samples (45.6 mg/L)

met the laboratory DQO, and therefore laboratory analytical precision was considered acceptable for this study.

All measurements were within the laboratory DQO, indicating that the laboratory analytical precision can be considered excellent.

Field sampling precision looks at relative percent difference (RPD), calculated as follows:

$$RPD = \frac{|R1 - R2|}{(|R1 + R2|/2)} * 100$$

Where R1 is the value of the original ("parent") sample and R2 is the value of the duplicate sample, with the absolute difference and sum of the two samples used. RPDs cannot be calculated if both values are below the LRL. If the original and duplicate sample have the same value, then the RPD is 0%.

There are two applicable DQOs for field duplicates:

1. Each RPD comparison between the original and duplicate result should be ≤ 30%; and,
2. Within each original and duplicate pairing (i.e., each duplicate pair), fewer than 20% of the total comparisons should be above the DQO as outlined above.

Five field duplicate samples were collected to assess water quality field sampling precision (Appendix Table B.2). Several RPDs were not calculated as both analyte concentrations were below the LRL. Of the 242 RPDs that were calculated, only 13 results did not meet the DQO of 30%, including one result for each of dissolved selenium, total copper, total iron (primary analytes of interest), three results for dissolved cadmium, and one result for each of total cadmium and dissolved manganese (secondary analytes of interest; Appendix Table B.2). Of the 13 results, three RPDs were above 30% due to one result in the pair being below the LRL, where greater variability is expected. Additionally, the RPDs for these analytes were not consistently above the DQO across duplicate pairs (Appendix Table B.2). High RPDs could be a result contamination (field or laboratory; see section B2.6). Overall, as only 5.37% of all water quality duplicate comparisons did not meet the DQO, field precision and reproducibility of these samples were considered acceptable for this study.

B2.4 Data Accuracy

Data accuracy was evaluated based on results of Laboratory Control Samples (LCS) and Matrix Spike (MS) samples within the ALS laboratory reports (VA24B4763, VA24B8050, VA24B8516, VA24C0557, VA24C1387, VA24C1718, VA24C2066, and VA24C2329; Appendix G). All 645 individual LCS analyte results met the laboratory DQO. Out of 587

Table B.2: Field Duplicate Results for Water Quality, MPMC CEMP, 2024

Analyte	Unit	MP_EDC-U_WS-1_2024-08	MP_EDC-U_WS-1X_2024-08	RPD (%)	MP_QUL-ZOO-1_WS-1_2024-06	MP_QUL-ZOO-1_WS-1X_2024-06	RPD (%)	MP_POL-P2_WS-1_2024-07	MP_POL-P2_WS-1X_2024-07	RPD (%)
Anions, Organics, Nutrients, and Physical Properties										
Alkalinity, Total (as $CaCO_3$)	mg/L	76	76.1	0.100	48.9	49.4	1.02	91.4	91.5	0.109
Conductivity	µS/cm	144	144	0	111	110	0.905	240	241	0.416
Hardness (as $CaCO_3$)	mg/L	75.7	68.2	10.4	50.9	51.2	0.588	120	119	0.837
Hardness - Dissolved (as $CaCO_3$)	mg/L	76.7	74.6	2.80	50.4	50.9	0.987	107	108	0.930
Total Suspended Solids	mg/L	1.5	1.4	6.90	1.9	1.8	5.41	1.3	1.2	8.00
Turbidity, Lab	NTU	1.47	1.5	2.00	0.96	1.04	8.00	0.76	0.82	7.59
pH, Lab	pH	8.04	8.02	0.200	7.97	7.98	0.125	7.94	7.99	0.628
Ammonia, Total (as N)	mg/L	0.014	0.0131	6.60	<0.005	<0.005	-	<0.005	0.0053	5.83
Chloride (Cl)	mg/L	<0.50	<0.5	-	<0.5	<0.5	-	0.82	0.82	0
Fluoride	mg/L	0.034	0.035	2.90	0.034	0.035	2.90	0.076	0.076	0
Nitrate (as N)	mg/L	0.0344	0.0356	3.40	0.1	0.1	0	<0.005	<0.005	-
Nitrite (as N)	mg/L	<0.0010	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Orthophosphate	mg/L	<0.0010	0.001	0	<0.001	<0.001	-	<0.001	<0.001	-
Phosphorus (P)-Dissolved	mg/L	0.0074	0.0074	0	<0.002	<0.002	-	0.0062	0.0056	10.2
Phosphorus (P)-Total	mg/L	0.0168	0.0165	1.80	<0.002	0.0022	9.52	0.0125	0.0093	29.4
Sulphate	mg/L	0.71	0.77	8.10	6.09	6.12	0.491	33.7	33.6	0.297
Dissolved Organic Carbon	mg/L	14.9	14.6	2.00	2.54	2.81	10.1	7.38	7	5.29
Total Dissolved Solids	mg/L	122	120	1.70	65	75	14.3	186	181	2.72
Total Metals										
Aluminum	mg/L	0.0704	0.0873	21.4	0.0324	0.0353	8.57	0.019	0.0226	17.3
Antimony	mg/L	<0.00010	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic	mg/L	0.00079	0.00079	0	0.00016	0.00015	6.45	0.00055	0.00056	1.80
Barium	mg/L	0.0146	0.0147	0.700	0.00581	0.00585	0.686	0.0108	0.0106	1.87
Beryllium	mg/L	<0.000100	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Bismuth	mg/L	<0.000050	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron	mg/L	<0.010	<0.01	-	<0.01	<0.01	-	0.021	0.021	0
Cadmium	mg/L	0.0000172	0.0000135	24.1	<0.000005	<0.000005	-	0.0000076	0.0000123	47.2
Calcium	mg/L	19.4	17.3	11.4	16.8	16.9	0.593	39	38.5	1.29
Chromium	mg/L	0.00062	0.00067	7.80	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt	mg/L	0.00028	0.00031	10.2	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper	mg/L	0.00215	0.00243	12.2	0.00099	0.00103	3.96	0.00399	0.00427	6.78
Iron	mg/L	0.289	0.326	12.0	0.044	0.05	12.8	<0.03	<0.03	-
Lead	mg/L	<0.000050	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium	mg/L	<0.0010	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium	mg/L	6.61	6.06	8.70	2.18	2.18	0	5.41	5.61	3.63
Manganese	mg/L	0.198	0.192	3.10	0.00736	0.00766	3.99	0.00433	0.0046	6.05
Molybdenum	mg/L	0.000362	0.000378	4.30	0.000411	0.000425	3.35	0.00624	0.00631	1.12
Nickel	mg/L	0.0015	0.00151	0.700	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Potassium	mg/L	0.868	0.853	1.70	0.537	0.54	0.557	0.97	0.993	2.34
Selenium	mg/L	0.000151	0.000125	18.8	0.000129	0.000124	3.95	0.000457	0.000451	1.32
Silicon	mg/L	3.87	4.01	3.60	1.7	1.79	5.16	3.16	3.2	1.26
Silver	mg/L	<0.000010	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium	mg/L	3.07	2.92	5.00	1.02	1.03	0.976	6.98	7.16	2.55
Strontium	mg/L	0.123	0.122	0.800	0.138	0.136	1.46	0.246	0.258	4.76
Thallium	mg/L	<0.000010	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Tin	mg/L	<0.00010	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium	mg/L	<0.0100	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Uranium	mg/L	0.00005	0.000053	5.80	0.000158	0.00016	1.26	0.000188	0.000192	2.11
Vanadium	mg/L	0.00084	0.00084	0	<0.0005	<0.0005	-	0.0014	0.00146	4.20
Zinc	mg/L	0.0134	0.0118	12.7	<0.003	<0.003	-	<0.003	<0.003	-
Dissolved Metals										
Aluminum	mg/L	0.0332	0.032	3.70	0.0088	0.0079	10.8	0.0033	0.0034	2.99
Antimony	mg/L	<0.00010	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic	mg/L	0.00072	0.00069	4.30	<0.0001	0.00011	9.52	0.00054	0.00052	3.77
Barium	mg/L	0.0144	0.0141	2.10	0.00547	0.0056	2.35	0.00937	0.00973	3.77
Beryllium	mg/L	<0.000100	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Bismuth	mg/L	<0.000050	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron	mg/L	<0.010	<0.01	-	<0.01	<0.01	-	0.022	0.022	0
Cadmium	mg/L	0.0000156	0.0000105	39.1	0.0000099	0.0000059	50.6	<0.000015	<0.000015	-
Calcium	mg/L	19.6	19.1	2.60	16.8	17	1.18	35.1	35.4	0.851
Chromium	mg/L	0.00052	0.0005	3.90	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt	mg/L	0.00023	0.00024	4.30	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper	mg/L	0.00194	0.00193	0.500	0.00064	0.00064	0	0.0033	0.0034	2.99
Iron	mg/L	0.202	0.199	1.50	<0.03	<0.03	-	<0.03	<0.03	-
Lead	mg/L	<0.000050	<0.00005	-	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium	mg/L	<0.0010	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium	mg/L	6.74	6.53	3.20	2.04	2.05	0.489	4.71	4.74	0.635
Manganese	mg/L	0.187	0.183	2.20	0.00118	0.00103	13.6	0.00178	0.00176	1.13
Molybdenum	mg/L	0.00033	0.000355	7.30	0.000424	0.000373	12.8	0.00621	0.00629	1.28
Nickel	mg/L	0.00143	0.00134	6.50	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Potassium	mg/L	0.88	0.863	2.00	0.52	0.522	0.384	1.02	1.03	0.976
Selenium	mg/L	0.000159	0.000106	40.0	0.000124	0.000138	10.7	0.000604	0.00056	7.56
Silicon	mg/L	3.71	3.79	2.10	1.67	1.67	0	2.91	2.87	1.38
Silver	mg/L	<0.000010	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium	mg/L	3.03	2.96	2.30	0.965	0.979	1.44	6.52	6.6	1.22
Strontium	mg/L	0.125	0.119	4.90	0.127	0.128	0.784	0.244	0.244	0
Thallium	mg/L	<0.000010	<0.00001	-	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Tin	mg/L	<0.00010	<0.0001	-	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium	mg/L	<0.0100	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Uranium	mg/L	0.000043	0.000047	8.90	0.000161	0.000157	2.52	0.000196	0.00019	3.11
Vanadium	mg/L	0.00064	0.00063	1.60	<0.0005	<0.0005	-	0.00126	0.00127	0.791
Zinc	mg/L	0.0084	0.0081	3.60	<0.003	<0.003	-	<0.003	<0.003	-

Value did not meet the data quality objective of≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit.

Table B.2: Field Duplicate Results for Water Quality, MPMC CEMP, 2024

Analyte	Unit	MP_QUL-LREF1_WS-1_2024-08	MP_QUL-LREF1_WS-1X_2024-08	RPD (%)	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	RPD (%)
Anions, Organics, Nutrients, and Physical Properties							
Alkalinity, Total (as $CaCO_3$)	mg/L	47.5	46.4	2.34	48.1	47.9	0.417
Conductivity	µS/cm	107	106	0.939	108	108	0
Hardness (as $CaCO_3$)	mg/L	48.6	48.2	0.826	47.3	48.1	1.68
Hardness - Dissolved (as $CaCO_3$)	mg/L	46	45.3	1.53	49.1	50.5	2.81
Total Suspended Solids	mg/L	1.2	<1	18.2	<1	1.5	40.0
Turbidity, Lab	NTU	0.4	0.43	7.23	0.6	1.09	58.0
pH, Lab	pH	7.98	7.98	0	7.97	7.99	0.251
Ammonia, Total (as N)	mg/L	<0.005	<0.005	-	0.0077	0.0071	8.11
Chloride (Cl)	mg/L	<0.5	<0.5	-	<0.5	<0.5	-
Fluoride	mg/L	0.032	0.033	3.08	0.035	0.032	8.96
Nitrate (as N)	mg/L	0.0079	0.0076	3.87	0.0411	0.0413	0.485
Nitrite (as N)	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Orthophosphate	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Phosphorus (P)-Dissolved	mg/L	0.0021	0.0027	25.0	<0.002	0.0026	26.1
Phosphorus (P)-Total	mg/L	0.0051	0.004	24.2	0.0033	0.0034	2.99
Sulphate	mg/L	6.23	6.2	0.483	6.15	6.12	0.489
Dissolved Organic Carbon	mg/L	2.3	2.19	4.90	2.4	2.32	3.39
Total Dissolved Solids	mg/L	64	65	1.55	70	74	5.56
Total Metals							
Aluminum	mg/L	0.023	0.0241	4.67	0.0676	0.0286	81.1
Antimony	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic	mg/L	0.0002	0.00023	13.9	0.00016	0.00013	20.7
Barium	mg/L	0.0067	0.00682	1.78	0.00688	0.00554	21.6
Beryllium	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Bismuth	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Cadmium	mg/L	0.0000053	<0.000005	5.83	0.0000134	0.0000099	30.0
Calcium	mg/L	15.8	15.5	1.92	15.6	16	2.53
Chromium	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper	mg/L	0.00063	0.00063	0	0.00447	0.00209	72.6
Iron	mg/L	0.055	0.052	5.61	0.063	<0.03	71.0
Lead	mg/L	<0.00005	<0.00005	-	0.000073	<0.00005	37.4
Lithium	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium	mg/L	2.21	2.3	3.99	2.03	1.97	3.00
Manganese	mg/L	0.00429	0.00428	0.233	0.0029	0.002	36.7
Molybdenum	mg/L	0.000527	0.000511	3.08	0.00036	0.000346	3.97
Nickel	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Potassium	mg/L	0.449	0.473	5.21	0.515	0.497	3.56
Selenium	mg/L	0.000195	0.000196	0.512	0.000108	0.000119	9.69
Silicon	mg/L	1.81	1.89	4.32	1.59	1.46	8.52
Silver	mg/L	<0.00001	<0.00001	-	<0.00001	0.00001	0
Sodium	mg/L	1.03	1.05	1.92	1.04	0.979	6.04
Strontium	mg/L	0.111	0.111	0	0.126	0.131	3.89
Thallium	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Tin	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Uranium	mg/L	0.000136	0.000133	2.23	0.00016	0.000166	3.68
Vanadium	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc	mg/L	<0.003	<0.003	-	0.0035	<0.003	15.4
Dissolved Metals							
Aluminum	mg/L	0.0109	0.0078	33.2	0.0087	0.0106	19.7
Antimony	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Arsenic	mg/L	0.00018	0.00018	0	0.00011	0.00011	0
Barium	mg/L	0.00651	0.00637	2.17	0.00552	0.00577	4.43
Beryllium	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Bismuth	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Boron	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Cadmium	mg/L	<0.000005	<0.000005	-	0.0000137	0.0000087	44.6
Calcium	mg/L	14.7	14.5	1.37	16.3	16.9	3.61
Chromium	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Cobalt	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Copper	mg/L	0.00059	0.00056	5.22	0.00121	0.00116	4.22
Iron	mg/L	<0.03	<0.03	-	<0.03	<0.03	-
Lead	mg/L	<0.00005	<0.00005	-	<0.00005	<0.00005	-
Lithium	mg/L	<0.001	<0.001	-	<0.001	<0.001	-
Magnesium	mg/L	2.26	2.22	1.79	2.03	2.01	0.99
Manganese	mg/L	0.00068	0.0006	12.5	0.00072	0.00072	0
Molybdenum	mg/L	0.000491	0.000494	0.609	0.000349	0.000357	2.27
Nickel	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Potassium	mg/L	0.534	0.51	4.60	0.53	0.514	3.07
Selenium	mg/L	0.000138	0.000147	6.32	0.000129	0.000101	24.4
Silicon	mg/L	1.69	1.68	0.593	1.46	1.46	0
Silver	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Sodium	mg/L	1.12	1.1	1.80	1.04	0.956	8.42
Strontium	mg/L	0.106	0.108	1.87	0.133	0.136	2.23
Thallium	mg/L	<0.00001	<0.00001	-	<0.00001	<0.00001	-
Tin	mg/L	<0.0001	<0.0001	-	<0.0001	<0.0001	-
Titanium	mg/L	<0.01	<0.01	-	<0.01	<0.01	-
Uranium	mg/L	0.000133	0.000133	0	0.000149	0.000148	0.673
Vanadium	mg/L	<0.0005	<0.0005	-	<0.0005	<0.0005	-
Zinc	mg/L	0.00310	<0.003	3.28	<0.003	<0.003	-

Value did not meet the data quality objective of≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit.

individual MS analyte results, only one individual MS result for dissolved silver could not be reliably calculated due to instability in the sample matrix, although the reported result was below detection and was considered reliable (VA24C1387; Appendix G). As all LCS results met the DQO and only 0.17% of MS results did not meet the DQO, the accuracy achieved by the laboratory was considered acceptable for this study.

B2.5 Hold Times

The recommended hold times were exceeded for pH (15 minute hold time) in all samples and for turbidity (three days) in 11 samples (see Appendix G). However, *in situ* pH measures were used for data interpretation and turbidity values were not included in data analysis. As such, hold time exceedances for these laboratory results had no impact on data interpretability. Additional hold time exceedances were observed for dissolved orthophosphate, nitrite, and nitrate (recommended hold times of three days [36 hour hold time]). Dissolved orthophosphate was exceeded by two days in 14 samples (see laboratory reports VA24C1387, VA24C1718, VA24C2066; Appendix G). Recommended hold times for nitrite and nitrate were each exceeded by one to two days in 16 samples (see laboratory reports (VA24C4763, VA24C1387, VA24C1718, VA24C2066; Appendix G). These hold time exceedances were a result of multiple factors, including short hold times, remote work location, and delays in the sample processing/ analysis at the receiving laboratory due to workload. Analyte results with hold time exceedances were similar to those samples without hold time exceedances in 2024 and were within the range of historic results, suggesting little if any impact of the hold time exceedances on analyte results.

B2.6 Other Concerns

Results for several analytes showed dissolved concentrations that were greater than the corresponding total concentrations in some samples. Differences were less than two-times the concentration of total analytes in most cases, except for one sample where dissolved cadmium was two times greater than the total concentration (VA24B4763; Appendix G), and one sample where dissolved selenium was one and a half times greater than the total concentration (VA24C0557; Appendix G). All results were verified by repeat analysis. A higher concentration of dissolved metals compared to total could be a result of contamination (field or laboratory).

B2.7 Data Quality Statement

Water quality data collected for the 2024 CEMP were considered acceptable for this study as characterized by good detectability, appropriate LRLs, negligible analyte concentrations in MBs, good laboratory precision and accuracy, and few hold time exceedances. One or more

results for primary analytes (dissolved selenium, total copper, total iron) and secondary analytes (dissolved cadmium, total cadmium, and dissolved manganese) did not meet the DQO in field duplicate samples. For a subset of samples, hold time exceedances occurred for orthophosphate, nitrate, and nitrite, but results were within the range of similar samples, suggesting that hold time exceedances had little, if any impact on analyte results. Therefore, the 2024 water quality data can be used with a good level of confidence for interpretation.

B3 SEDIMENT QUALITY

B3.1 Laboratory Reporting Limits

The analytical ALS laboratory reports for sediment quality (VA24C0980, VA24C2399, and VA24C2503; Appendix G) were examined to determine which analytes had one or more results below the LRL. The range of reported LRLs for these analytes were assessed relative to applicable British Columbia Working Sediment Quality Guidelines (BCWSQG; BCMOWLRS 2024, 2025; Appendix Table B.3). Total nitrogen, total sulphur, bismuth and boron, and thallium all had at least one result below the LRL. For these analytes, 5% to 21% of samples were below the LRL; however, these analytes do not have associated guidelines (i.e., all analytes with associated guidelines were detectable above the LRL; Appendix Table B.3). Therefore, the achieved LRLs were appropriate for this study.

B3.2 Laboratory Blanks

Laboratory MB samples were analyzed in the ALS laboratory reports (VA24C0980, VA24C2399, and VA24C2503; Appendix G). All 186 reported MB results met the laboratory DQO, indicating no inadvertent contamination within the laboratory.

B3.3 Data Precision

A total of 12 laboratory duplicate samples were used to evaluate precision in the ALS laboratory reports (VA24C0980, VA24C2399, and VA24C2503; Appendix G). All the 191 analyte results met the laboratory DQO for laboratory duplicates, and thus the laboratory analytical precision was considered acceptable for this study.

A total of six field duplicate samples were collected to assess sediment quality field sampling precision (Appendix Table B.4; see Section B.2.3 for explanation on RPD calculation and DQOs). Some RPDs were not calculated as both analyte concentrations were below the LRL. Of the 235 comparisons that were calculated, only eight RPDs exceeded the DQO of 30% (Appendix Table B.4). These DQO exceedances include three comparisons for particle size composition (% sand), and one comparison each of total nitrogen, antimony, mercury, tin, and zirconium. Fewer than 20% of analytes within each duplicate pair exceeded the 30% DQO. Exceedances of the DQO exceedances may be attributed to variability during the multi-element scan as well as subtle differences in the distribution of fine particulate matter (and associated analytes) amongst split samples that may exist even after homogenization in the field. As only 3.40% of all comparisons exceeded the DQO, sample precision and reproducibility were considered acceptable for this study.

Table B.3: Laboratory Reporting Limits (LRLs) for Sediment Quality Results, MPMC CEMP, 2024

Constituent	Units	Range of LRLs	No. Sample Results < LRL
Anions and Nutrients			
Nitrogen (N)-Total	%	0.0200	3 (5%)
Sulphur (S)-Total	mg/kg	500	7 (11%)
Metals, Metalloids, and Non-metals			
Bismuth	mg/kg	0.100	8 (12%)
Boron	mg/kg	5.00	14 (21%)
Thallium	mg/kg	0.0500	3 (5%)

Notes: LRL = Laboratory Reporting Limit. Only constituents with one or more results < LRL or LRLs above applicable guidelines are displayed. The total number of samples assessed (n) was 66, including six duplicate samples.

Table B.4: Field Duplicate Results for Sediment Analyses, MPMC CEMP, 2024

Constituent	Unit	MP_BOL-B2 _SE-5_2024-08	MP_BOL-B2 _SE-5X_2024-08	RPD (%)	MP_HAC-D _SE-4_2024-08	MP_HAC-D _SE-4 X_2024-08	RPD (%)	MP_HAC-U _SE-3_2024-08	MP_HAC-U _SE-3 X_2024-08	RPD (%)	MP_POL-P1 _SE-2_2024-08	MP_POL-P1 _SE-2X_2024-08	RPD (%)	MP_QUL-PNF _SE-3_2024-08	MP_QUL-PNF _SE-3X_2024-08	RPD (%)	MP_QUL-PREF1 _SE-4_2024-08	MP_QUL-PREF1 _SE-4X_2024-08	RPD (%)
Nutrients																			
Nitrogen, total (bulk sediment)	%	1.56	1.55	0.643	0.27	0.229	16.4	0.791	0.791	0	1.19	1.17	1.69	0.059	0.039	40.8	0.169	0.191	12.2
Sulphur, total (bulk sediment)	mg/kg	7,170	6,640	7.68	1,370	1,670	19.7	5,110	5,010	1.98	6,870	6,540	4.92	670	780	15.2	1,210	1,220	0.823
Particle Size																			
% Clay (<4µm)	%	18.8	17.7	6.03	14.1	13.5	4.35	20.6	20	2.96	20	20.9	4.40	46.2	44.7	3.30	11.6	11.9	2.55
% Gravel (>2mm)	%	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
% Sand (2.0mm - 0.063mm)	%	<1	<1	-	9.1	13.3	37.5	4.5	6.6	37.8	<1	1.6	46.1	5.9	5.3	10.7	14.5	14.7	1.37
% Silt (0.063mm - 4µm)	%	80.7	81.8	1.35	76.8	73.2	4.80	74.9	73.4	2.02	79.4	77.5	2.42	47.9	50	4.29	73.9	73.4	0.679
Physical Tests & Carbon																			
pH (1:2 soil:water)	pH	5.75	5.8	0.866	7.56	7.64	1.05	7.34	7.57	3.09	6.88	6.96	1.16	8.21	8.21	0	6.32	6.36	0.631
% Moisture	%	94.1	90.5	3.90	64.8	69	6.28	84.1	84.7	0.711	90.7	93.1	2.61	52.4	53.1	1.33	56.4	56	0.712
Carbon, total organic, <63µm	%	14.2	14	1.42	2.12	2.05	3.36	6.07	6.37	4.82	10.5	10.5	0	0.351	0.383	8.72	1.78	1.76	1.13
Metals (<63 µm)																			
Aluminum	mg/kg	19,900	21,300	6.80	22,200	20,200	9.43	19,900	20,100	1	24,200	24,900	2.85	29,600	29,900	1.01	19,000	20,700	8.56
Antimony	mg/kg	0.81	0.91	11.6	0.57	0.57	0	0.28	0.48	52.6	0.48	0.52	8.00	0.57	0.49	15.1	0.4	0.42	4.88
Arsenic	mg/kg	7.66	8.15	6.20	23	22.3	3.09	8.96	8.84	1.35	10.5	10.8	2.82	15.4	15	2.63	8.89	8.96	0.784
Barium	mg/kg	300	316	5.19	249	233	6.64	293	315	7.24	226	238	5.17	288	297	3.08	167	178	6.38
Beryllium	mg/kg	0.71	0.74	4.14	0.66	0.59	11.2	0.58	0.57	1.74	0.74	0.76	2.67	0.96	0.95	1.05	0.51	0.54	5.71
Bismuth	mg/kg	0.12	0.12	0	0.19	0.23	19.1	<0.1	<0.1	-	0.1	0.1	0	0.17	0.16	6.06	0.16	0.16	0
Boron	mg/kg	13.7	15.5	12.3	13	11.3	14.0	15.2	18.6	20.1	13.2	13.8	4.44	11.5	10.9	5.36	<5	<5	-
Cadmium	mg/kg	0.38	0.395	3.87	0.406	0.37	9.28	0.526	0.5	5.07	0.39	0.401	2.78	0.226	0.23	1.75	0.395	0.423	6.85
Calcium	mg/kg	7,750	8,140	4.91	20,800	20,500	1.45	22,400	22,700	1.33	15,200	16,100	5.75	22,400	20,900	6.93	9,150	9,600	4.80
Chromium	mg/kg	33.6	36.5	8.27	41.2	38.6	6.52	24	28.6	17.5	37.4	36.8	1.62	29.4	29.6	0.678	60.1	63	4.71
Cobalt	mg/kg	11.6	12.1	4.22	17.7	16	10.1	17.3	16.6	4.13	16.5	16.7	1.20	24	23.6	1.68	14.4	15.1	4.75
Copper	mg/kg	334	346	3.53	378	325	15.1	542	514	5.30	470	480	2.11	818	799	2.35	45.9	47.5	3.43
Iron	mg/kg	28,000	29,000	3.51	43,800	40,400	8.08	36,400	35,500	2.50	30,600	31,300	2.26	43,200	43,500	0.692	33,800	34,400	1.76
Lead	mg/kg	9.03	9.37	3.70	11.4	11.1	2.67	6.41	6.46	0.777	6.68	6.77	1.34	12.7	12.3	3.20	7.71	7.92	2.69
Lithium	mg/kg	11.7	12.5	6.61	17.6	16	9.52	14.8	14.9	0.673	19	18.9	0.528	29.5	29.5	0	15.4	16.2	5.06
Magnesium	mg/kg	5,490	5,900	7.20	9,970	9,380	6.10	10,600	10,100	4.83	10,400	10,500	0.957	16,200	16,300	0.615	8,970	9,340	4.04
Manganese	mg/kg	1,440	1,500	4.08	1,120	1,000	11.3	2,450	3,020	20.8	1,200	1,190	0.837	1,300	1,310	0.766	496	524	5.49
Mercury	mg/kg	0.224	0.228	1.77	0.11	0.105	4.65	0.0836	0.125	39.7	0.13	0.129	0.772	0.0954	0.0885	7.50	0.0484	0.0549	12.6
Molybdenum	mg/kg	3.05	3.18	4.17	1.65	1.66	0.604	5.48	5.38	1.84	4.9	5.12	4.39	3.22	2.7	17.6	0.93	1	7.25
Nickel	mg/kg	26.6	27.5	3.33	34.9	32.5	7.12	28.4	27	5.05	27.9	28.2	1.07	26.9	26.5	1.5	39.4	41	3.98
Phosphorus	mg/kg	1,890	1,990	5.15	1,460	1,330	9.32	1,700	1,580	7.32	1,590	1,660	4.31	1,250	1,290	3.15	1,370	1,350	1.47
Potassium	mg/kg	1,420	1,560	9.40	2,160	1,960	9.71	1,500	1,530	1.98	1,780	1,780	0	2,870	2,880	0.348	1,640	1,830	10.9
Selenium	mg/kg	2.36	2.72	14.2	2.83	2.39	16.9	7.66	7.67	0.130	3.1	3.13	0.963	0.97	0.89	8.60	1.23	1.33	7.81
Silver	mg/kg	0.342	0.34	0.587	0.225	0.194	14.8	0.234	0.238	1.69	0.338	0.34	0.590	0.358	0.324	9.97	0.199	0.207	3.94
Sodium	mg/kg	268	294	9.25	387	356	8.34	536	523	2.46	799	806	0.872	1,220	1,240	1.63	520	567	8.65
Strontium	mg/kg	89.2	95.3	6.61	189	170	10.6	144	147	2.06	168	167	0.597	221	204	8.00	87.6	93.2	6.19
Thallium	mg/kg	0.119	0.117	1.69	0.195	0.183	6.35	0.056	0.062	10.2	0.084	0.085	1.18	0.084	0.089	5.78	0.176	0.186	5.52
Tin	mg/kg	0.5	0.72	36.1	0.77	0.66	15.4	0.73	0.82	11.6	1.26	1.43	12.6	1.64	1.56	5.00	0.33	0.36	8.70
Titanium	mg/kg	514	626	19.6	1,020	957	6.37	762	901	16.7	1,120	1,170	4.37	1,950	1,790	8.56	1,080	1,240	13.8
Uranium	mg/kg	2.1	2.16	2.82	1.19	1.14	4.29	0.972	0.996	2.44	1.39	1.41	1.43	1.52	1.48	2.67	1.56	1.67	6.81
Vanadium	mg/kg	70.3	75.7	7.40	122	108	12.2	108	116	7.14	112	116	3.51	143	141	1.41	70.4	75	6.33
Zinc	mg/kg	72.5	73.9	1.91	102	94.2	7.95	87.3	98.6	12.2	80.2	80.5	0.373	95.8	95.6	0.209	79.3	81.8	3.10
Zirconium	mg/kg	3.9	3.8	2.60	3	2.8	6.90	2.9	2.8	3.51	6.4	7.3	13.1	6.7	4.4	41.4	4.6	4.6	0

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-" = not calculated. LRL = Laboratory Reporting Limit.

B3.4 Data Accuracy

Data accuracy for sediment quality analyses completed by ALS was evaluated based on the analysis of LCS and reference material (RM) samples. All 192 individual LCS met the laboratory DQO. Of the 177 individual RM analyte results, one individual bismuth result was marginally above the DQO (see laboratory report VA24C2399; Appendix G). As fewer than 10% of analyte results in the multi-elemental scan, the results were considered acceptable by the laboratory[2]. Overall, accuracy achieved by the laboratory was acceptable for this study.

B3.5 Hold Times

Seventeen samples exceeded the recommended hold times for total nitrogen analysis by one to three days due to a delay between sample receipt at the analytical laboratory and sample processing date (VA24C0980; Appendix G).

B3.6 Other Concerns

The measurement uncertainty for particle size analysis was higher than usual due to limited sample availability in 13 lake sediment samples (VA24C2503; Appendix G). The minimum standard sample size is 100g, which can be difficult to achieve when samples have high moisture content. High moisture content is difficult to manage in the field as decanting excess water may lead to loss of important sample material (i.e., fine sand, silt, and/or clay particles in which metals are known to accumulate). However, particle size results were similar among replicate samples and were comparable to those from previous years. As such, the effect of limited sample volume on particle size measurements was considered negligible. Future monitoring efforts will implement strategies to try and avoid the uncertainty associated with particle size analysis (e.g., collection of additional sample material if available, or alternate laboratory processing approaches.[3]

B3.7 Data Quality Statement

Sediment quality data collected for the 2024 CEMP were considered acceptable for this study as characterized by appropriate LRLs, appropriate detectability, negligible concentrations in method blank samples, excellent laboratory and field sampling precision, and excellent

[2] Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

[3] Additional jars of sediment were collected in 2024 to provide sufficient sample volume for particle size analysis (i.e., one two jars for particle size instead of one) following similar flags in the 2023 data quality review; however, sample volume in 2024 was still limited due to high moisture content in samples. The ALS Burnaby laboratory manager proposed adjusting logistics so that that future sediment quality samples are processed at a single analytical laboratory location (i.e., ALS Saskatoon) to allow the analytical laboratory to manage sample weights more efficiently.

laboratory accuracy. Although measurement uncertainty for particle size analysis was higher in sediment samples due to low sample volumes, most particle size results were within range of historic results. Most laboratory quality control samples met the internal DQOs, and overall, the associated data can be used with a high level of confidence in the derivation of conclusions.

B4 SEDIMENT TOXICITY

Sediment toxicity testing was completed by Nautilus Environmental. During the 2024 sediment toxicity, an insufficient number of test organisms was used for the *C. dilutus* test, which resulted in a separate batch of test organisms being used between tests for MP_BOL-B2 compared to MP_POL-P2 and MP_POL-P1. Data interpretation and statistical approaches are outlined in Section 3.2.3 of the present CEMP report.

B4.1 Laboratory Control

Sediment toxicity test laboratory controls met the acceptable criteria and water quality requirements of the Environment Canada protocols (Nautilus Environmental 2024; Appendix G). Sediment toxicity data were considered of excellent quality for data interpretation.

B4.2 Reference Toxicants

The results of the reference toxicant (KCl) on *Hyallela azteca* and *Chironomus dilutus* produced toxicity endpoints that met the passing control criterion of ≥80% survival and ≥0.1 mg/amphipod weight for *H. azteca* and ≥70% survival and ≥0.6 mg/worm dry weight for *C. dilutus*. The results for the test were within the acceptable range of organism performance (mean LC_{50} within two standard deviations of historical laboratory values; Nautilus Environmental; Appendix G). Most water quality parameters remained within acceptable ranges throughout the tests except for pH for QUL-LREF1 and QUL-LREF1, which exceeded a pH of 8.0 by a small margin for most tests (Nautilus 2024; Appendix G). For *H. azteca* testing, pH ranged from 7.7 to 8.3 in the control sediment test vessels, 7.9 to 8.3 in the QUL-LNF1 test vessels, and 7.5 to 8.1 in the QUL-LREF1 test vessel. For *C. dilutus* testing, pH ranged from 7.4 to 8.2 in the control sediment test vessels. For Polley Lake and Bootjack Lake test vessels, pH ranged from 7.8 to 8.1 (POL-P1 and POL-P2) and 7.2 to 7.9 (BOL-B2; Nautilus 2024; Appendix G). For Quesnel Lake test vessels, pH ranged from 7.9 to 8.3 (QUL-PNF) and 6.9 to 7.9 (QUL-PREF1). Despite this, examination of laboratory bench sheets indicated that temperature, dissolved oxygen, conductivity, and pH were all stable over the course of the toxicity tests. Reference toxicant test results fell within the acceptable range and therefore the sensitivity of test organisms was appropriate (Nautilus 2024; Appendix G). All ammonia concentrations were at levels that are not expected to cause adverse effects to *H. azteca*.

B4.2 Overlying Water Chemistry

As part of the sediment toxicity sampling, water samples were sent from Nautilus Environmental to ALS Environmental for analysis of dissolved organic carbon (DOC), dissolved copper, and ammonia (WT2430256, Appendix G). Laboratory MB samples for DOC did not meet the DQO and had detectable concentrations. However, all DOC results were greater than five-times the detected MB result and was therefore considered reliable by the laboratory. Additionally, LRLs were adjusted for dissolved copper results due to matrix interference, but all dissolved copper results were above LRL.

B4.4 Data Quality Statement

Based on acceptability criteria, water quality requirements of the Environment Canada protocols and reference toxicant test results, data from sediment toxicity tests can be used with a good degree of confidence in the 2024 CEMP.

B5 PLANKTON COMMUNITY AND PRODUCTIVITY

B5.1 Laboratory Reporting Limits

The analytical ALS laboratory reports for phytoplankton productivity were examined to assess the LRLs for chlorophyll-a results (VA24B6518, VA24B8959, and VA24C2323; Appendix G). All individual measures of chlorophyll-a were above the LRL and, as such, no table was presented for phytoplankton productivity LRLs. The achieved LRLs were appropriate for the study.

B5.2 Laboratory Blanks

A total of five MB samples were analyzed in the ALS laboratory reports for phytoplankton productivity (VA24B6518, VA24B8959, and VA24C2323; Appendix G). All chlorophyll-a results met the laboratory DQO, indicating that no inadvertent laboratory contamination occurred.

B5.3 Data Precision

Laboratory precision was not assessed for chlorophyll-a as the entire sample must be consumed for analysis. Three field duplicate samples were collected to assess the precision of field sampling for chlorophyll-a (Appendix Table B.5; see Section B.2.3 for explanation on RPD calculation and DQOs). All RPDs met the DQO of 30%. Therefore, the field precision and reproducibility of chlorophyll-a samples were acceptable for this study.

B5.4 Data Accuracy

Chlorophyll-a accuracy was evaluated based on results of five LCS samples which all met the laboratory DQO (VA24B6518, VA24B8959, and VA24C2323; Appendix G). The accuracy achieved by the laboratory was considered acceptable for this study.

B5.5 Hold Times

Chlorophyll-a samples were field filtered and frozen before shipment to the laboratory for analysis to prolong recommended hold times[4]. The recommended hold time (28 days) for phytoplankton chlorophyll-a was exceeded in three samples by one day (see laboratory report VA24B6518; Appendix G). The hold time exceedance was due to a delay between sample receipt at the analytical laboratory and sample analysis. As only 7.14% of samples

[4] Aqueous (non-filtered) chlorophyll-a has a recommended hold time of 48 hours which was often exceeded in earlier years of sampling (e.g, Minnow 2022a).

Table B.5: Field Duplicate Results for Phytoplankton Chlorophyll-a, MPMC CEMP, 2024

Constituent	Unit	MP_POL-P2_CHLA-2_2024-07	MP_POL-P2_CHLA-2X_2024-07	RPD (%)	MP_QUL-ZOO-1_CHLA-1_2024-06	MP_QUL-ZOO-1_CHLA-1X_2024-06	RPD (%)	MP_QUL-ZOO-7_CHLA-1_2024-08	MP_QUL-ZOO-7_CHLA-1X_2024-08	RPD (%)
Chlorophyll-a	µg/L	1.24	1.09	12.9	0.796	0.885	10.6	0.652	0.788	18.9

Note: µg/L = micrograms per litre.

exceeded the recommended hold time, and results were within historic range, any impact on data interpretability there was considered negligible.

Plankton community samples were preserved at the end of each field day and were processed by the analytical laboratory within hold times (as applicable).

B5.6 Phytoplankton Density Accuracy

Phytoplankton density was re-analyzed in 10% of all samples (i.e., three samples) to evaluate sub-sampling accuracy and enumeration precision, as outlined in laboratory methods report (fp24-169, Appendix G). Since there was a high percent of agreement between the quality control samples (mean = 90.8%), the laboratory subsampling precision and reproducibility was considered acceptable for this study (Appendix Table B.6).

B5.7 Zooplankton Abundance Accuracy

Zooplankton density was re-analyzed in 10% of all samples (i.e., four samples) to evaluate sub-sampling accuracy and taxonomic consistency, outlined in the laboratory methods report (10% of all samples; fz24-169, Appendix G). Since there was a high percent of agreement between the duplicate pairs (mean = 91.6%), the laboratory subsampling precision and reproducibility was considered acceptable for this study (Appendix Table B.7).

B5.8 Data Quality Statement

Plankton community data collected for the 2024 CEMP were considered acceptable for this study as characterized by good sub-sampling accuracy. Additionally, productivity measurements (chlorophyll-a) results were characterized by appropriate LRLs, excellent detectability, negligible analyte concentrations in MBs, good laboratory precision, and good laboratory accuracy. Therefore, the associated data can be used with a good level of confidence in the derivation of conclusions.

Table B.6: Percent Agreement for Freshwater Phytoplankton Community Samples, MPMC CEMP, 2024

Sample ID	Laboratory ID	Original Density	Quality Assurance Density	Percent Agreement[a] (%)
MP_QUL-ZOO-1_PHYC-1_2024-06	fp24-169-003	3,688,046	3,605,302	97.8
MP_POL-P2_PHYC-5_2024-07	fp24-169-013	7,472,098	6,397,347	85.6
MP_BOL-B2_PHYC-1_2024-07	fp24-169-014	12,438,776	11,071,457	89.0
			Average	**90.8**

[a] Percent agreement calculated as: (100- [(difference in abundance between samples) / total abundance of original sample)] *100)%.

Table B.7: Duplicate Zooplankton Abundance Samples, MPMC CEMP, 2024

Sample ID	Laboratory ID	Original Density	Quality Assurance Density	Percent Agreement[a] (%)
MP_POL-P2_ZOOC-4_2024-07	fz24-169-032	21,983	21,050	95.8
MP_BOL-B2_ZOOC-2_2024-07	fz24-169-035	21,045	18,877	89.7
MP_QUL-ZOO-1_ZOOC-2_2024-07	fz24-169-040	10,647	12,307	84.4
MP_QUL-ZOO-7_ZOOC-1_2024-08	fz24-169-056	13,056	12,300	94.2
			Average	**91.0**

[a] Percent agreement calculated as: (100- [(difference in abundance between samples) / total abundance of original sample)] *100)%.

B6 ZOOPLANKTON TISSUE QUALITY

B6.1 Laboratory Reporting Limits

The analytical ALS laboratory reports for zooplankton tissue quality (VA24C2311, VA24B6519, VA24C0701; Appendix G) were examined to provide an inventory of analytes for which sample results were less than the LRL. The maximum LRLs for these analytes were assessed relative to existing guidelines, which were only available for selenium (BC interim guideline for benthic invertebrate tissue [4 mg/kg]; BCMOE 2014). Selenium LRLs were all well below the BC interim guideline. The LRLs were adjusted for several analytes across samples due to high moisture content, due to dilution during the laboratory analysis process, or due to small sample volumes[5]. As all selenium LRLs were below the available guideline for selenium (Appendix Table B.8), the achieved LRLs were appropriate for the study.

B6.2 Laboratory Blanks

Laboratory MB samples were analyzed in the ALS laboratory reports (VA24C2311, VA24B6519, VA24C0701; Appendix G). All 259 individual analyte results met the laboratory DQO, indicating no inadvertent laboratory contamination.

B6.3 Data Precision

Two laboratory duplicate samples were used to evaluate precision within the ALS laboratory report (VA24C0701, VA24C2311; Appendix G). Of the 38 individual laboratory duplicate results, two did not pass the laboratory DQO due to sample heterogeneity. This included one duplicate result each for barium and cadmium (VA24C0701; Appendix G). As only 5.26% of laboratory duplicate results exceeded the laboratory DQO, laboratory precision and reproducibility were considered acceptable for this study.

A total of three field duplicate samples were collected to assess field sampling precision and reproducibility in zooplankton tissue (Appendix Table B.9; see Section B.2.3 for explanation on RPD calculation and DQOs). Several RPDs were not calculated as both analyte concentrations were below the LRL. Replicability was poor in zooplankton tissue field duplicate samples collected in July and August, as 32.3% and 22.2% of calculable analyte comparisons exceeded the DQO of 30% (Appendix Table B.9). The RPDs for nickel and tin (both secondary analytes of interest) exceeded the DQO in both July and August measured duplicate pairs. In contract, the duplicate pair in June had excellent agreement, with only one analyte

[5] Zooplankton tissue samples can be time intensive to collect and there is sometimes a trade-off between sampling effort and amount of sample due to timing restraints. In addition, once the samples are prepared for analysis at the laboratory, sample volume might be reduced (due to drying, transfer etc.).

Table B.8: Laboratory Reporting Limits (LRLs) for Zooplankton Tissue Quality Results, MPMC CEMP, 2024

Constituent	Units	Guidelines	Range of LRLs	No. Sample Results < LRL
Metals				
Antimony	mg/kg	-	0.0100 to 0.116	1 (3%)
Beryllium	mg/kg	-	0.0100 to 0.0580	10 (32%)
Bismuth	mg/kg	-	0.0100 to 0.0580	17 (55%)
Boron	mg/kg	-	1.00 to 7.70	10 (32%)
Cesium	mg/kg	-	0.00500 to 0.0290	2 (6%)
Chromium	mg/kg	-	0.200 to 1.16	3 (10%)
Lead	mg/kg	-	0.0500 to 0.290	3 (10%)
Lithium	mg/kg	-	0.500 to 2.90	17 (55%)
Mercury	mg/kg	-	0.00500 to 0.158	6 (19%)
Molybdenum	mg/kg	-	0.0400 to 0.232	2 (6%)
Nickel	mg/kg	-	0.200 to 1.16	2 (6%)
Selenium	mg/kg	4.00	0.100 to 0.580	2 (6%)
Silver	mg/kg	-	0.00500 to 0.0290	3 (10%)
Tellurium	mg/kg	-	0.0200 to 0.116	28 (90%)
Thallium	mg/kg	-	0.00200 to 0.0154	6 (19%)
Tin	mg/kg	-	0.100 to 0.580	9 (29%)
Zirconium	mg/kg	-	0.200 to 2.00	9 (29%)

Notes: LRL = Laboratory Reporting Limit. Only constituents with one or more results < LRL or LRLs above applicable guidelines are displayed. The total number of samples assessed (n) was 31, including 3 duplicate samples.

[a] British Columbia guideline for the protection of aquatic life (for invertebrate tissue; BCMOE 2014).

Table B.9: Field Duplicate Results for Zooplankton Tissue Analyses, MPMC CEMP, 2024

Constituent	Unit	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06	RPD (%)	MP_BOL-B2_ZOOT-5_2024-07	MP_BOL-B2_ZOOT-5X_2024-07	RPD (%)	MP_QUL-ZOO-7_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1X_2024-08	RPD (%)
Aluminum	mg/kg	16.5	14.8	10.9	2,820	3,280	15.1	1,570	1,560	0.639
Antimony	mg/kg	0.037	0.025	38.7	0.213	0.364	52.3	1.61	0.136	169
Arsenic	mg/kg	0.15	0.139	7.61	4.06	4.12	1.47	4.02	3.18	23.3
Barium	mg/kg	0.687	0.575	17.8	119	111	6.96	48.7	28.8	51.4
Beryllium	mg/kg	<0.01	<0.01	-	0.128	0.123	3.98	0.057	0.059	3.45
Bismuth	mg/kg	<0.01	<0.01	-	0.032	<0.058	57.8	0.028	0.012	80
Boron	mg/kg	<1	<1	-	9.9	17.8	57	2.6	2.1	21.3
Cadmium	mg/kg	0.063	0.06	4.88	0.383	0.459	18.1	1.82	1.62	11.6
Calcium	mg/kg	157	148	5.9	28,400	32,600	13.8	38,100	43,300	12.8
Cesium	mg/kg	<0.005	<0.005	-	0.302	0.418	32.2	0.222	0.228	2.67
Chromium	mg/kg	<0.2	<0.2	-	6.08	9.64	45.3	18.2	13.4	30.4
Cobalt	mg/kg	0.033	0.029	12.9	2.03	2.39	16.3	2.09	1.81	14.4
Copper	mg/kg	1.1	0.99	10.5	110	113	2.69	98.1	109	10.5
Iron	mg/kg	37.5	32.4	14.6	6,500	6,660	2.43	2,960	3,050	3
Lead	mg/kg	<0.05	<0.05	-	1.88	2.27	18.8	24.6	0.975	185
Lithium	mg/kg	<0.5	<0.5	-	1.99	<2.9	37.2	2.01	2.19	8.57
Magnesium	mg/kg	63.1	57.4	9.46	1,960	2,040	4	2,540	2,330	8.62
Manganese	mg/kg	3.37	3.08	8.99	2,660	2,960	10.7	140	117	17.9
Mercury	mg/kg	<0.005	<0.005	-	0.163	0.094	53.7	0.071	0.074	4.14
	mg/kg ww	<0.001	<0.001	-	0.0069	0.0036	62.9	<0.002	<0.002	-
Molybdenum	mg/kg	<0.04	<0.04	-	1.55	1.66	6.85	0.728	0.762	4.56
Nickel	mg/kg	<0.2	<0.2	-	5.04	8.06	46.1	6.9	4.75	36.9
Phosphorus	mg/kg	540	490	9.71	13,900	14,400	3.53	12,800	12,700	0.784
Potassium	mg/kg	458	411	10.8	3,760	3,900	3.66	8,850	8,170	7.99
Rubidium	mg/kg	0.821	0.742	10.1	5.57	5.99	7.27	14	11.7	17.9
Selenium	mg/kg	<0.1	<0.1	-	2.73	3.37	21	3.45	3.23	6.59
Silver	mg/kg	<0.005	<0.005	-	0.0994	0.127	24.4	0.0902	0.0777	14.9
Sodium	mg/kg	201	179	11.6	2,300	2,220	3.54	5,940	6,910	15.1
Strontium	mg/kg	1.09	0.99	9.62	198	214	7.77	254	279	9.38
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.116	-	0.022	<0.02	9.52
Thallium	mg/kg	<0.002	<0.002	-	0.0384	0.0454	16.7	0.0275	0.0243	12.4
Tin	mg/kg	<0.1	<0.1	-	0.99	1.52	42.2	0.43	0.94	74.5
Titanium	mg/kg	1.1	0.93	16.8	114	159	33	108	114	5.41
Uranium	mg/kg	0.004	0.0037	7.79	0.464	0.494	6.26	0.178	0.135	27.5
Vanadium	mg/kg	0.22	0.21	4.65	12.6	13.4	6.15	8.26	9.77	16.8
Zinc	mg/kg	4.1	4	2.47	129	147	13	118	95	21.6
Zirconium	mg/kg	<0.2	<0.2	-	2.33	3.69	45.2	0.99	1.5	41

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-"= no data/not calculated. LRL = Laboratory Reporting Limit. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight.

(antimony) that exceeded the DQO (i.e., 4.8% of comparisons; Appendix Table B.9). Differences in the agreement of field duplicate pairs are likely the result of natural variability in community composition, which may vary among seasons, and variability associated with multi-element scans. Results were confirmed by reanalysis for samples with sufficient remaining mass. These discrepancies will be taken into consideration during interpretation.

B6.4 Data Accuracy

Data accuracy was evaluated based on the results of LCS samples and RM samples (VA24C2311, VA24B6519, VA24C0701; Appendix G). The laboratory added an incorrect amount of standard in one sample lot, which resulted in elevated LCS results; however, the corresponding RM results remained within QC limits, confirming the reported results (VA24C0701; Appendix G). As such, the LCS and RM samples from laboratory report VA24C0701 were not evaluated for data accuracy. The LCS and RM samples from the remaining laboratory reports were evaluated for data accuracy, and all 218 LCS and 160 RM results met the laboratory DQO (VA24C2311, VA24B6519; Appendix G). As all viable LCS and RM results met the laboratory DQO, the accuracy achieved by the laboratory was considered acceptable for this study.

B6.5 Hold Times

Recommended hold times were met for all zooplankton tissue samples (VA24C2311, VA24B6519, VA24C0701; Appendix G).

B6.6 Other Concerns

Concentrations of several analytes, including copper, a primary analyte of interest, were elevated in one sample (MP_POL-P2_ZOOT-1_2024-06; see laboratory report VA24B6519; Appendix G) when results were compared to historic concentrations in zooplankton tissue collected at the same station and time of the year. Laboratory reanalysis confirmed the original reported data. Analyte concentrations that were above historic values could be a result of field or laboratory contamination.

B6.7 Data Quality Statement

Zooplankton tissue quality collected as part of the 2024 CEMP were considered acceptable for this study as characterized by appropriate detection limits, no detectable concentrations in MBs, and good laboratory precision. Poor field replicability will be considered during data interpretation, as samples collected in July and August both exceeded the 30% DQO for RPDs between field duplicates. Overall, zooplankton tissue quality collected as part of the

2024 CEMP can be used with a good level of confidence in the derivation of conclusions, provided that natural variability is considered.

B7 PERIPHYTON COMMUNITY AND PRODUCTIVITY

B7.1 Laboratory Reporting Limits

Periphyton productivity was assessed through collection of ash free dry mass (AFDM) and chlorophyll-a results were examined to provide an inventory of analytes that were less than the LRL (VA24C1399; Appendix G). All AFDM and chlorophyll-a results were above the LRL and, as such, no table was presented for periphyton productivity LRLs. The achieved LRLs were appropriate for the study.

B7.2 Laboratory Blanks

Four MB samples were analyzed in the ALS Laboratory Report (VA24C1399; Appendix G). All eight results for dry weight, ash weight, ash free dry weight, and chlorophyll-a met the laboratory DQO. Therefore, laboratory contamination had no impact on the results.

B7.3 Data Accuracy

Accuracy of periphyton productivity endpoints was evaluated based on results of four LCS. All eight results met the laboratory DQO (VA24C1399; Appendix G). Therefore, accuracy achieved by the laboratory in this study was considered acceptable for this study.

B7.4 Data Precision

Laboratory precision was not assessed for periphyton productivity (i.e., ash free dry mass and chlorophyll-a) as the entire sample must be consumed for analysis. No field duplicates were collected due to the high inherent natural variability. The level of replication (n=5) at each monitoring area was considered sufficient for this study.

B7.5 Hold Times

The recommended hold time (28 days) for periphyton chlorophyll-a was exceeded in three samples by one day (see laboratory report VA24C1399; Appendix G). The hold time exceedance was due to a delay between sample receipt at the analytical laboratory and sample analysis. As only 12% of samples exceeded the recommended hold time, and results were within historic range, any impact on data interpretability there was considered negligible.

Periphyton community samples were preserved at the end of each field day and were processed by the analytical laboratory within hold times (as applicable).

B7.6 Subsampling Precision

Periphyton density was re-analyzed in 10% of total samples (i.e., two samples) to evaluate precision of enumeration and taxonomic agreement, as outlined in the laboratory methods (pp24-169; Appendix G). As there was a high percent of agreement between the duplicate pairs (mean = 94.5%) the samples were considered to have good laboratory subsampling precision and reproducibility (Appendix Table B.10).

B7.7 Data Quality Statement

Periphyton productivity measurements (ash free dry weight and chlorophyll-a) results had appropriate LRLs, were of acceptable detectability, and demonstrated good laboratory precision and laboratory accuracy. Productivity measurements (ash free dry weight and chlorophyll-a) results had appropriate LRLs, were of acceptable detectability, and demonstrated good laboratory precision and laboratory accuracy. Additionally, community data collected for the 2024 CEMP were of acceptable quality as characterized by good enumeration precision. Therefore, the associated data can be used with a high level of confidence in the derivation of conclusions.

Table B.10: Percent Agreement for Freshwater Periphyton Community Samples, MPMC CEMP, 2024

Sample ID	Laboratory ID	Original Density	Quality Assurance Density	Percent Agreement[a] (%)
MP_HAC-U-PERC-2_2024-08	pp24-169-055	804,808	892,598	89.1
MP_EDC-U-PERC-2_2024-08	pp24-169-060	1,782,268	1,779,222	99.8
			Average	**94.5**

[a] Percent agreement calculated as: (100- [(difference in abundance between samples) / total abundance of original sample)] *100)%.

B8 BENTHIC INVERTEBRATE COMMUNITY

B8.1 Sorting Efficiency

The analytical laboratory reports for benthic invertebrate community composition (Appendix G) were assessed for the organism sorting efficiency relative to the laboratory's DQO (≥ 90%) in four samples (Appendix Table B.11). One of the lake benthic invertebrate samples (MP_QUL-PFF1_PON-2_2024-08; Appendix G) did not meet the laboratory DQO for sorting efficiency; however, this may be attributed to the low number of organisms recovered from the initial sort (25 organisms). Despite this, the average recovery was 95.1% and so organism sorting efficiency was considered acceptable[6].

B8.2 Subsampling Precision and Accuracy

Of the 55 benthic invertebrate community samples analyzed, 26 were subsampled. Of those 26 samples, the proportion of sample sorted ranged from 5% to 50% of the total sample material (Appendix Table B.12). Five samples (i.e., 9% of all samples) were assessed for precision and accuracy. All assessed samples met the laboratory DQO (<20%) for both precision and accuracy (Appendix Table B.13). Thus, the precision and accuracy for sub-sampling of the benthic invertebrate community samples was considered acceptable for this study.

B8.3 Taxonomic Identification Accuracy

The laboratory performed an internal audit of taxonomic identification for six samples (11% of all samples; Appendix Table B.14). The analysts reported total identification error rate (TIR) of 0%, percent difference in enumeration (PDE) of 0 to 0.288%, percent taxonomic disagreement (PTD) of 0% to 1.437%, and Bray Curtis Dissimilarity Index (BCDI, a measure of the differences in identifications between different analysts) of 0 to 0.012 (Appendix Table B.14). All TIRs were below the laboratory DQO (<5% TIR), which is based on CABIN laboratory methods (Environment Canada 2014), so the taxonomic accuracy of analyses was considered acceptable for this study.

B8.4 Data Quality Statement

Benthic community data collected for the 2024 CEMP was considered acceptable for this study as characterized by appropriate sorting efficiency for most samples, excellent subsampling

[6] The analytical laboratory stated: "when a failure of a QC [quality control] occurs, the person who failed is required to go back to all of the samples that they processed and redo [re-check] them to ensure that they are looked at a second time and QC would be passed on those samples".

Table B.11: Benthic Invertebrate Community Sorting Efficiency, MPMC CEMP, 2024

Habitat	Sample ID	Laboratory ID	Number of Organisms Recovered		Taxon	Number in Re-sort	% Efficiency
			Initial Sort	Resort			
Creek	MP_FPC-R3_SURB-4_2024-08	CC250306	323	4	Plecoptera	2	98.8%
					Trombidiformes	1	
					Coleoptera	1	
	MP_HAC-R1_HESS-4_2024-08	CC250316	359	10	Chironomidae	7	97.3%
					Trichoptera	2	
					Trombidiformes	1	
	MP_HAC-U_HESS-1_2024-08	CC250318	313	4	Heptageniidae	2	98.7%
					Chironomidae	1	
					Trichoptera	1	
Lake	MP_QUL-PNF_PON-1_2024-08	CC250492	25	0	-	0	100%
	MP_QUL-PFF1_PON-1_2024-08	CC250497	45	1	Oligochaeta	1	97.8%
	MP_QUL-PFF1_PON-2_2024-08	CC250498	25	7	Chironomidae	6	78.1%
					Diptera	1	
Average Recovery							**95.1%**

Table B.12: Percent of Sample Sorted and Total Number of Invertebrates Recovered, MPMC CEMP, 2024

Habitat	Sample ID	Date	Sieve Size (µm)	Laboratory ID	% Sampled	# Invertebrates
Creek	MP_FPC-R3_SURB-1_2024-08	14-Aug-24	250	CC250303	5%	425
	MP_FPC-R3_SURB-2_2024-08	14-Aug-24	250	CC250304	7%	327
	MP_FPC-R3_SURB-3_2024-08	14-Aug-24	250	CC250305	6%	348
	MP_FPC-R3_SURB-4_2024-08	14-Aug-24	250	CC250306	7%	327
	MP_FPC-R3_SURB-5_2024-08	14-Aug-24	250	CC250307	17%	344
	MP_HAC-R3_HESS-1_2024-08	13-Aug-24	250	CC250308	9%	324
	MP_HAC-R3_HESS-2_2024-08	13-Aug-24	250	CC250309	6%	313
	MP_HAC-R3_HESS-3_2024-08	13-Aug-24	250	CC250310	20%	451
	MP_HAC-R3_HESS-4_2024-08	13-Aug-24	250	CC250311	14%	313
	MP_HAC-R3_HESS-5_2024-08	13-Aug-24	250	CC250312	22%	329
	MP_HAC-R1_HESS-1_2024-08	15-Aug-24	250	CC250313	20%	315
	MP_HAC-R1_HESS-2_2024-08	15-Aug-24	250	CC250314	14%	331
	MP_HAC-R1_HESS-3_2024-08	15-Aug-24	250	CC250315	11%	372
	MP_HAC-R1_HESS-4_2024-08	15-Aug-24	250	CC250316	7%	369
	MP_HAC-R1_HESS-5_2024-08	15-Aug-24	250	CC250317	7%	338
	MP_HAC-U_HESS-1_2024-08	13-Aug-24	250	CC250318	10%	317
	MP_HAC-U_HESS-2_2024-08	13-Aug-24	250	CC250319	8%	319
	MP_HAC-U_HESS-3_2024-08	13-Aug-24	250	CC250320	5%	456
	MP_HAC-U_HESS-4_2024-08	12-Aug-24	250	CC250321	5%	543
	MP_HAC-U_HESS-5_2024-08	12-Aug-24	250	CC250322	5%	418
	MP_EDC-U_SURB-1_2024-08	12-Aug-24	250	CC250323	5%	373
	MP_EDC-U_SURB-2_2024-08	12-Aug-24	250	CC250324	20%	416
	MP_EDC-U_SURB-3_2024-08	11-Aug-24	250	CC250325	18%	381
	MP_EDC-U_SURB-4_2024-08	11-Aug-24	250	CC250326	13%	377
	MP_EDC-U_SURB-5_2024-08	11-Aug-24	250	CC250327	29%	327
Lake	MP_QUL-PNF_PON-1_2024-08	23-Aug-24	250	CC250492	100%	25
	MP_QUL-PNF_PON-2_2024-08	23-Aug-24	250	CC250493	100%	38
	MP_QUL-PNF_PON-3_2024-08	24-Aug-24	250	CC250494	100%	35
	MP_QUL-PNF_PON-4_2024-08	24-Aug-24	250	CC250495	100%	40
	MP_QUL-PNF_PON-5_2024-08	24-Aug-24	250	CC250496	100%	37
	MP_QUL-PFF1_PON-1_2024-08	21-Aug-24	250	CC250497	100%	46
	MP_QUL-PFF1_PON-2_2024-08	21-Aug-24	250	CC250498	100%	32
	MP_QUL-PFF1_PON-3_2024-08	21-Aug-24	250	CC250499	100%	33
	MP_QUL-PFF1_PON-4_2024-08	21-Aug-24	250	CC250500	100%	45
	MP_QUL-PFF1_PON-5_2024-08	22-Aug-24	250	CC250501	100%	28
	MP_QUL-PREF1-PON-1_2024-08	22-Aug-24	250	CC250502	50%	322
	MP_QUL-PREF1-PON-2_2024-08	22-Aug-24	250	CC250503	100%	362
	MP_QUL-PREF1-PON-3_2024-08	22-Aug-24	250	CC250504	100%	459
	MP_QUL-PREF1-PON-4_2024-08	23-Aug-24	250	CC250505	100%	228
	MP_QUL-PREF1-PON-5_2024-08	23-Aug-24	250	CC250506	100%	220
	MP_BOL-B2_PON-1_2024-08	19-Aug-24	250	CC250507	100%	248
	MP_BOL-B2_PON-2_2024-08	20-Aug-24	250	CC250508	100%	292
	MP_BOL-B2_PON-3_2024-08	20-Aug-24	250	CC250509	100%	315
	MP_BOL-B2_PON-4_2024-08	20-Aug-24	250	CC250510	100%	217
	MP_BOL-B2_PON-5_2024-08	20-Aug-24	250	CC250511	100%	217
	MP_POL-P1_PON-1_2024-08	22-Aug-24	250	CC250512	100%	188
	MP_POL-P1_PON-2_2024-08	22-Aug-24	250	CC250513	100%	167
	MP_POL-P1_PON-3_2024-08	23-Aug-24	250	CC250514	100%	233
	MP_POL-P1_PON-4_2024-08	23-Aug-24	250	CC250515	100%	152
	MP_POL-P1_PON-5_2024-08	23-Aug-24	250	CC250516	100%	115
	MP_POL-P2_PON-1_2024-08	21-Aug-24	250	CC250517	100%	68
	MP_POL-P2_PON-2_2024-08	21-Aug-24	250	CC250518	100%	69
	MP_POL-P2_PON-3_2024-08	22-Aug-24	250	CC250519	100%	132
	MP_POL-P2_PON-4_2024-08	24-Aug-24	250	CC250520	100%	63
	MP_POL-P2_PON-5_2024-08	24-Aug-24	250	CC250521	100%	120

Table B.13: Benthic Invertebrate Community Sub-sampling Precision and Accuracy, MPMC CEMP, 2024

Habitat	Station ID		Organisms in Subsample					Total	Precision Error		Accuracy Error	
	Sample ID	Laboratory ID	1	2	3	4	5		Min (%)	Max (%)	Min (%)	Max (%)
Creek	MP_HAC-R3_HESS-3_2024-08	CC250310	451	436	462	463	480	2,292	0.22	9.17	0.79	4.89
	MP_EDC-U_SURB-2_2024-08	CC250324	425	441	448	457	444	2,215	0.68	7.00	0.23	4.06
	MP_HAC-R1_HESS-1_2024-08	CC250313	328	360	302	307	366	1,663	1.63	17.49	1.38	10.04
Lake	MP_QUL-PREF1-PON-1_2024-08	CC250502	325	306	-	-	-	631	5.85	5.85	3.01	3.01
	MP_QUL-PREF1-PON-2_2024-08	CC250503	94	93	90	85	-	362	1.06	9.57	0.55	6.08
Average									**1.888**	**9.8**	**1.192**	**5.62**

Note: "-" indicates no additional subsamples.

Table B.14: Summary of Benthic Invertebrate Community Taxonomic Error[a], MPMC CEMP, 2024

Habitat	Sample ID	Laboratory ID	Percent Sampled (%)	Taxa Identified	TIR (%)	PDE (%)	PTD (%)	BCDI
Creek	MP_FPC-R3_SURB-3_2024-08	CC250305	6	346	0	0.288	1.437	0.012
	MP_HAC-R1_HESS-2_2024-08	CC250314	14	332	0	0.151	0.602	0.005
	MP_EDC-U_SURB-1_2024-08	CC250323	5	373	0	0	0.268	0.003
Lake	MP_QUL-PNF_PON-2_2024-08	CC250493	38	0	0	0	0.000	0.000
	MP_QUL-PREF1-PON-3_2024-08	CC250504	459	0.22	0	0	0.218	0.002
	MP_POL-P1_PON-3_2024-08	CC250514	234	0	0	0.214	0.427	0.002

Notes: TIR = Total Identification Error Rate. PDE = Percent Difference in Enumeration. PTD = Percent Taxonomic Disagreement. BCDI = Bray Curtis Dissimilarity Index to quantify differences in identifications.

[a] For error rationale and calculations, refer to Cordillera report (Appendix G).

precision and accuracy, and excellent taxonomic identification accuracy. One lake benthic community sample did not meet the internal DQO for sorting efficiency, although the lower efficiency rate may be attributed to low abundance in the sample. Overall, the associated data can be used with a high level of confidence in the derivation of conclusions.

B9 PERIPHYTON AND BENTHIC INVERTEBRATE TISSUE QUALITY

B9.1 Laboratory Reporting Limits

One analytical ALS laboratory report for benthic invertebrate and periphyton tissue quality (VA24C1418; Appendix G) was examined to provide an inventory of analytes for which sample results were less than the LRL (Appendix Table B.15). The maximum LRLs for these analytes were assessed relative to existing guidelines, which were only available for selenium (BC interim guideline for benthic invertebrate tissue [4 mg/kg]; BCMOE 2014). Selenium LRLs were all well below the BC interim guideline. As such, the achieved LRLs were appropriate for the study.

B9.2 Laboratory Blanks

A total of 20 MB samples were analyzed in the ALS laboratory report (VA24C1418; Appendix G). Out of the 380 individual results met the laboratory DQO, four results (three for manganese and one for tin) did not meet the DQO and had detectable concentrations. However, results for these analytes were considered reliable by the laboratory, as they were either greater than five-times the detected MB result (manganese results) or below LRLs (tin results). As a relatively low number of MBs exceeded the laboratory DQO (1.14%), and the MB results were not likely to impact the reliability of the results, these laboratory flags had a negligible impact on data reliability.

B9.3 Data Precision

A total of eight laboratory duplicate samples were used to evaluate precision (see laboratory report VA24C1418; Appendix G). Of the 290 laboratory duplicate results, 20 did not pass the laboratory DQO (i.e., 6.90% of all results) due to sample heterogeneity. Laboratory DQOs were not met for the primary analytes selenium and iron (one duplicate result each) and secondary analytes cadmium (two duplicate results), and cobalt, manganese, molybdenum, nickel, phosphorus, silver, titanium, uranium, vanadium and zinc (one duplicate result each). Since these analytes have been identified as strongly indicative (primary) or potentially indicative (secondary) of mine influence, consideration will be given to other quality control samples and interpretation of data. As the overall occurrence of laboratory duplicate DQO exceedances was low, laboratory precision and reproducibility in benthic invertebrate and periphyton tissue was considered acceptable for this study.

Table B.15: Evaluation of Laboratory Reporting Limits (LRLs) in Benthic Invertebrate and Periphyton Tissue Quality Results Relative to Guidelines, MPMC CEMP, 2024

Constituent	Benthic Invertebrate Tissue		Periphyton Tissue	
	Range of LRLs	No. Sample Results < LRL	Range of LRLs	No. Sample Results < LRL
Metals				
Antimony	0.0100 to 0.0200	9 (8%)	0.0100 to 0.0540	0 (0%)
Beryllium	0.0100 to 0.0200	43 (41%)	0.0100 to 0.0540	4 (8%)
Bismuth	0.0100 to 0.0200	84 (79%)	0.0100 to 0.0540	24 (45%)
Boron	1.00 to 2.00	36 (34%)	1.00 to 5.40	0 (0%)
Cadmium	0.0100 to 0.0200	7 (7%)	0.0100 to 0.0540	0 (0%)
Cesium	0.00500 to 0.00990	7 (7%)	0.00500 to 0.0272	0 (0%)
Chromium	0.200 to 0.400	25 (24%)	0.200 to 1.23	2 (4%)
Lead	0.0500 to 0.0990	21 (20%)	0.0500 to 0.272	0 (0%)
Lithium	0.500 to 0.990	53 (50%)	0.500 to 2.72	13 (25%)
Mercury	0.00500 to 0.0100	0 (0%)	0.00500 to 0.0130	10 (19%)
Mercury	0.00100 to 0.00200	0 (0%)	0.00100 to 0.00200	1 (2%)
Nickel	0.200 to 0.400	19 (18%)	0.200 to 1.09	0 (0%)
Silver	0.00500	18 (17%)	0.00500	7 (13%)
Tellurium	0.0200 to 0.0400	102 (96%)	0.0200 to 0.109	49 (92%)
Thallium	0.00200 to 0.00400	26 (25%)	0.00200 to 0.0109	2 (4%)
Tin	0.100 to 0.200	99 (93%)	0.100 to 0.540	45 (85%)
Titanium	0.500	2 (2%)	0.500 to 0.530	0 (0%)
Uranium	0.00200 to 0.00400	1 (1%)	0.00200 to 0.0109	0 (0%)
Vanadium	0.100 to 0.200	3 (3%)	0.100 to 0.540	0 (0%)
Zirconium	0.200 to 0.400	43 (41%)	0.200 to 1.09	2 (4%)

Notes: Only analytes for which at least one sample was <LRL are displayed. All concentrations are in milligrams per kilogram dry weight (mg/kg dw). The total number of samples in 2024 was 209, which included 15 field duplicate samples.

A total of fifteen field duplicate samples were collected for benthic invertebrate and periphyton tissue (five of each composite-taxa, caddisfly, and periphyton tissue samples) to assess the precision associated with field sampling (Appendix Table B.16; VA24C1418; Appendix G). Please see Section B.2.3 for explanation on RPD calculation and DQOs. Of the 15 duplicate pairs, 13 had >20% of analytes with RPDs >30% including all composite-taxa and caddisfly duplicate sets, and four of five periphyton duplicate sets. All primary and secondary analytes had at least one RPD that exceeded the 30% RPD DQO, with iron (primary analyte), aluminum, barium, calcium, lead, strontium, and zinc (all secondary analytes except for aluminum) exceeding the DQO in over half of the duplicate sets (Appendix Table B.16). This variability is due to sample heterogeneity (e.g., taxonomic variability in composite-taxa samples or natural variability within a single taxon) rather than inconsistent field sampling methods. Reanalysis was requested for four field duplicate pairs[7] and reanalysis results confirmed low agreement (i.e., high RPDs) between parent and duplicate samples, likely due to sample heterogeneity. Field crews strived to split field samples evenly between the parent and duplicate sample containers; however, a perfect split was not always feasible. It should be noted that tissue samples were collected in replicates of eight for each tissue type (periphyton, composite-taxa, and caddisfly) to account for sampling heterogeneity (i.e., a total of 24 samples per sampling area). As a high proportion of all field duplicate analyses exceeded the DQO, these sources of variability will be considered during data interpretation.

B9.4 Data Accuracy

Data accuracy was evaluated based on results of 36 LCS samples and 24 RM samples, which yielded 380 LCS results and 280 RM results (see laboratory report VA24C1418; Appendix G). Of these, one LCS result for titanium and did not meet the DQO. The results are still considered acceptable as the LCS result for titanium exceeded the DQO by a marginal (<10%) amount, and less than 10% of analyte results in the multi-elemental scan exceeded the DQO. As the laboratory DQO was only exceeded in 0.263% of LCS results and all RM results met the laboratory DQO, accuracy achieved by the laboratory was considered acceptable for this study.

[7] There was insufficient sample volume for reanalysis of the duplicate pair VA24C1418-084 and -153 (composite-taxa benthic tissue). Reanalysis of duplicate pairs VA24C1418-096 and-150 (composite-taxa benthic tissue) and VA24C1418-048 and -147 (periphyton tissue) confirmed high variability (i.e., high RPDs) of these duplicate pairs due to sample heterogeneity. For the duplicate pair VA24C1418-132 and -155 (caddisfly tissue), reanalysis results showed better agreement between the duplicate pair but there was no justification for reporting the reanalysis results instead of the original data, therefore the original data were reported.

Table B.16: **Field Duplicate Results for Benthic Invertebrate and Periphyton Tissue Quality, MPMC CEMP, 2024**

Analyte	Unit	MP_E1_PERT-8_2024-08	MP_E1_PERT-8X_2024-08	RPD (%)	MP_EDC-D_PERT-4_2024-08	MP_EDC-D_PERT-4X_2024-08	RPD (%)	MP_HAC-D_PERT-4_2024-08	MP_HAC-D_PERT-4X_2024-08	RPD (%)	MP_HAC-R1_PERT-8_2024-08	MP_HAC-R1_PERT-8X_2024-08	RPD (%)	MP_HAC-U_PERT-4_2024-08	MP_HAC-U_PERT-4X_2024-08	RPD (%)
Physical Tests																
% Moisture	%	72.6	82.2	12.4	91	89.8	1.33	62.6	57.9	7.80	64.8	62.1	4.26	59.2	68.1	14.0
Metals																
Aluminum	mg/kg	9,690	12,600	26.1	3,620	6,030	50.0	1,320	970	30.6	574	434	27.8	335	398	17.2
Antimony	mg/kg	0.068	0.068	0	0.061	0.054	12.2	0.072	0.067	7.19	0.051	0.056	9.35	0.074	0.073	1.36
Arsenic	mg/kg	9.35	14	39.8	12	14.5	18.9	3.65	3	19.6	1.31	1.35	3.01	1.51	1.5	0.664
Barium	mg/kg	1,320	238	139	77.2	106	31.4	156	170	8.59	60.2	62	2.95	97.8	81.8	17.8
Beryllium	mg/kg	0.277	0.422	41.5	0.137	0.188	31.4	0.046	0.042	9.09	0.022	0.02	9.52	0.015	0.018	18.2
Bismuth	mg/kg	0.063	0.1	45.4	0.032	0.043	29.3	<0.013	<0.015	-	<0.017	<0.014	-	<0.012	<0.017	-
Boron	mg/kg	48.9	24.2	67.6	177	271	42.0	226	216	4.52	250	226	10.1	250	256	2.37
Cadmium	mg/kg	0.392	0.337	15.1	0.264	0.273	3.35	0.54	0.565	4.52	0.101	0.111	9.43	0.146	0.153	4.68
Calcium	mg/kg	37,900	20,200	60.9	17,300	19,900	14.0	240,000	228,000	5.13	201,000	223,000	10.4	231,000	220,000	4.88
Cesium	mg/kg	0.842	1.41	50.4	0.573	0.87	41.2	0.316	0.209	40.8	0.107	0.0931	13.9	0.0678	0.109	46.6
Chromium	mg/kg	13.7	19.1	32.9	15.5	13.8	11.6	2.52	1.78	34.4	0.83	0.72	14.2	0.72	0.97	29.6
Cobalt	mg/kg	8.28	11.6	33.4	4.27	6.17	36.4	2.48	2.13	15.2	0.796	0.69	14.3	0.646	0.667	3.20
Copper	mg/kg	158	233	38.4	14.2	17.6	21.4	40.6	35.9	12.3	29.5	27.4	7.38	21.8	21.1	3.26
Iron	mg/kg	14,800	24,500	49.4	7,620	12,000	44.6	2,290	1,530	39.8	972	756	25.0	455	651	35.4
Lead	mg/kg	4.29	6.26	37.4	1.6	2.41	40.4	0.642	0.399	46.7	0.213	0.17	22.4	0.126	0.163	25.6
Lithium	mg/kg	7.45	12.7	52.1	3.69	5.28	35.5	1.48	0.93	45.6	<0.84	<0.68	-	<0.62	<0.84	-
Magnesium	mg/kg	5,020	7,140	34.9	3,260	4,300	27.5	3,220	2,620	20.6	2,180	2,160	0.922	2,360	2,400	1.68
Manganese	mg/kg	2,870	2,100	31.0	1,220	1,340	9.38	2,980	3,150	5.55	848	920	8.14	2,930	2,380	20.7
Mercury	mg/kg	0.122	0.0848	36.0	0.035	0.0468	28.9	0.0128	0.016	22.2	0.0054	<0.005	7.69	<0.005	0.01	66.7
	mg/kg ww	0.0335	0.0151	75.7	0.0032	0.0048	40.0	0.0048	0.0067	33.0	0.0019	0.0015	23.5	0.0018	0.0032	56.0
Molybdenum	mg/kg	1.25	0.739	51.4	1.69	2.16	24.4	0.83	0.827	0.362	0.922	0.87	5.80	0.716	0.976	30.7
Nickel	mg/kg	14.4	19.9	32.1	16.2	11.9	30.6	4.51	3.78	17.6	2.27	2.44	7.22	1.9	1.94	2.08
Phosphorus	mg/kg	1,660	2,030	20.1	1,700	1,950	13.7	714	624	13.4	539	539	0	564	540	4.35
Potassium	mg/kg	3,030	2,430	22.0	5,130	4,940	3.77	3,530	2,770	24.1	2,510	2,540	1.19	2,500	3,180	23.9
Rubidium	mg/kg	7.83	10.2	26.3	7.88	9.75	21.2	4.59	3.19	36.0	2.65	2.66	0.377	2.39	3.17	28.1
Selenium	mg/kg	0.88	1.19	29.9	1.08	1.12	3.64	3.93	3.57	9.60	1.88	2.42	25.1	3.08	1.99	43.0
Silver	mg/kg	0.123	0.127	3.20	0.0398	0.0479	18.5	0.0122	0.0106	14.0	0.0065	0.0062	4.72	<0.005	0.0053	5.83
Sodium	mg/kg	1,240	386	105	429	481	11.4	216	214	0.93	237	202	15.9	212	224	5.50
Strontium	mg/kg	228	113	67.5	121	134	10.2	479	442	8.03	459	485	5.51	511	488	4.60
Tellurium	mg/kg	<0.034	<0.05	-	<0.02	<0.02	-	<0.027	<0.03	-	<0.034	<0.027	-	<0.025	<0.034	-
Thallium	mg/kg	0.0523	0.0826	44.9	0.0504	0.0588	15.4	0.0332	0.0262	23.6	0.004	0.0041	2.47	0.0053	0.0052	1.90
Tin	mg/kg	0.17	<0.25	38.1	<0.1	<0.1	-	<0.13	<0.15	-	<0.17	<0.14	-	<0.12	<0.17	-
Titanium	mg/kg	557	599	7.27	142	229	46.9	63.2	50.2	22.9	44.7	36.9	19.1	17.7	33.5	61.7
Uranium	mg/kg	0.32	0.552	53.2	0.209	0.267	24.4	0.164	0.155	5.64	0.0751	0.0882	16.0	0.0943	0.0922	2.25
Vanadium	mg/kg	41.7	54.2	26.1	13.7	23.2	51.5	7.39	5.63	27.0	3.41	2.95	14.5	2.89	3.43	17.1
Zinc	mg/kg	71.2	66.7	6.53	43	42.9	0.233	14.8	17.1	14.4	5.2	4.7	10.1	4.3	4.3	0
Zirconium	mg/kg	6.32	7.65	19.0	3.85	4.93	24.6	1.03	0.34	101	0.6	0.45	28.6	0.38	0.45	16.9

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-" = not calculated. LRL = Laboratory Reporting Limit.

Table B.16: **Field Duplicate Results for Benthic Invertebrate and Periphyton Tissue Quality, MPMC CEMP, 2024**

Analyte	Unit	MP_E1_INV-8 _2024-08	MP_E1_INV-8X _2024-08	RPD (%)	MP_EDC-D _INV-4_2024-08	MP_EDC-D_INV-4X_2024-08	RPD (%)	MP_HAC-D _INV-4_2024-08	MP_HAC-D _INV-4X_2024-08	RPD (%)	MP_HAC-R1 _INV-8_2024-08	MP_HAC-R1 _INV-8X_2024-08	RPD (%)	MP_HAC-U _INV-4_2024-08	MP_HAC-U _INV-4X_2024-08	RPD (%)
Physical Tests																
% Moisture	%	79.9	77.8	2.66	82.9	79.5	4.19	84.5	81.2	3.98	75.2	82.2	8.89	82.6	78.9	4.58
Metals																
Aluminum	mg/kg	1,560	583	91.2	1,670	210	155	2,080	2,110	1.43	1,220	1,410	14.4	638	438	37.2
Antimony	mg/kg	0.076	0.026	98.0	0.029	0.019	41.7	0.058	0.057	1.74	0.068	0.046	38.6	0.051	0.057	11.1
Arsenic	mg/kg	3.65	2.93	21.9	7.5	3.28	78.3	8.06	6.09	27.8	2.57	2.44	5.19	1.52	1.58	3.87
Barium	mg/kg	36.9	16.9	74.3	48.2	7.54	146	51.5	52.4	1.73	75.9	56.4	29.5	60.7	62.7	3.24
Beryllium	mg/kg	0.045	0.021	72.7	0.056	<0.01	139	0.075	0.07	6.90	0.052	0.046	12.2	0.026	0.017	41.9
Bismuth	mg/kg	0.011	<0.01	9.52	0.012	<0.01	18.2	0.023	0.018	24.4	<0.01	<0.01	-	<0.01	<0.013	-
Boron	mg/kg	2.4	2.3	4.26	13.3	2.7	132	11.3	8.5	28.3	3.5	4.7	29.3	3	5.9	65.2
Cadmium	mg/kg	2.74	2.45	11.2	0.934	0.722	25.6	11.3	5.65	66.7	1.78	2.06	14.6	1.41	1.91	30.1
Calcium	mg/kg	3,340	1,820	58.9	2,530	1,460	53.6	14,700	9,150	46.5	4,930	6,670	30.0	4,570	6,300	31.8
Cesium	mg/kg	0.167	0.0842	65.9	0.263	0.049	137	0.467	0.378	21.1	0.134	0.174	26.0	0.0908	0.0684	28.1
Chromium	mg/kg	4.96	1.62	102	4.05	1.43	95.6	4.23	4.26	0.707	1.9	2.35	21.2	1.14	1.24	8.40
Cobalt	mg/kg	2.54	1.42	56.6	1.99	0.85	80.3	4.79	4.03	17.2	1.98	2.39	18.8	1.12	0.969	14.5
Copper	mg/kg	74.9	57.2	26.8	27.1	31.7	15.7	443	275	46.8	147	209	34.8	136	139	2.18
Iron	mg/kg	3,210	1,440	76.1	2,940	549	137	4,350	3,900	10.9	1,910	2,560	29.1	1,160	830	33.2
Lead	mg/kg	0.695	0.365	62.3	0.598	0.125	131	1.19	1.08	9.69	0.59	0.557	5.75	0.328	0.365	10.7
Lithium	mg/kg	1.99	0.6	107	1.65	<0.5	107	2.77	2.2	22.9	1.11	1.32	17.3	0.57	<0.66	14.6
Magnesium	mg/kg	2,740	1,450	61.6	2,220	1,520	37.4	2,890	2,380	19.4	1,960	2,380	19.4	1,930	1,900	1.57
Manganese	mg/kg	670	329	68.3	564	242	79.9	1,660	1,520	8.81	1,520	1,550	1.95	3,030	2,740	10.1
Mercury	mg/kg	0.114	0.117	2.60	0.0446	0.0614	31.7	0.175	0.117	39.7	0.0726	0.0675	7.28	0.0834	0.126	40.7
	mg/kg ww	0.0229	0.026	12.7	0.0076	0.0126	49.5	0.0271	0.022	20.8	0.018	0.012	40.0	0.0145	0.0266	58.9
Molybdenum	mg/kg	1.33	0.93	35.4	1.23	0.756	47.7	2.47	2.62	5.89	2.15	2.38	10.2	5.23	3.09	51.4
Nickel	mg/kg	6.1	1.88	106	4.35	2.2	65.7	5.89	5.55	5.94	2.67	3.62	30.2	2.06	2.1	1.92
Phosphorus	mg/kg	9,990	8,470	16.5	10,900	7,900	31.9	11,700	10,200	13.7	11,400	11,200	1.77	9,460	10,800	13.2
Potassium	mg/kg	7,870	7,430	5.75	11,200	6,820	48.6	10,000	9,920	0.803	10,200	9,720	4.82	7,880	9,890	22.6
Rubidium	mg/kg	5.4	8.26	41.9	6.84	3.54	63.6	10.6	8.6	20.8	5.88	5.07	14.8	2.95	3.57	19.0
Selenium	mg/kg	2.45	2.18	11.7	1.76	2.36	29.1	9.44	6.92	30.8	4.91	5.36	8.76	8.2	9.11	10.5
Silver	mg/kg	0.0906	0.0511	55.8	0.0978	0.106	8.05	0.117	0.0736	45.5	0.0273	0.0349	24.4	0.0578	0.0891	42.6
Sodium	mg/kg	5,460	4,700	15.0	3,540	2,890	20.2	3,750	4,100	8.92	4,390	4,530	3.14	4,090	4,520	9.99
Strontium	mg/kg	20	11.2	56.4	17.8	10.5	51.6	54.8	37.2	38.3	28.2	38.2	30.1	23	31.3	30.6
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.026	-
Thallium	mg/kg	0.0239	0.0188	23.9	0.0222	0.012	59.6	0.0498	0.0372	29.0	0.0062	0.0076	20.3	0.0148	0.007	71.6
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.13	-
Titanium	mg/kg	57.4	29	65.7	63.3	8.68	152	87.1	93.5	7.09	54.9	86	44.1	32.6	26.2	21.8
Uranium	mg/kg	0.0926	0.0459	67.4	0.102	0.0321	104	0.173	0.148	15.6	0.0805	0.103	24.5	0.102	0.0884	14.3
Vanadium	mg/kg	6.53	2.87	77.9	5.41	0.93	141	11.1	9.76	12.8	6.29	9.13	36.8	4.34	3	36.5
Zinc	mg/kg	178	127	33.4	165	168	1.80	164	146	11.6	121	134	10.2	158	184	15.2
Zirconium	mg/kg	0.98	0.52	61.3	1.24	0.2	144	0.58	1.48	87.4	0.68	0.88	25.6	0.48	0.31	43.0

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-" = not calculated. LRL = Laboratory Reporting Limit.

Table B.16: **Field Duplicate Results for Benthic Invertebrate and Periphyton Tissue Quality, MPMC CEMP, 2024**

Analyte	Unit	MP_E1 _INVTRI-8_2024-08	MP_E1 _INVTRI-8X_2024-08	RPD (%)	MP_EDC-D _INVTRI-4_2024-08	MP_EDC-D _INVTRI-4X_2024-08	RPD (%)	MP_HAC-D _INVTRI-4_2024-08	MP_HAC-D _INVTRI-4X_2024-08	RPD (%)	MP_HAC-R1 _INVTRI-8_2024-08	MP_HAC-R1 _INVTRI-8X_2024-08	RPD (%)	MP_HAC-U _INVTRI-4_2024-08	MP_HAC-U _INVTRI-4X_2024-08	RPD (%)
Physical Tests																
% Moisture	%	74.8	75.7	1.20	72.7	75.8	4.18	77.7	78.6	1.15	75.9	73.2	3.62	75.1	74.9	0.267
Metals																
Aluminum	mg/kg	105	224	72.3	266	698	89.6	802	1,320	48.8	57	31.2	58.5	83.5	10.2	156
Antimony	mg/kg	0.02	0.023	13.9	0.015	0.056	115	0.049	0.051	4.00	0.021	0.023	9.09	0.022	0.011	66.7
Arsenic	mg/kg	0.885	1.28	36.5	5.83	9.31	46.0	1.89	2.21	15.6	0.366	0.243	40.4	0.574	0.432	28.2
Barium	mg/kg	7.37	21	96.1	39.2	55.6	34.6	37	59.6	46.8	1.51	1.15	27.1	15	1.63	161
Beryllium	mg/kg	<0.01	<0.01	-	0.012	0.031	88.4	0.03	0.039	26.1	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	0.011	0.013	16.7	<0.01	<0.01	-	<0.01	<0.01	-
Boron	mg/kg	<1	<1	-	2.8	6.2	75.6	3.4	4.2	21.1	<1	<1	-	<1	<1	-
Cadmium	mg/kg	0.178	0.218	20.2	0.166	0.122	30.6	0.4	0.48	18.2	<0.01	<0.01	-	0.11	0.041	91.4
Calcium	mg/kg	847	1,200	34.5	888	1,640	59.5	3,580	4,890	30.9	700	479	37.5	908	740	20.4
Cesium	mg/kg	0.0179	0.0293	48.3	0.0422	0.0943	76.3	0.145	0.212	37.5	0.012	0.0072	50.0	0.0135	0.0087	43.2
Chromium	mg/kg	0.37	<0.2	59.6	1	2.02	67.5	1.88	2.24	17.5	<0.2	<0.2	-	<0.2	<0.2	-
Cobalt	mg/kg	0.208	0.385	59.7	1.01	1.58	44.0	1.68	2.06	20.3	0.08	0.079	1.26	0.21	0.124	51.5
Copper	mg/kg	21.3	27.8	26.5	17.7	18.1	2.23	68	91.5	29.5	18.3	18.9	3.23	20.9	25.2	18.7
Iron	mg/kg	291	566	64.2	683	1,730	86.8	1,610	2,100	26.4	209	136	42.3	206	92.9	75.7
Lead	mg/kg	0.094	0.172	58.6	0.206	0.391	62.0	0.54	0.702	26.1	<0.05	<0.05	-	0.052	<0.05	3.92
Lithium	mg/kg	<0.5	<0.5	-	<0.5	0.7	33.3	0.88	1.13	24.9	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	1,240	1,320	6.25	1,290	1,330	3.05	1,280	1,500	15.8	1,360	1,110	20.2	1,180	1,140	3.45
Manganese	mg/kg	232	302	26.2	553	709	24.7	1,140	1,310	13.9	98.9	75.9	26.3	1,170	144	156
Mercury	mg/kg	0.0772	0.0487	45.3	0.0444	0.052	15.8	0.0517	0.0724	33.4	0.0559	0.0636	12.9	0.0649	0.0532	19.8
	mg/kg ww	0.0195	0.0118	49.2	0.0121	0.0126	4.05	0.0115	0.0155	29.6	0.0134	0.017	23.7	0.0161	0.0134	18.3
Molybdenum	mg/kg	5.32	5.48	2.96	4.07	4.63	12.9	5.17	4.37	16.8	7.83	12.6	46.7	5.82	10.8	59.9
Nickel	mg/kg	0.3	0.23	26.4	1.84	3.04	49.2	2.52	3.04	18.7	<0.2	<0.2	-	0.26	<0.2	26.1
Phosphorus	mg/kg	6,880	8,160	17.0	7,600	7,390	2.80	7,980	8,370	4.77	8,200	7,490	9.05	7,440	7,560	1.60
Potassium	mg/kg	5,890	7,330	21.8	8,790	10,500	17.7	6,900	7,400	6.99	7,380	6,170	17.9	6,900	7,040	2.01
Rubidium	mg/kg	1.32	1.68	24.0	3.16	3.78	17.9	3.01	3.54	16.2	1.3	1.22	6.35	1.34	1.81	29.8
Selenium	mg/kg	1.5	1.51	0.664	1.28	1.66	25.9	8.37	6.95	18.5	13.2	18.4	32.9	11	15.5	34.0
Silver	mg/kg	0.0097	0.013	29.1	0.0206	0.0199	3.46	0.0289	0.0438	41.0	<0.005	<0.005	-	<0.005	<0.005	-
Sodium	mg/kg	2,810	3,260	14.8	2,190	2,430	10.4	2,880	3,340	14.8	2,870	2,300	22.1	2,250	2,540	12.1
Strontium	mg/kg	5.79	7.37	24.0	7.29	11.6	45.6	17.8	40.5	77.9	4.66	3.04	42.1	6.64	3.97	50.3
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Thallium	mg/kg	0.003	0.0049	48.1	0.0048	0.0104	73.7	0.0153	0.0218	35.0	<0.002	<0.002	-	<0.002	<0.002	-
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Titanium	mg/kg	5.52	13.5	83.9	12.6	33.3	90.2	37.5	50.1	28.8	6.07	2.34	88.7	5.09	0.71	151
Uranium	mg/kg	0.0073	0.0303	122	0.0316	0.0702	75.8	0.0777	0.0872	11.5	0.0041	0.0024	52.3	0.0242	0.0045	137
Vanadium	mg/kg	0.47	1.16	84.7	1.15	3.12	92.3	3.95	5.14	26.2	0.36	0.21	52.6	0.63	0.18	111
Zinc	mg/kg	137	137	0	148	126	16.1	128	131	2.32	107	93.9	13.0	90.1	93.7	3.92
Zirconium	mg/kg	<0.2	0.21	4.88	0.28	0.74	90.2	0.66	0.85	25.2	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: The RPD was calculated using < LRL results at the LRL if one result in a duplicate pair was below the LRL. The RPD was not calculated if both results were <LRL. RPD = relative percent difference. "-" = not calculated. LRL = Laboratory Reporting Limit.

B9.5 Hold Times

Recommended hold times were met for all benthic invertebrate and periphyton tissue quality samples (VA24C1418; Appendix G).

B9.6 Data Quality Statement

Benthic and periphyton tissue quality data collected as part of the 2024 were considered acceptable for this study as characterized by good detectability and appropriate LRLs (below the BCMOE guideline for selenium), few detectable analyte concentrations in MBs, and acceptable laboratory accuracy and precision. Field sampling precision, as quantified by calculation of relative percent differences between parent and field duplicate sample results, was relatively low across all tissue types; however, this is likely compensated for by the number of replicate tissue samples. Interpretation of benthic invertebrate and periphyton tissue quality results from the 2024 CEMP should be approached carefully and compared relative to historic results before derivation of conclusions. Several primary and secondary analytes did not meet the DQO in laboratory and field duplicate samples, suggesting natural heterogeneity in sample; however, the study design addressed this variability by targeting eight replicates sampled for each tissue type. These sources of variability will be considered during data interpretation.

B10 FISH TISSUE QUALITY

B10.1 Laboratory Reporting Limits

The analytical ALS laboratory reports for fish tissue quality (VA24B0407, VA24C1393, VA24C9858, VA24C9929, and VA24C9932; Appendix G) were examined to provide an inventory of analytes for which the sample results were less than the LRL. The LRL range for these analytes were also assessed relative to available guidelines, which exist only for mercury (wet weight; CFIA 2015) and selenium (dry weight; BCMOE 2014). Results for several analytes were frequently below the LRL, although all results for mercury (wet weight) and selenium were above LRLs (Appendix Table B.17). All achieved LRLs were below the available guidelines and, as such, the achieved LRLs were appropriate for this study.

B10.2 Laboratory Blanks

Laboratory MB samples were analyzed in the ALS laboratory reports (VA24B0407, VA24C9858, VA24C9932, VA24C1393 and VA24C9929; Appendix G). Of the 1,138 individual MB results, only two did not meet the laboratory DQO and include one result for each of zirconium and manganese, and LRLs were raised for associated samples (see laboratory reports VA24C0407, VA24C9858; Appendix G). Only 0.18% of results did not meet the laboratory DQO, indicating minimal inadvertent laboratory contamination.

B10.3 Data Precision

A total of 30 laboratory duplicate samples were used to evaluate laboratory precision (see laboratory reports VA24B0407, VA24C9858, VA24C9932, VA24C1393 and VA24C9929; Appendix G). Of the 847 duplicate pair results, 30 did not meet the laboratory DQO due to sample heterogeneity (laboratory reports VA23B1226 and VA23B4184; Appendix G). This included four results for iron (a primary analyte), two results each for aluminum, manganese, and uranium, and one result each for barium, cadmium, chromium, copper, and strontium (all secondary analytes except for aluminum and chromium). As only 1.79% of laboratory duplicate samples exceeded the laboratory DQO, laboratory precision and reproducibility were considered acceptable for this study.

A total of 27 field duplicate samples were collected to assess field sampling precision (Appendix Table B.18), with 12 field duplicate samples collected during the spring fish tissue monitoring program and 15 field duplicate samples collected during the fall fish tissue monitoring program. Spring fish tissue samples included three of each tissue type (muscle, ovary, liver, kidney) from longnose sucker and rainbow trout captured (Polley and Bootjack Lakes), while fall samples included either three (ovary) or four (muscle, liver, kidney)

Table B.17: Evaluation of Laboratory Reporting Limits (LRL) in Fish Tissue Quality Results, MPMC CEMP, 2024

Analyte	Units	Range of LRLs	No. Sample Results < LRL
Metals			
Aluminum	mg/kg	2.00 to 6.70	124 (37%)
Antimony	mg/kg	0.0100 to 0.0270	296 (88%)
Arsenic	mg/kg	0.0200 to 0.0670	4 (1%)
Barium	mg/kg	0.0500 to 0.0670	39 (12%)
Beryllium	mg/kg	0.0100 to 0.0130	335 (99%)
Bismuth	mg/kg	0.0100 to 0.0130	315 (93%)
Boron	mg/kg	1.00 to 1.80	335 (99%)
Cadmium	mg/kg	0.00500 to 0.0130	101 (30%)
Chromium	mg/kg	0.0500 to 0.270	142 (42%)
Cobalt	mg/kg	0.0200 to 0.0270	48 (14%)
Lead	mg/kg	0.0200 to 0.0670	251 (74%)
Lithium	mg/kg	0.500 to 0.670	336 (99%)
Mercury	mg/kg	0.00500 to 0.0942	6 (2%)
Molybdenum	mg/kg	0.0200 to 0.0540	74 (22%)
Nickel	mg/kg	0.200 to 0.270	228 (67%)
Silver	mg/kg	0.00500 to 0.00670	154 (46%)
Tellurium	mg/kg	0.0200 to 0.0270	313 (93%)
Thallium	mg/kg	0.00200 to 0.00360	50 (15%)
Tin	mg/kg	0.100 to 0.130	304 (90%)
Titanium	mg/kg	0.250 to 0.890	178 (53%)
Uranium	mg/kg	0.00200 to 0.00270	134 (40%)
Vanadium	mg/kg	0.100 to 0.130	174 (51%)
Zirconium	mg/kg	0.200 to 0.400	337 (100%)

Notes: mg/kg = milligrams per kilogram dry weight. LRL = laboratory reporting limit. Only constituents for which at least one sample was <LRL are displayed. Fish tissue guidelines only exist for mercury (wet weight) and selenium (dry weight), which are not displayed in the table as all results were >LRL. The total number of samples in 2024 was 338, which included 27 field duplicate samples.

Table B.18: Field Duplicate Results for Fish Tissue Quality, MPMC CEMP, 2024

Analyte	Unit	MP_BOL_RB-Ki-4_2024-04	MP_BOL_RB-Ki-4X _2024-04	RPD (%)	MP_BOL_RB-Li-4_2024-04	MP_BOL_RB-Li-4X_2024-04	RPD (%)	MP_BOL_RB-M-4_2024-04	MP_BOL_RB-M-4X _2024-04	RPD (%)	MP_BOL_RB-O-4_2024-04	MP_BOL_RB-O-4X _2024-04	RPD (%)	MP_POL_LSU-Ki-7_2024-04	MP_POL_LSU-Ki-7X_2024-04	RPD (%)	MP_POL_LSU-Li-7_2024-04	MP_POL_LSU-Li-7X_2024-04	RPD (%)
Aluminum	mg/kg	10.3	7.50	31.5	<5	<5	-	10.0	<2	133	<2	<2	-	<5	6.20	21.4	3.40	<2	51.9
Antimony	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	0.0180	0.0160	11.8
Arsenic	mg/kg	0.541	0.505	6.88	0.122	0.138	12.3	0.0500	0.0500	0	0.0320	0.0320	0	0.239	0.226	5.59	0.396	0.340	15.2
Barium	mg/kg	1.08	1.16	7.14	0.146	0.172	16.4	0.439	0.0600	152	0.528	0.505	4.45	1.26	0.651	63.7	0.213	0.152	33.4
Beryllium	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Boron	mg/kg	1.00	<1	0	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium	mg/kg	0.480	0.634	27.6	0.134	0.146	8.57	<0.005	<0.005	-	<0.005	<0.005	-	4.77	5.90	21.2	0.768	0.641	18.0
Calcium	mg/kg	672	643	4.41	342	458	29.0	1,210	387	103	1,230	1,180	4.15	481	391	20.6	243	205	17.0
Cesium	mg/kg	0.0297	0.0406	31.0	0.0332	0.0305	8.48	0.0659	0.0594	10.4	0.0138	0.0132	4.44	0.0431	0.0440	2.07	0.0305	0.0295	3.33
Chromium	mg/kg	0.380	0.230	49.2	0.320	0.370	14.5	0.0890	<0.05	56.1	<0.05	<0.05	-	<0.2	<0.2	-	0.270	0.0680	120
Cobalt	mg/kg	0.425	0.643	40.8	0.0960	0.0980	2.06	<0.02	<0.02	-	0.0470	0.0480	2.11	0.600	0.665	10.3	0.124	0.102	19.5
Copper	mg/kg	5.44	6.21	13.2	178	126	34.2	2.74	1.98	32.2	9.41	8.73	7.50	7.04	6.87	2.44	71.6	63.6	11.8
Iron	mg/kg	1,050	921	13.1	2,860	4,520	45.0	51.9	34.6	40.0	72.2	56.1	25.1	330	316	4.33	604	491	20.6
Lead	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.05	<0.05	-	<0.02	<0.02	-
Lithium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	661	712	7.43	629	850	29.9	1,270	1,170	8.20	1,560	1,520	2.60	716	706	1.41	1,320	1,160	12.9
Manganese	mg/kg	2.82	3.23	13.6	6.16	8.64	33.5	1.00	0.530	61.4	6.16	6.42	4.13	5.42	5.41	0.185	15.2	13.6	11.1
Mercury	mg/kg	0.488	0.515	5.38	0.393	0.492	22.4	0.440	0.381	14.4	0.0197	0.0134	38.1	0.233	0.260	10.9	0.128	0.113	12.4
Mercury	mg/kg ww	0.122	0.114	6.78	0.0996	0.126	23.4	0.0936	0.0835	11.4	0.00710	0.00490	36.7	0.0467	0.0563	18.6	0.0269	0.0267	0.746
Molybdenum	mg/kg	0.600	0.583	2.87	1.38	1.76	24.2	<0.02	<0.02	-	0.0350	0.0290	18.8	1.04	1.21	15.1	2.06	1.76	15.7
Nickel	mg/kg	0.450	0.430	4.55	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	0.510	0.510	0	<0.2	<0.2	-
Phosphorus	mg/kg	10,300	11,600	11.9	12,600	14,800	16.1	12,700	12,300	3.20	11,300	11,900	5.17	15,000	15,000	0	22,700	20,100	12.2
Potassium	mg/kg	9,740	10,800	10.3	11,000	11,500	4.44	20,500	20,000	2.47	7,260	6,880	5.37	12,400	12,100	2.45	19,100	16,900	12.2
Rubidium	mg/kg	5.73	6.54	13.2	6.90	7.05	2.15	9.34	9.67	3.47	3.86	3.67	5.05	9.26	9.31	0.539	14.0	12.0	15.4
Selenium	mg/kg	10.5	10.4	0.957	43.4	28.5	41.5	2.16	2.08	3.77	4.92	4.81	2.26	10.4	10.8	3.77	14.1	12.1	15.3
Silver	mg/kg	0.00580	0.00530	9.01	2.58	1.65	44.0	<0.005	<0.005	-	0.00820	0.00770	6.29	<0.005	<0.005	-	0.0688	0.0679	1.32
Sodium	mg/kg	8,030	10,300	24.8	6,100	6,390	4.64	1,890	1,770	6.56	2,610	2,550	2.33	7,020	5,780	19.4	3,540	2,980	17.2
Strontium	mg/kg	2.30	2.35	2.15	0.800	1.05	27.0	1.75	0.430	121	3.81	3.78	0.791	1.04	0.760	31.1	0.494	0.399	21.3
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	0.0470	0.0530	12.0	<0.02	<0.02	-
Thallium	mg/kg	0.0501	0.0456	9.40	0.204	0.226	10.2	0.00840	0.00860	2.35	<0.002	<0.002	-	0.0129	0.0146	12.4	0.00390	0.00400	2.53
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	0.240	82.3	0.160	<0.1	46.1	<0.1	<0.1	-	<0.1	0.390	118
Titanium	mg/kg	0.970	0.580	50.3	<0.5	<0.5	-	0.930	<0.25	115	<0.25	<0.25	-	0.770	1.00	26.0	0.360	<0.25	36.1
Uranium	mg/kg	0.0127	0.0122	4.02	0.00970	0.0146	40.3	<0.002	<0.002	-	<0.002	<0.002	-	0.0130	0.0116	11.4	0.00270	<0.002	29.8
Vanadium	mg/kg	0.510	0.420	19.4	0.340	0.480	34.1	<0.1	<0.1	-	<0.1	<0.1	-	5.37	5.61	4.37	0.890	0.650	31.2
Zinc	mg/kg	250	221	12.3	172	206	18.0	15.7	15.3	2.58	72.8	70.6	3.07	156	140	10.8	120	102	16.2
Zirconium	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit. Duplicate samples could not be collected for whole-body tissue samples (i.e., northern pikeminnow from Quesnel Lake and coho salmon or rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek).

Table B.18: Field Duplicate Results for Fish Tissue Quality, MPMC CEMP, 2024

Analyte	Unit	MP_POL_LSU-M-7_2024-04	MP_POL_LSU-M-7X_2024-04	RPD (%)	MP_POL_LSU-O-7_2024-04	MP_POL_LSU-O-7X_2024-04	RPD (%)	MP_POL_RB-Ki-4_2024-04	MP_POL_RB-Ki-4X_2024-04	RPD (%)	MP_POL_RB-Li-4_2024-04	MP_POL_RB-Li-4X_2024-04	RPD (%)	MP_POL_RB-M-4_2024-04	MP_POL_RB-M-4X _2024-04	RPD (%)	MP_POL_RB-O-4_2024-04	MP_POL_ RB-O-4X_2024-04	RPD (%)
Aluminum	mg/kg	<2	2.30	13.9	<2	<2	-	6.50	17.2	90.3	7.40	<5	38.7	<2	2.10	4.88	<2	<2	-
Antimony	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.02	0.0270	29.8	0.0170	<0.01	51.9	<0.01	<0.01	-	<0.01	<0.01	-
Arsenic	mg/kg	0.169	0.155	8.64	0.112	0.103	8.37	0.458	0.381	18.4	0.122	0.0950	24.9	0.0850	0.0740	13.8	0.0690	0.0560	20.8
Barium	mg/kg	0.159	0.342	73.0	0.146	0.133	9.32	0.267	0.301	12.0	0.0870	<0.05	54.0	<0.05	0.104	70.1	0.218	0.196	10.6
Beryllium	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	0.0200	66.7	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Boron	mg/kg	<1	<1	-	<1	<1	-	<1	1.40	33.3	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium	mg/kg	<0.005	<0.005	-	0.00810	0.00680	17.4	0.801	0.340	80.8	0.0600	0.0360	50.0	<0.005	<0.005	-	<0.005	<0.005	-
Calcium	mg/kg	1,290	3,790	98.4	581	554	4.76	978	639	41.9	240	277	14.3	715	419	52.2	1,360	1,280	6.06
Cesium	mg/kg	0.136	0.128	6.06	0.0152	0.0157	3.24	0.0239	0.0277	14.7	0.0315	0.0436	32.2	0.0481	0.0422	13.1	0.0112	0.00990	12.3
Chromium	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.2	5.37	186	<0.2	<0.2	-	0.0650	0.251	118	<0.05	<0.05	-
Cobalt	mg/kg	<0.02	<0.02	-	0.0840	0.0810	3.64	1.24	0.703	55.3	0.0760	0.0790	3.87	0.0200	<0.02	0	0.0800	0.0820	2.47
Copper	mg/kg	1.24	1.30	4.72	3.15	3.04	3.55	5.80	3.90	39.2	11.1	13.6	20.2	2.38	2.09	13.0	8.82	8.55	3.11
Iron	mg/kg	14.4	28.4	65.4	35.2	34.8	1.14	896	957	6.58	762	428	56.1	29.9	31.1	3.93	45.2	39.7	13.0
Lead	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.05	0.0580	14.8	<0.05	<0.05	-	<0.02	<0.02	-	<0.02	<0.02	-
Lithium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	1,310	1,280	2.32	704	686	2.59	567	622	9.25	700	764	8.74	1,290	1,150	11.5	1,500	1,490	0.669
Manganese	mg/kg	1.26	3.68	98.0	22.9	22.6	1.32	3.09	2.22	32.8	4.90	3.70	27.9	0.472	0.461	2.36	3.91	3.66	6.61
Mercury	mg/kg	0.687	0.725	5.38	0.0111	0.00990	11.4	0.582	0.556	4.57	0.496	0.493	0.607	0.519	0.476	8.64	0.00660	0.00540	20.0
Mercury	mg/kg ww	0.143	0.148	3.44	0.00400	0.00360	10.5	0.134	0.130	3.03	0.122	0.114	6.78	0.115	0.119	3.42	0.00260	0.00220	16.7
Molybdenum	mg/kg	<0.02	<0.02	-	0.0900	0.0780	14.3	0.390	0.299	26.4	0.686	0.430	45.9	<0.02	<0.02	-	0.0560	0.0470	17.5
Nickel	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	0.300	2.33	154	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
Phosphorus	mg/kg	12,600	14,300	12.6	11,600	11,600	0	9,060	11,500	23.7	13,600	14,500	6.41	12,300	10,800	13.0	11,800	12,000	1.68
Potassium	mg/kg	22,800	22,800	0	6,240	6,090	2.43	9,340	11,200	18.1	12,200	13,100	7.11	19,900	16,800	16.9	7,400	7,030	5.13
Rubidium	mg/kg	13.4	13.0	3.03	4.51	4.52	0.221	5.18	5.94	13.7	7.15	8.21	13.8	8.65	7.48	14.5	3.63	3.59	1.11
Selenium	mg/kg	5.97	6.30	5.38	7.31	6.98	4.62	12.6	10.8	15.4	10.6	7.64	32.5	3.11	2.85	8.72	8.54	8.13	4.92
Silver	mg/kg	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	-	0.107	0.120	11.4	<0.005	<0.005	-	0.00820	0.00790	3.73
Sodium	mg/kg	1,640	1,640	0	1,600	1,480	7.79	8,680	7,660	12.5	5,480	6,180	12.0	1,930	1,760	9.21	1,980	1,760	11.8
Strontium	mg/kg	1.81	7.10	119	0.722	0.682	5.70	1.53	1.14	29.2	0.410	0.380	7.59	0.621	0.353	55.0	3.23	3.07	5.08
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Thallium	mg/kg	<0.002	<0.002	-	<0.002	<0.002	-	0.0589	0.0537	9.24	0.209	0.120	54.1	0.00820	0.00620	27.8	<0.002	<0.002	-
Tin	mg/kg	<0.1	0.360	113	<0.1	<0.1	-	<0.1	0.200	66.7	<0.1	<0.1	-	<0.1	0.560	139	<0.1	0.100	0
Titanium	mg/kg	<0.25	0.390	43.8	<0.25	<0.25	-	0.540	1.40	88.7	0.540	<0.5	7.69	<0.25	<0.25	-	<0.25	<0.25	-
Uranium	mg/kg	<0.002	<0.002	-	<0.002	<0.002	-	0.00970	0.00910	6.38	0.00400	0.00210	62.3	<0.002	<0.002	-	<0.002	<0.002	-
Vanadium	mg/kg	<0.1	0.130	26.1	0.150	0.140	6.90	0.520	0.650	22.2	0.280	0.180	43.5	<0.1	<0.1	-	<0.1	<0.1	-
Zinc	mg/kg	19.4	20.0	3.05	87.7	86.0	1.96	240	203	16.7	118	126	6.56	17.5	17.7	1.14	57.4	56.9	0.875
Zirconium	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit. Duplicate samples could not be collected for whole-body tissue samples (i.e., northern pikeminnow from Quesnel Lake and coho salmon or rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek).

Table B.18: Field Duplicate Results for Fish Tissue Quality, MPMC CEMP, 2024

Analyte	Unit	MP_QUL-NCP_LT-KI-1_2024-10	MP_QUL-NCP_LT-KI-1X_2024-10	RPD (%)	MP_QUL-NCP_LT-LI-1_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	RPD (%)	MP_QUL-NCP_LT-MU-1_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	RPD (%)	MP_QUL-NCP_LT-OV-1_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10	RPD (%)	MP_QUL-NGC_PCC-KI-1_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	RPD (%)	MP_QUL-NGC_PCC-LI-1_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10	RPD (%)
Aluminum	mg/kg	17.1	12.6	30.3	<5	<5	-	<2	<2	-	<2	<2	-	5.40	6.40	16.9	9.40	9.40	0
Antimony	mg/kg	<0.01	0.0110	9.52	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	0.0230	<0.02	13.9	0.0230	<0.02	13.9
Arsenic	mg/kg	0.698	0.525	28.3	1.04	1.09	4.69	0.458	0.510	10.7	0.227	0.208	8.74	0.173	0.191	9.89	0.141	0.142	0.707
Barium	mg/kg	0.147	0.161	9.09	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	1.45	1.64	12.3	0.490	0.276	55.9
Beryllium	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	0.0840	0.0760	10.0	0.0890	0.0810	9.41
Boron	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium	mg/kg	2.60	3.35	25.2	0.641	0.507	23.3	<0.005	<0.005	-	<0.005	<0.005	-	13.8	11.7	16.5	0.924	0.910	1.53
Calcium	mg/kg	1,700	584	97.7	491	427	13.9	426	329	25.7	840	592	34.6	489	418	15.7	185	241	26.3
Cesium	mg/kg	0.100	0.217	73.8	0.204	0.213	4.32	0.433	0.391	10.2	0.0677	0.0593	13.2	0.0684	0.0557	20.5	0.0364	0.0420	14.3
Chromium	mg/kg	0.720	0.690	4.26	0.240	0.250	4.08	0.103	<0.05	69.3	<0.05	<0.05	-	0.430	0.440	2.30	0.780	0.430	57.9
Cobalt	mg/kg	0.112	0.166	38.9	0.0880	0.0760	14.6	<0.02	<0.02	-	0.0200	<0.02	0	4.41	3.85	13.6	0.246	0.244	0.816
Copper	mg/kg	5.16	6.18	18.0	82.1	79.4	3.34	1.36	1.27	6.84	8.90	8.84	0.676	6.74	8.52	23.3	14.4	16.6	14.2
Iron	mg/kg	1,640	1,460	11.6	1,010	793	24.1	16.8	15.5	8.05	44.3	43.4	2.05	409	415	1.46	438	446	1.81
Lead	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.02	<0.02	-	<0.02	<0.02	-	0.0510	0.0630	21.1	0.0510	0.0550	7.55
Lithium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	266	645	83.2	1,010	755	28.9	1,570	1,310	18.1	1,230	1,220	0.816	903	650	32.6	766	1,440	61.1
Manganese	mg/kg	0.880	1.18	29.1	5.11	4.02	23.9	0.451	0.361	22.2	0.378	0.450	17.4	6.83	5.91	14.4	5.99	8.69	36.8
Mercury	mg/kg	5.62	6.43	13.4	3.43	3.28	4.47	1.63	1.37	17.3	0.182	0.187	2.71	0.345	0.326	5.66	0.364	0.367	0.821
Mercury	mg/kg ww	1.15	0.969	17.1	0.649	0.635	2.18	0.290	0.242	18.1	0.0608	0.0620	1.95	0.0886	0.0962	8.23	0.0964	0.0905	6.31
Molybdenum	mg/kg	0.179	0.269	40.2	0.354	0.341	3.74	<0.02	<0.02	-	<0.02	<0.02	-	0.607	0.535	12.6	0.835	0.859	2.83
Nickel	mg/kg	0.470	0.460	2.15	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	1.46	1.40	4.20	0.400	0.320	22.2
Phosphorus	mg/kg	6,780	14,500	72.6	17,500	17,400	0.573	13,000	12,400	4.72	11,000	9,900	10.5	14,000	11,400	20.5	14,000	15,700	11.4
Potassium	mg/kg	8,500	14,700	53.5	15,100	14,700	2.68	24,200	24,200	0	6,220	5,950	4.44	12,000	9,730	20.9	11,900	12,400	4.12
Rubidium	mg/kg	28.3	51.8	58.7	56.4	57.7	2.28	74.4	72.6	2.45	16.3	16.1	1.23	12.4	9.93	22.1	11.4	12.3	7.59
Selenium	mg/kg	8.43	9.55	12.5	6.77	6.58	2.85	2.05	2.06	0.487	3.81	3.43	10.5	6.46	6.03	6.89	9.56	8.96	6.48
Silver	mg/kg	0.0162	0.0129	22.7	0.529	0.483	9.09	<0.005	<0.005	-	0.0128	0.0100	24.6	0.0140	0.0155	10.2	0.0976	0.130	28.5
Sodium	mg/kg	10,000	15,800	45.0	9,760	8,430	14.6	2,170	2,100	3.28	3,390	3,410	0.588	3,010	2,700	10.9	2,400	2,850	17.1
Strontium	mg/kg	2.34	1.67	33.4	0.460	0.320	35.9	0.281	0.295	4.86	2.24	1.95	13.8	1.20	0.940	24.3	0.500	0.510	1.98
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	0.0650	0.0540	18.5	<0.02	<0.02	-
Thallium	mg/kg	0.0825	0.0984	17.6	0.550	0.438	22.7	0.0265	0.0224	16.8	0.0155	0.0158	1.92	0.0408	0.0331	20.8	0.0238	0.0217	9.23
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Titanium	mg/kg	0.860	0.700	20.5	<0.5	<0.5	-	0.290	<0.25	14.8	<0.25	<0.25	-	<0.5	0.520	3.92	<0.5	<0.5	-
Uranium	mg/kg	0.00570	0.00510	11.1	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	-	0.0633	0.0586	7.71	0.0266	0.0233	13.2
Vanadium	mg/kg	0.150	0.110	30.8	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	0.360	0.370	2.74	0.300	0.280	6.90
Zinc	mg/kg	70.6	65.5	7.49	134	133	0.749	14.2	13.8	2.86	61.3	58.7	4.33	191	210	9.48	119	120	0.837
Zirconium	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit. Duplicate samples could not be collected for whole-body tissue samples (i.e., northern pikeminnow from Quesnel Lake and coho salmon or rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek).

Table B.18: Field Duplicate Results for Fish Tissue Quality, MPMC CEMP, 2024

Analyte	Unit	MP_QUL-NGC_PCC-MU-1_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	RPD (%)	MP_QUL-NGC_PCC-OV-1_2024-10	MP_QUL-NGC_PCC-OV-1X_2024-10	RPD (%)	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-3X_2024-10	RPD (%)	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-7X_2024-10	RPD (%)	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-3X_2024-10	RPD (%)	MP_QUR_RB-LI-7_2024-10	MP_QUR_RB-LI-7X_2024-10	RPD (%)
Aluminum	mg/kg	<5	<5	-	<5	<5	-	9.80	12.2	21.8	35.2	53.5	41.3	9.40	13.7	37.2	15.2	16.9	10.6
Antimony	mg/kg	<0.01	<0.01	-	<0.01	0.0820	157	<0.01	<0.02	-	<0.02	0.0260	26.1	<0.02	<0.02	-	<0.02	<0.02	-
Arsenic	mg/kg	0.162	0.151	7.03	0.0450	0.140	103	0.888	0.566	44.3	1.12	1.68	40.0	0.186	0.198	6.25	0.0880	0.105	17.6
Barium	mg/kg	0.517	0.242	72.5	0.331	0.369	10.9	0.368	0.446	19.2	0.773	1.78	78.9	0.118	0.240	68.2	0.0590	0.172	97.8
Beryllium	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	0.0160	46.1	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Boron	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium	mg/kg	0.0240	0.0120	66.7	0.0350	0.0330	5.88	0.891	0.696	24.6	1.45	5.16	112	0.805	0.636	23.5	1.03	0.918	11.5
Calcium	mg/kg	6,000	901	148	484	473	2.30	912	562	47.5	978	1,940	65.9	223	283	23.7	229	230	0.436
Cesium	mg/kg	0.146	0.143	2.08	0.0628	0.0629	0.159	0.0379	0.0345	9.39	0.0300	0.0363	19.0	0.0400	0.0266	40.2	0.0283	0.0266	6.19
Chromium	mg/kg	<0.2	<0.2	-	0.220	0.210	4.65	0.420	0.640	41.5	0.720	0.710	1.40	<0.2	0.240	18.2	<0.2	<0.2	-
Cobalt	mg/kg	<0.02	0.0280	33.3	0.150	0.152	1.32	0.976	0.851	13.7	1.12	1.06	5.50	0.195	0.165	16.7	0.102	0.121	17.0
Copper	mg/kg	0.760	1.41	59.9	4.76	4.40	7.86	3.91	4.14	5.71	5.08	9.04	56.1	167	335	66.9	41.5	61.1	38.2
Iron	mg/kg	14.6	27.6	61.6	106	120	12.4	1,110	1,170	5.26	1,830	1,280	35.4	1,930	1,610	18.1	1,260	1,340	6.15
Lead	mg/kg	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	0.0580	14.8	0.0650	0.0810	21.9	<0.05	<0.05	-	<0.05	<0.05	-
Lithium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	1,800	1,470	20.2	896	732	20.1	625	470	28.3	802	868	7.90	722	546	27.8	813	834	2.55
Manganese	mg/kg	2.32	0.559	122	7.86	6.78	14.8	2.33	1.64	34.8	3.03	5.71	61.3	5.12	5.53	7.70	10.7	11.4	6.33
Mercury	mg/kg	0.673	0.639	5.18	0.0439	0.0480	8.92	0.466	0.360	25.7	0.610	0.562	8.19	0.154	0.185	18.3	0.231	0.230	0.434
Mercury	mg/kg ww	0.144	0.132	8.70	0.0131	0.0138	5.20	0.107	0.0889	18.5	0.117	0.128	8.98	0.0387	0.0604	43.8	0.0637	0.0663	4.00
Molybdenum	mg/kg	<0.04	<0.04	-	0.133	0.179	29.5	0.318	0.205	43.2	0.450	1.01	76.7	0.877	1.02	15.1	0.982	1.07	8.58
Nickel	mg/kg	<0.2	0.750	116	<0.2	<0.2	-	0.590	0.540	8.85	1.88	1.87	0.533	<0.2	2.19	167	<0.2	<0.2	-
Phosphorus	mg/kg	13,200	10,900	19.1	10,500	10,100	3.88	10,100	9,390	7.29	11,400	9,540	17.8	16,200	12,700	24.2	15,800	16,300	3.12
Potassium	mg/kg	20,000	20,600	2.96	10,300	9,880	4.16	10,900	9,510	13.6	12,200	10,400	15.9	14,000	8,920	44.3	13,900	13,500	2.92
Rubidium	mg/kg	17.6	17.6	0	11.4	11.0	3.57	11.9	10.6	11.6	9.35	9.32	0.321	16.1	10.6	41.2	18.3	18.2	0.548
Selenium	mg/kg	1.80	1.84	2.20	8.94	9.10	1.77	14.8	11.4	25.9	20.1	24.0	17.7	40.1	95.1	81.4	12.6	16.0	23.8
Silver	mg/kg	<0.005	<0.005	-	0.0439	0.0441	0.455	0.00760	0.0148	64.3	0.0120	0.0391	106	1.97	4.34	75.1	0.836	1.26	40.5
Sodium	mg/kg	904	966	6.63	1,890	1,770	6.56	7,250	6,850	5.67	9,900	9,730	1.73	4,390	3,630	18.9	2,740	2,960	7.72
Strontium	mg/kg	14.8	0.930	176	0.720	0.620	14.9	2.21	1.57	33.9	4.92	7.77	44.9	0.440	0.690	44.2	0.310	0.340	9.23
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	0.0280	<0.02	33.3	0.0550	0.0380	36.6	<0.02	<0.02	-	<0.02	<0.02	-
Thallium	mg/kg	0.00340	0.00520	41.9	0.00520	0.0189	114	0.0767	0.0458	50.5	0.0931	0.182	64.6	0.129	0.106	19.6	0.150	0.160	6.45
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Titanium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	0.530	0.690	26.2	1.36	2.30	51.4	<0.5	<0.5	-	<0.5	<0.5	-
Uranium	mg/kg	0.00570	<0.002	96.1	0.0166	0.0173	4.13	0.0204	0.0135	40.7	0.0915	0.0798	13.7	0.00620	0.00900	36.8	0.0305	0.0321	5.11
Vanadium	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	0.150	0.120	22.2	4.01	2.78	36.2	<0.1	<0.1	-	1.72	1.96	13.0
Zinc	mg/kg	22.8	30.2	27.9	153	139	9.59	110	83.5	27.4	134	134	0	120	136	12.5	135	154	13.2
Zirconium	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit. Duplicate samples could not be collected for whole-body tissue samples (i.e., northern pikeminnow from Quesnel Lake and coho salmon or rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek).

Table B.18: Field Duplicate Results for Fish Tissue Quality, MPMC CEMP, 2024

Analyte	Unit	MP_QUR_RB-MU-3_2024-10	MP_QUR_RB-MU-3X_2024-10	RPD (%)	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-7X_2024-10	RPD (%)	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-7X_2024-10	RPD (%)
Aluminum	mg/kg	3.10	<2	43.1	<2	<2	-	<2	3.00	40.0
Antimony	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Arsenic	mg/kg	0.130	0.123	5.53	0.163	0.166	1.82	0.0270	0.0470	54.0
Barium	mg/kg	0.0950	0.0700	30.3	<0.05	0.0650	26.1	0.567	0.972	52.6
Beryllium	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Bismuth	mg/kg	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Boron	mg/kg	<1	<1	-	<1	<1	-	<1	<1	-
Cadmium	mg/kg	<0.005	<0.005	-	<0.005	<0.005	-	0.00840	0.0109	25.9
Calcium	mg/kg	304	512	51.0	348	663	62.3	1,720	2,610	41.1
Cesium	mg/kg	0.0774	0.0787	1.67	0.0580	0.0545	6.22	0.0109	0.0195	56.6
Chromium	mg/kg	0.0980	0.0710	31.9	0.904	0.0720	170	0.0820	0.133	47.4
Cobalt	mg/kg	0.0650	0.0480	30.1	0.0240	<0.02	18.2	0.189	0.312	49.1
Copper	mg/kg	1.85	1.51	20.2	0.870	0.690	23.1	13.8	23.2	50.8
Iron	mg/kg	42.4	29.7	35.2	23.3	17.5	28.4	89.5	157	54.8
Lead	mg/kg	0.0250	<0.02	22.2	<0.02	<0.02	-	<0.02	<0.02	-
Lithium	mg/kg	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Magnesium	mg/kg	1,380	1,260	9.09	1,360	1,230	10.0	1,620	2,870	55.7
Manganese	mg/kg	0.718	0.376	62.5	0.262	0.431	48.8	9.45	15.9	50.9
Mercury	mg/kg	0.292	0.235	21.6	0.315	0.324	2.82	0.0230	0.0323	33.6
Mercury	mg/kg ww	0.0616	0.0573	7.23	0.0624	0.0716	13.7	0.00780	0.00600	26.1
Molybdenum	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	0.0250	0.0290	14.8
Nickel	mg/kg	0.270	0.220	20.4	<0.2	<0.2	-	<0.2	<0.2	-
Phosphorus	mg/kg	12,300	10,900	12.1	12,900	11,200	14.1	10,600	19,500	59.1
Potassium	mg/kg	20,200	17,800	12.6	23,300	20,900	10.9	4,790	8,680	57.8
Rubidium	mg/kg	19.4	17.1	12.6	15.0	13.5	10.5	4.15	7.28	54.8
Selenium	mg/kg	2.39	2.06	14.8	2.17	2.08	4.24	16.6	28.7	53.4
Silver	mg/kg	<0.005	<0.005	-	<0.005	<0.005	-	0.0161	0.0227	34.0
Sodium	mg/kg	1,760	1,290	30.8	1,280	1,190	7.29	3,080	5,230	51.7
Strontium	mg/kg	0.399	0.663	49.7	0.442	0.969	74.7	4.72	8.29	54.9
Tellurium	mg/kg	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Thallium	mg/kg	0.0317	0.0298	6.18	0.0212	0.0155	31.1	0.0103	0.0106	2.87
Tin	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Titanium	mg/kg	0.360	<0.25	36.1	<0.25	<0.25	-	<0.25	<0.25	-
Uranium	mg/kg	<0.002	<0.002	-	<0.002	<0.002	-	0.00560	0.00990	55.5
Vanadium	mg/kg	<0.1	<0.1	-	<0.1	<0.1	-	0.110	0.180	48.3
Zinc	mg/kg	19.8	16.4	18.8	12.6	11.9	5.71	96.2	165	52.7
Zirconium	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-

Value did not meet the data quality objective of ≤ 30% Relative Percent Difference (RPD).

Notes: Relative Percent Difference (RPD) was calculated using the LRL if one result in a duplicate pair was below the LRL. RPD was not calculated if both results were < LRL. "-" indicates that the RPD was not calculated. LRL = Laboratory Reporting Limit. Duplicate samples could not be collected for whole-body tissue samples (i.e., northern pikeminnow from Quesnel Lake and coho salmon or rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek).

of each tissue type from lake trout, peamouth chub from Quesnel Lake and rainbow trout from Quesnel River. Field duplicates could not be collected for whole-body tissue samples (i.e., coho salmon and rainbow trout from Hazeltine Creek, Frypan Creek, and Edney Creek and northern pikeminnow from Quesnel Lake) as the entire sample was required for analysis. Several RPDs were not calculated as both analyte concentrations were below the LRL (Appendix Table B.18; see Section B.2.3 for explanation on RPD calculation and DQOs). Of the 27 field duplicate pairs, 15 (i.e., 55.6% of duplicate pairs) pairs had >20% of analytes with RPDs >30%. Muscle tissue had the highest rate of DQO exceedances (85.7% of muscle tissue comparisons), and ovary tissue had the lowest average rate of DQO exceedances (20% of ovary tissue comparisons). In response to high RPDs, three field duplicate sample pairs from Quesnel Lake (VA24C9858)[8] and two field duplicate pairs from Quesnel River (VA24C9932)[9] were reanalyzed to check variability (see laboratory reports VA24C9858 and VA24C9932, respectively; Appendix G). In most or all cases, this variability was confirmed by reanalysis.[10] These relatively high rates of DQO exceedances were likely due to sample heterogeneity expected in biological tissues, as well as variability associated with multi-element scans. Tissue samples were collected in replicates of eight for each tissue type (muscle, liver, kidney, and ovary [as available]) to account for sampling heterogeneity (i.e., a total of 24 samples per sampling area). As a high proportion of all field duplicate analyses exceeded the DQO, these sources of variability will be considered during data interpretation.

B10.4 Data Accuracy

Data accuracy was evaluated based on results of RM and LCS samples (VA24B0407, VA24C9858, VA24C9932, VA24C1393 and VA24C9929). Out of 420 individual analyte results for RM samples, only three results (one for each of calcium, barium, and aluminum) did not meet the laboratory DQO (VA24C9858, VA24C9932, VA24C1393; Appendix G). This DQO exceedance occurred in multi-element scans where >10% of analytes met the laboratory DQO, which is a level deemed acceptable by the CCME. Out of the 416 individual LCS results, three did not meet the laboratory DQO, including one result each for boron, cadmium, and silver, phosphorus, and rubidium (VA24C9858; Appendix G). The DQO exceedances (as above) were due to multi-element scans where >10% of analytes met the laboratory DQO,

[8] Sample pairs VA24C9932-043 and -0114 (peamouth chub muscle), VA24C9858-071 and -119 (lake trout muscle), and VA24C9858-081 and -121 (lake trout kidney) were reanalyzed. Variability (i.e., high RPD) was confirmed in all samples except for VA24C9858-071 and -119 (lake trout muscle), for which revised results were reported.

[9] Sample pairs VA24C9932-019 and -032 (rainbow trout kidney) and VA24C9932-028 and -036 (rainbow trout ovary) were reanalyzed. The results of reanalysis confirmed variability in the metal scans (i.e., high RPDs).

[10] The ALS DQO for metals reanalysis is met if results from reanalysis are within 40 to 60% of the original results.

which is a level deemed acceptable by the CCME. As these DQO exceedances only represent 0.71 and 0.72% of all individual analyte results for RM and LCS samples respectively, laboratory accuracy was considered acceptable for this study.

B10.5 Hold Times

Recommended hold times were met for all fish tissue samples (VA24B0407, VA24C9858, VA24C9932, VA24C1393 and VA24C9929; Appendix G).

B10.6 Other Concerns

Concentrations of several analytes in 2024 were higher than historic maximum results for Quesnel River rainbow trout ovary tissue, including primary analytes selenium and iron (2.2-times and 5.7-times, respectively), and secondary analytes manganese, nickel and vanadium (2.5-times, 6.8-times, and 86-times higher, respectively) in sample MP_QUR_RB-OV-1_2024-10 (VA24C9932; Appendix G). Laboratory reanalysis did not find any obvious errors in the data nor justification to report the reanalysis results instead than the original data, therefore the original data were reported. Analyte concentrations that were above historic values could be related to observed variation in the development stage of the collected ovary tissues, or possibly a result of field or laboratory contamination.

B10.7 Data Quality Statement

Fish tissue quality data collected as part of the 2024 CEMP were of good quality as characterized by appropriate LRLs, excellent laboratory precision, no evidence of laboratory contamination, and excellent laboratory accuracy. Field sampling precision, as quantified using field duplicate samples, was relatively low (especially in muscle tissue); however, this was likely compensated for by the number of replicate fish tissue samples employed in this study. Therefore, fish tissue quality data can be used with a high level of confidence in the derivation of conclusions for the 2024 CEMP, though sources of variability in fish tissue samples will be considered during data interpretation.

B11 FISH AGING

B11.1 Data Accuracy

Analytical reports of fish age estimates from AAE Tech Services Inc. (see laboratory reports in Appendix G) were examined to evaluate data accuracy. Fish aging samples were collected from rainbow trout, longnose sucker, peamouth chub, lake trout, and northern pikeminnow (lakes) and coho salmon and rainbow trout (creeks). To determine the accuracy of age estimates, a subset (51% of all samples) of aging structures were re-assessed by a second analyst. The original and second analyst assigned a confidence index to each age estimate. Out of 64 total samples that were reassessed for quality control, 59 samples had perfect agreement between the primary age and secondary age estimates. Two aging samples from longnose sucker (pectoral fins), and one aging sample from lake trout (otolith) were all reassessed at one year younger than the original age estimate, and two aging samples from northern pikeminnow (scales) were both reassessed at one year older (see laboratory reports in Appendix G). As only five aging structures were reassessed at different ages, and the difference between original and QA/QC ages was only one year (meets internal DQO), the accuracy achieved by the laboratory in this study can be considered acceptable for this study.

B12 DATA QUALITY REVIEW SUMMARY

Data collected for the 2024 CEMP were of acceptable quality as characterized by appropriate LRLs, good detectability, negligible analyte concentration in MB samples, good laboratory precision, and good laboratory accuracy in water and sediment quality samples. Concentrations of several dissolved analytes were greater than the concentration of the corresponding total analyte for some water samples. Direct comparisons for sediment toxicity results between Polley Lake (POL-P1, POL-P2) and Bootjack Lake (BOL-B2) were limited due to laboratory error, and a weight-of-evidence approach will be used to interpret results. Field sampling precision, as measured by RPD in field duplicate pairs, was low in benthic invertebrate, periphyton, and fish tissue samples, reflecting natural variability in field samples and from multi-element scans.

Overall, data collected as part of the 2024 Mount Polley Mine CEMP can be used with a high level of confidence in the derivation of conclusions.

B13 REFERENCES

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APPENDIX C
DATA - LAKE HABITAT

APPENDIX C.1
WATER QUALITY

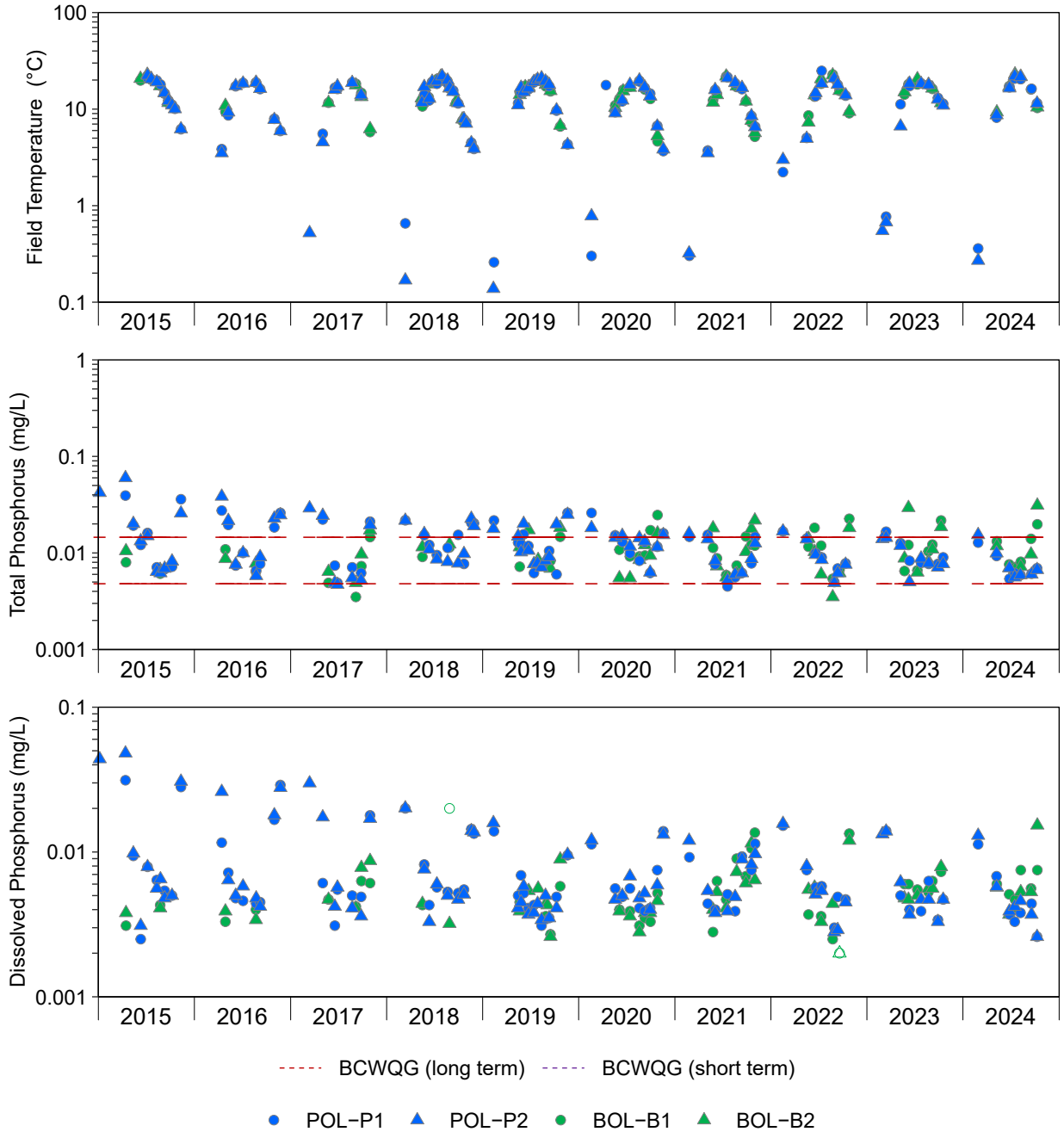
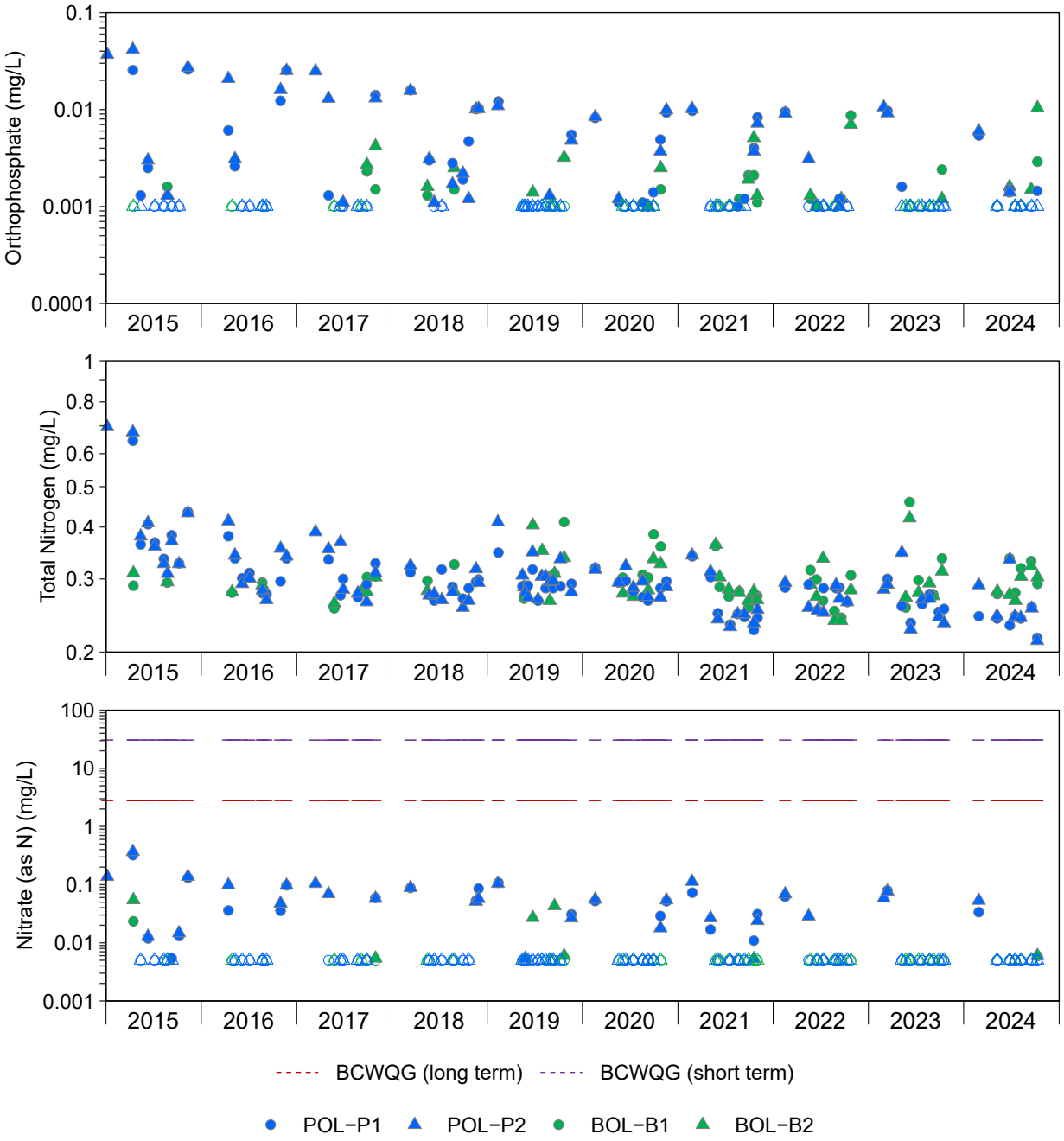


Figure C.1.1: Temperature and Nutrient Concentrations in Post−Breach Surface Water for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B1, BOL−B2; Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Total phosphorus BCWQG is shown as the guideline range (0.005 to 0.015 mg/L).



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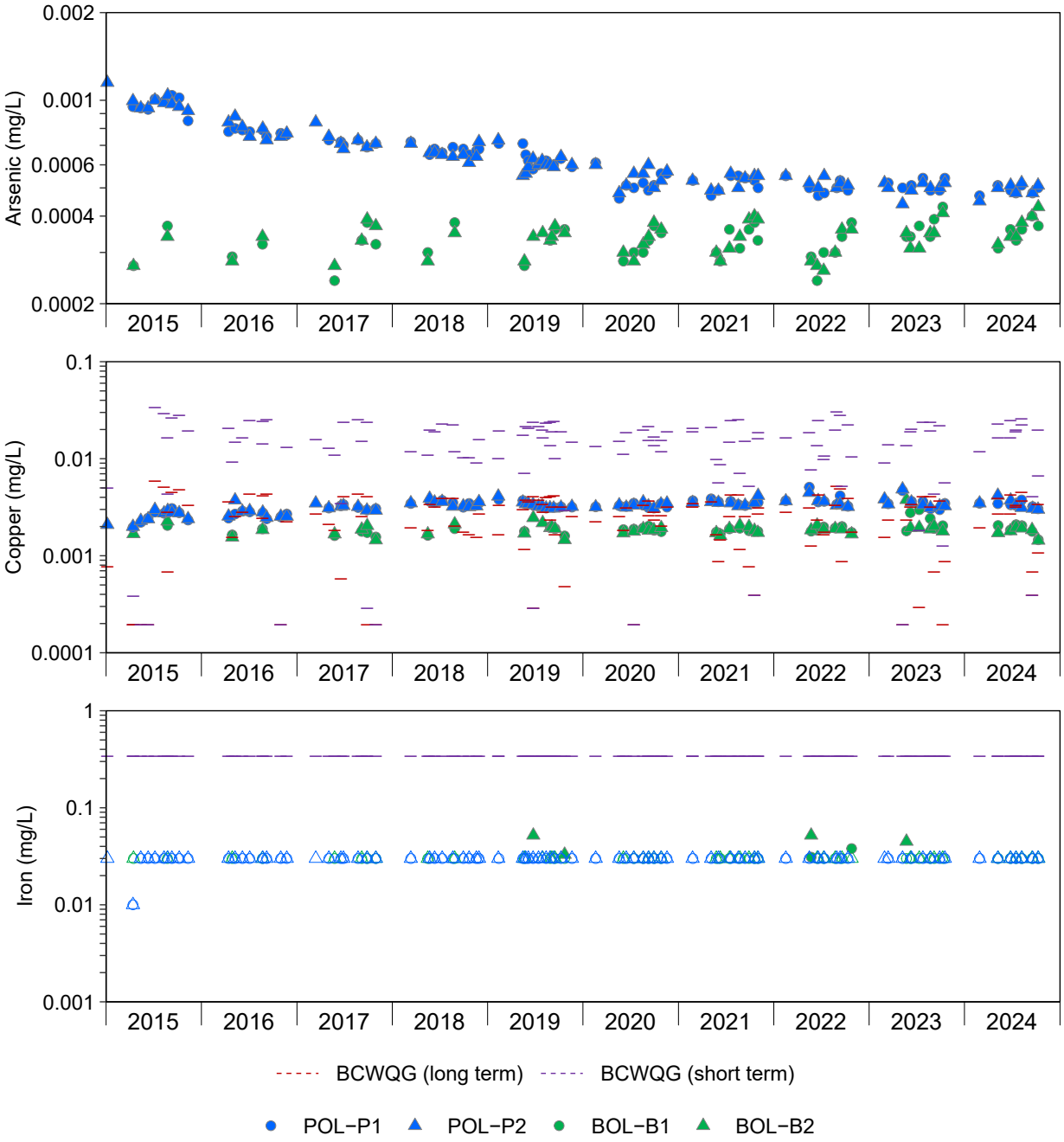

Figure C.1.2: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B1, BOL−B2; Reference) Monitoring Stations, 2015 to 2024

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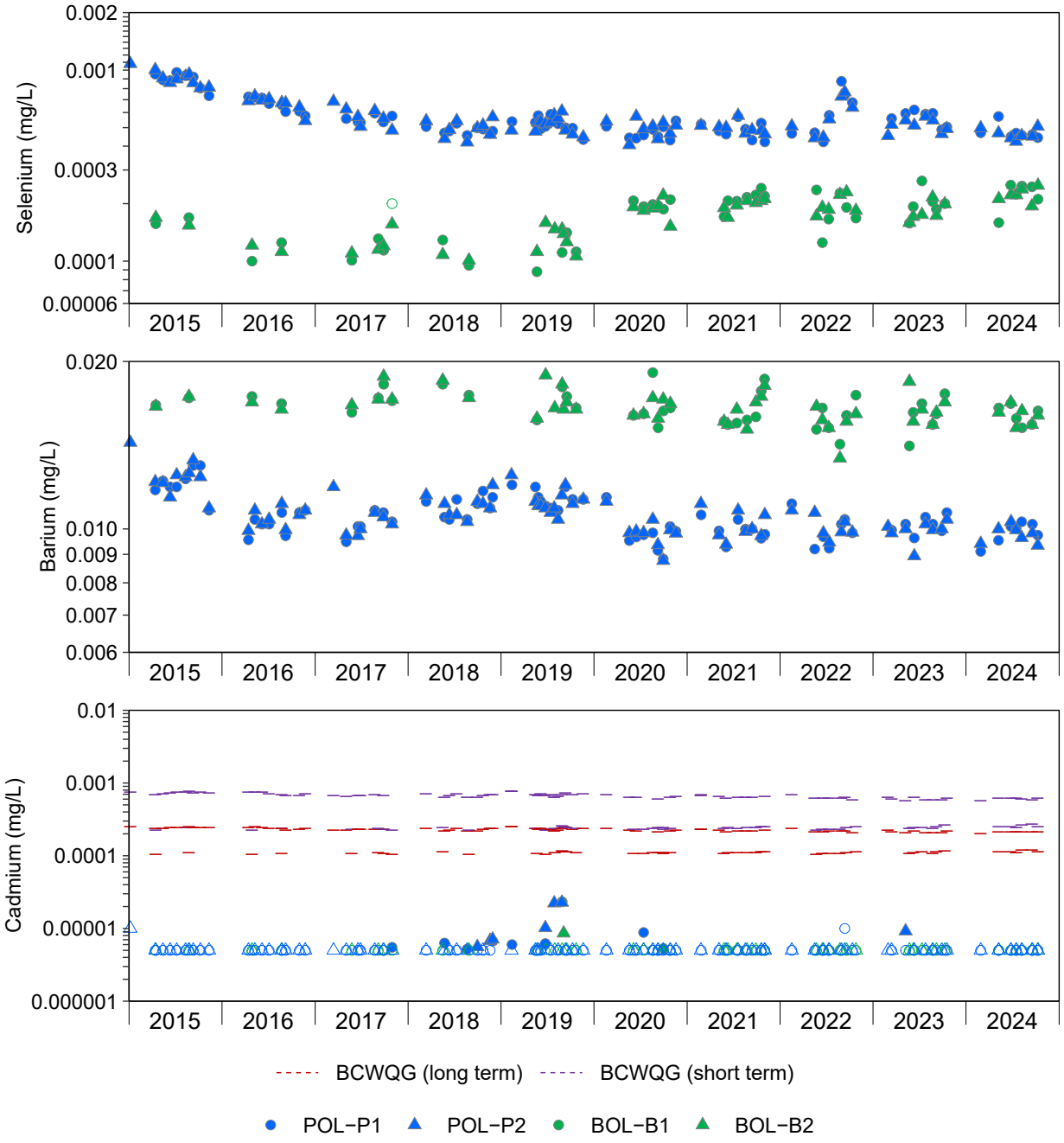

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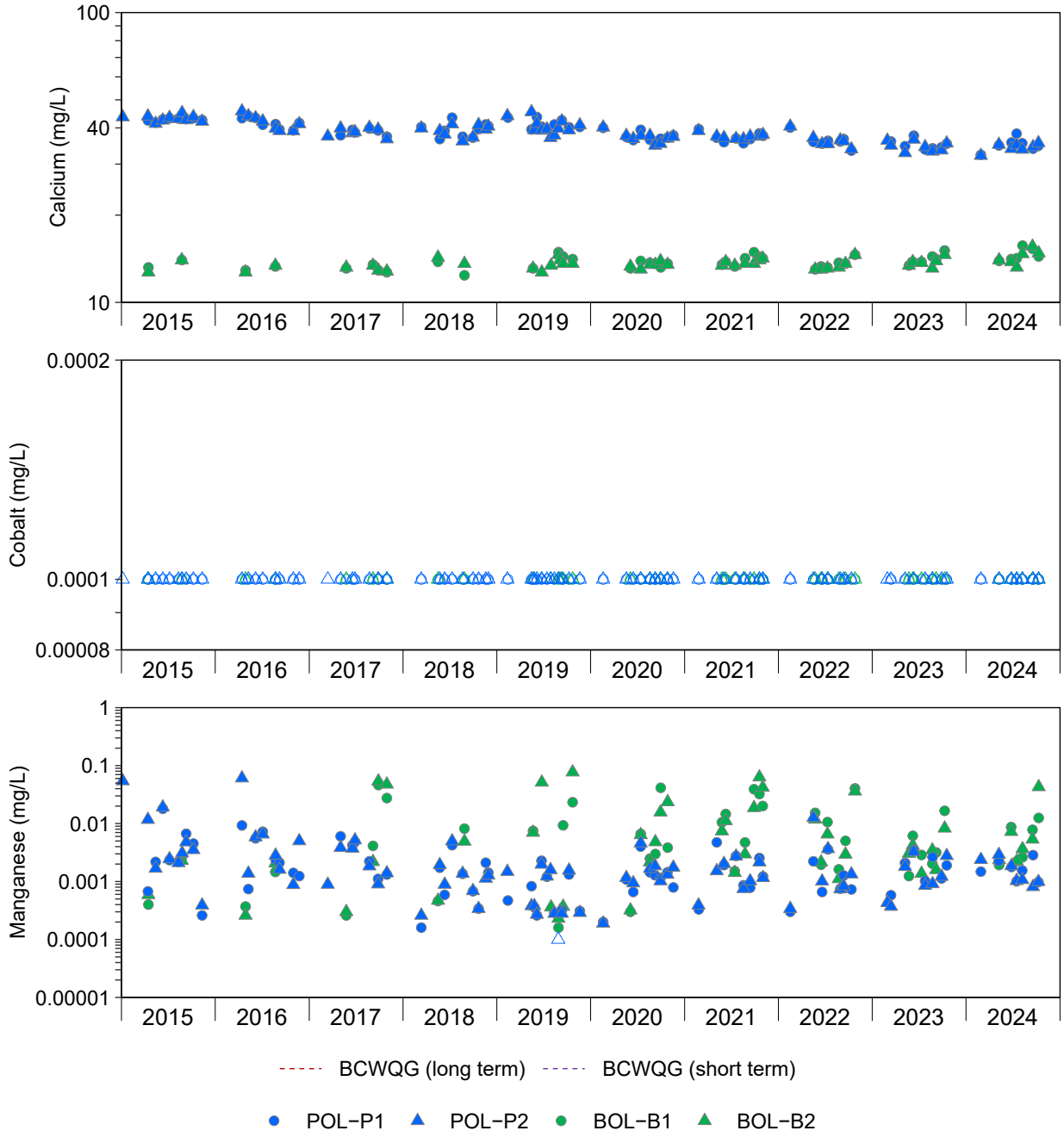

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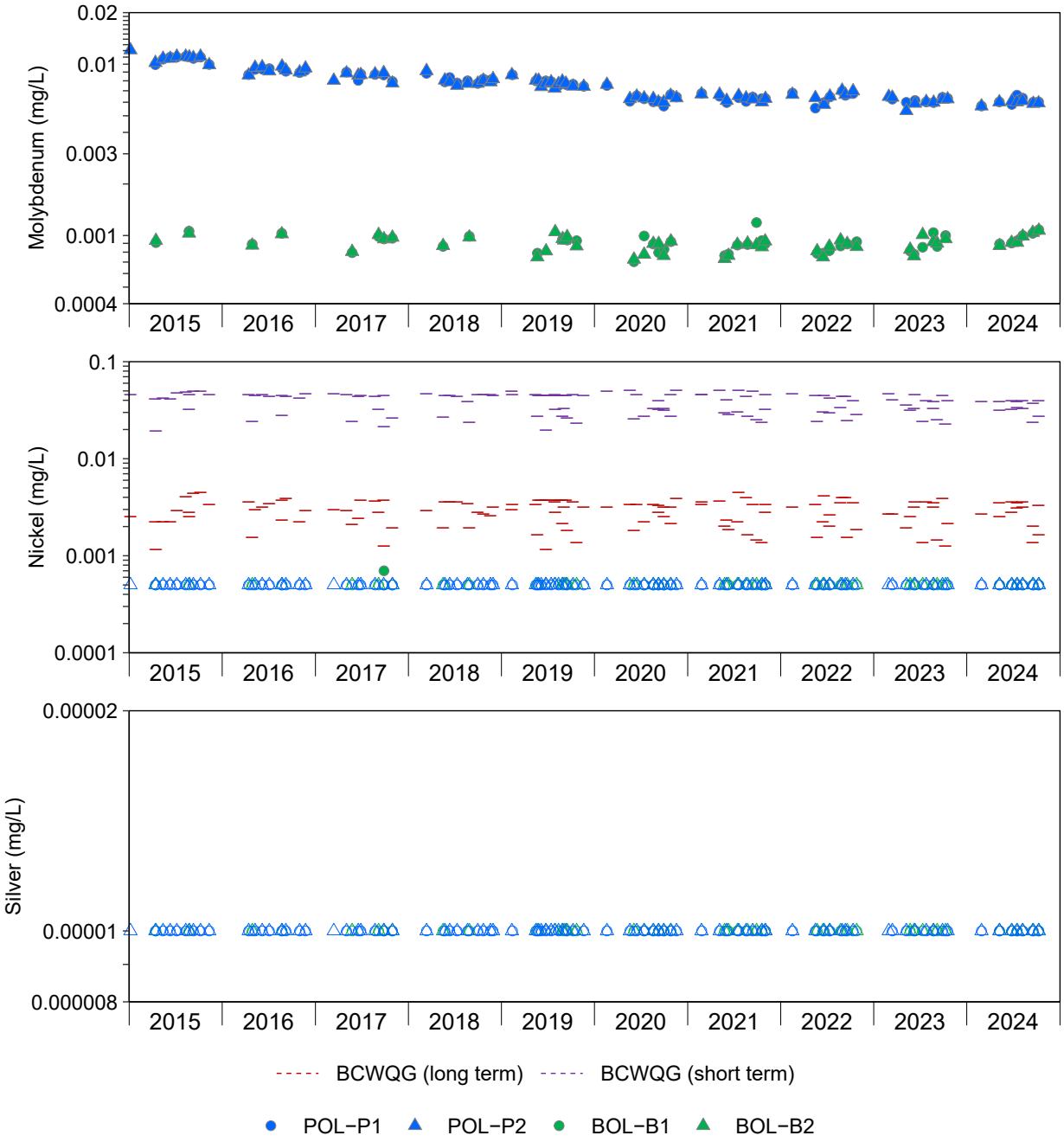

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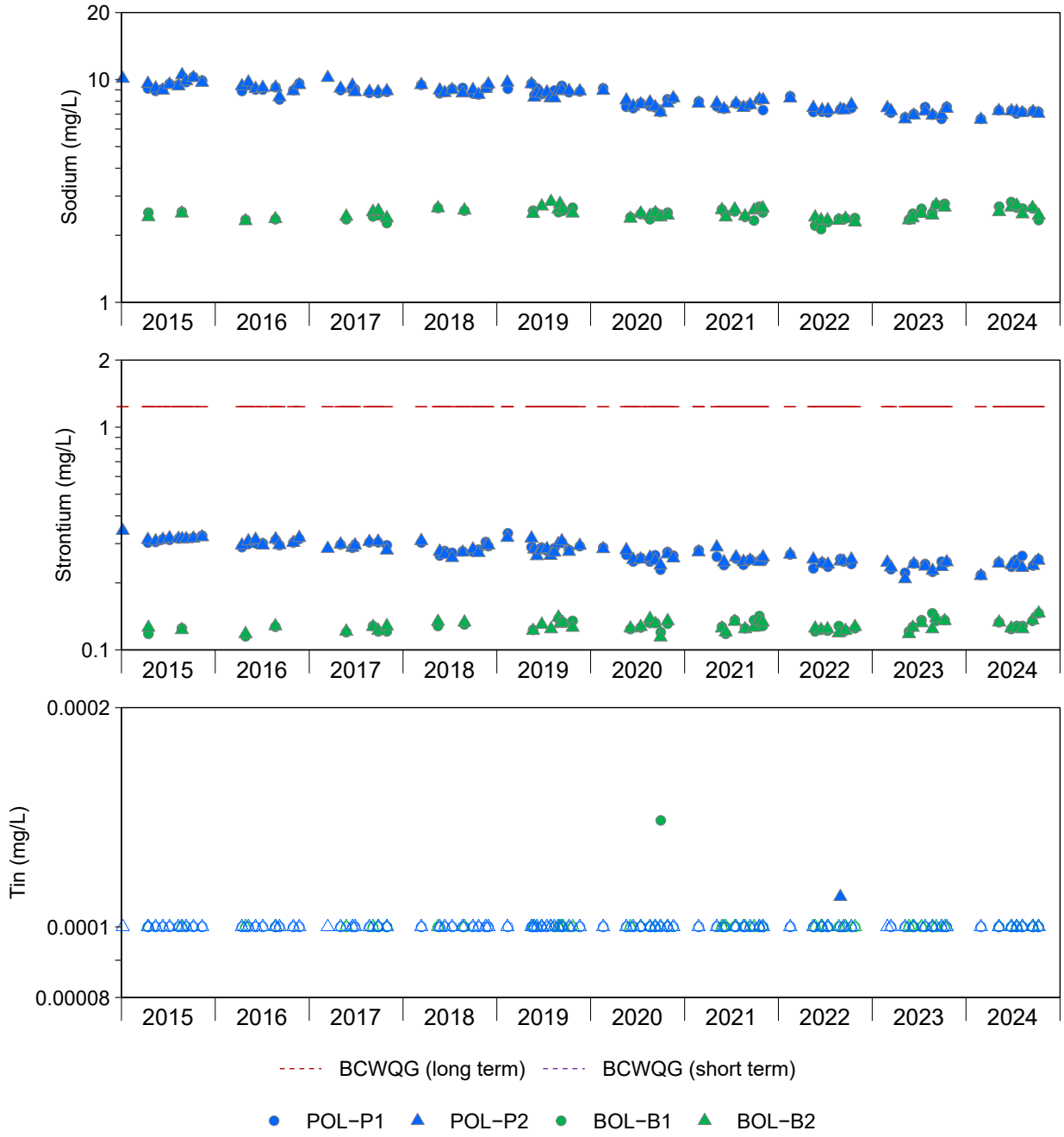

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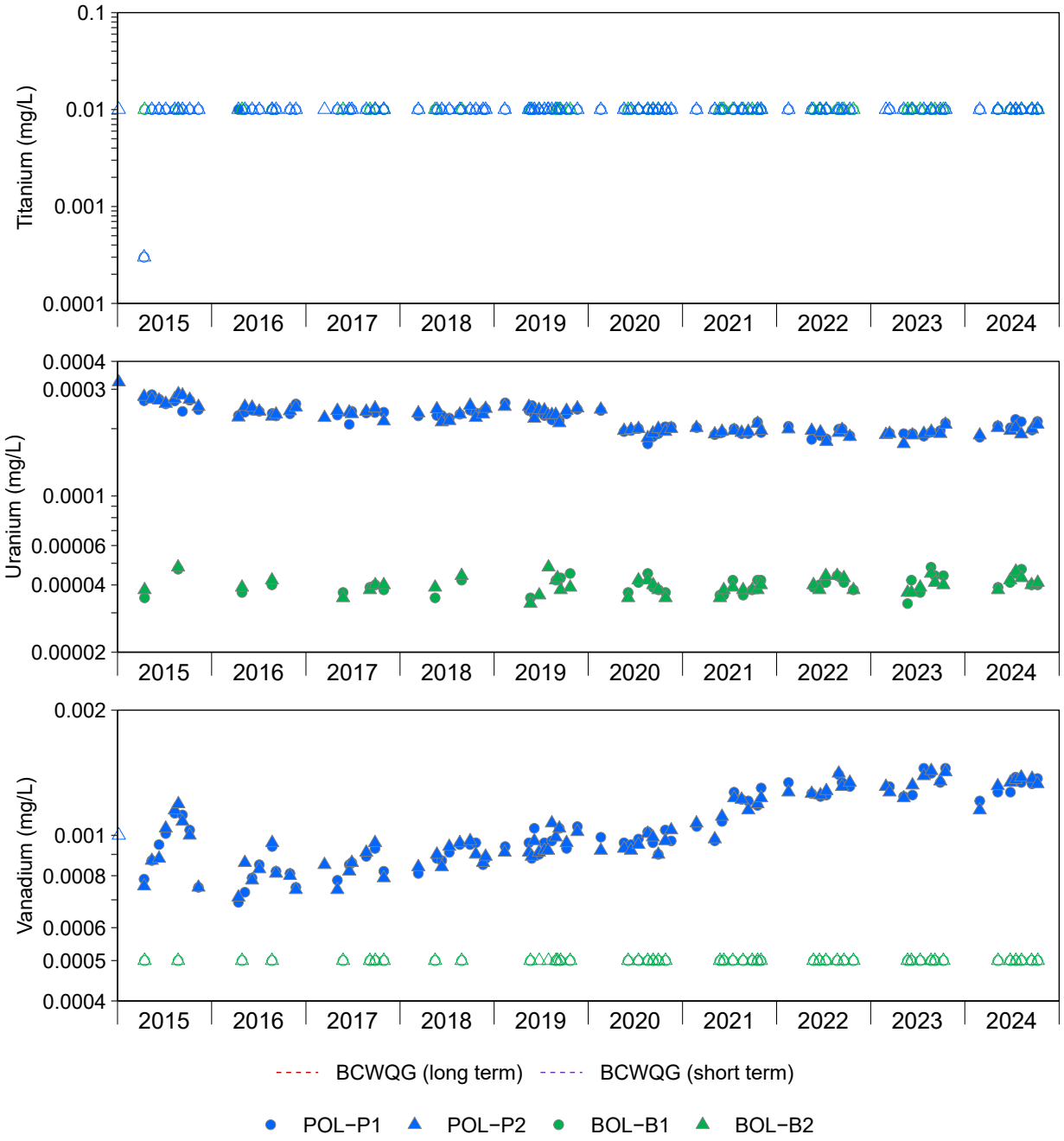

Figure C.1.2: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B1, BOL−B2; Reference) Monitoring Stations, 2015 to 2024

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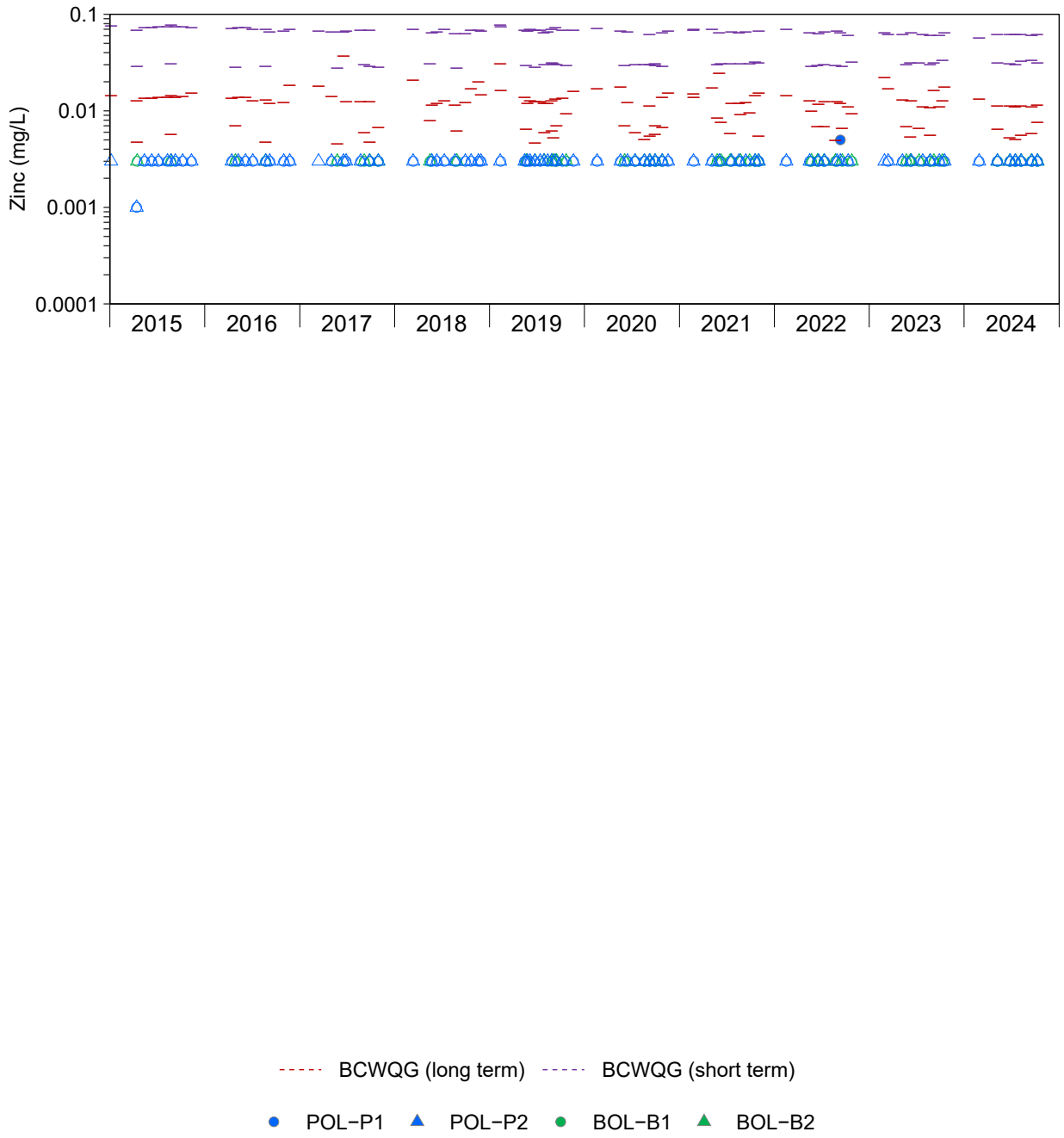

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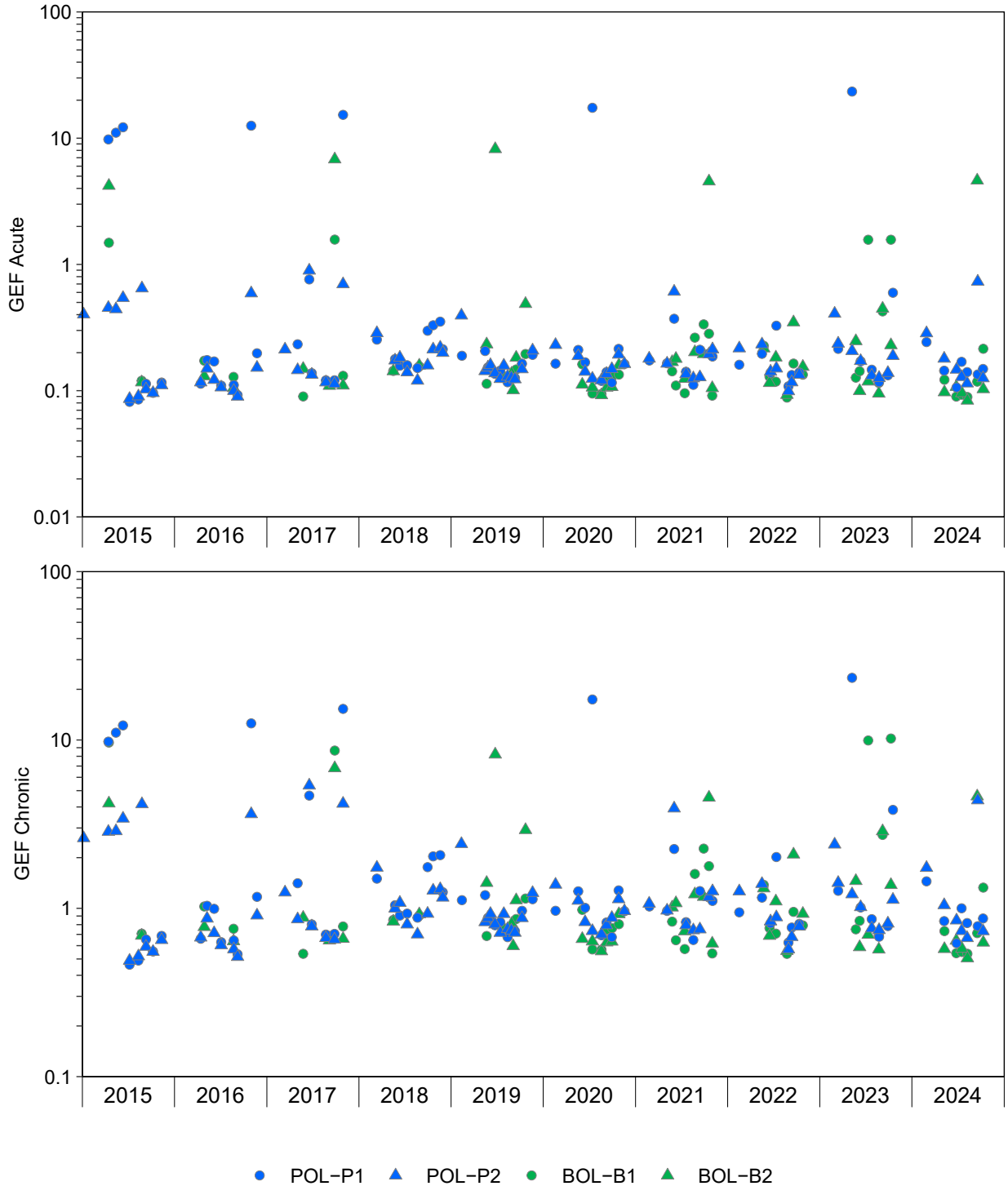

Figure C.1.3: Guideline Exceedance Factor (GEF) of Dissolved Copper in Post−Breach Surface Water for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B1, BOL−B2; Reference) Monitoring Stations, 2015 to 2024

Notes: GEF = Guideline Exceedance Factor. Green represents reference stations and blue represents exposed stations.

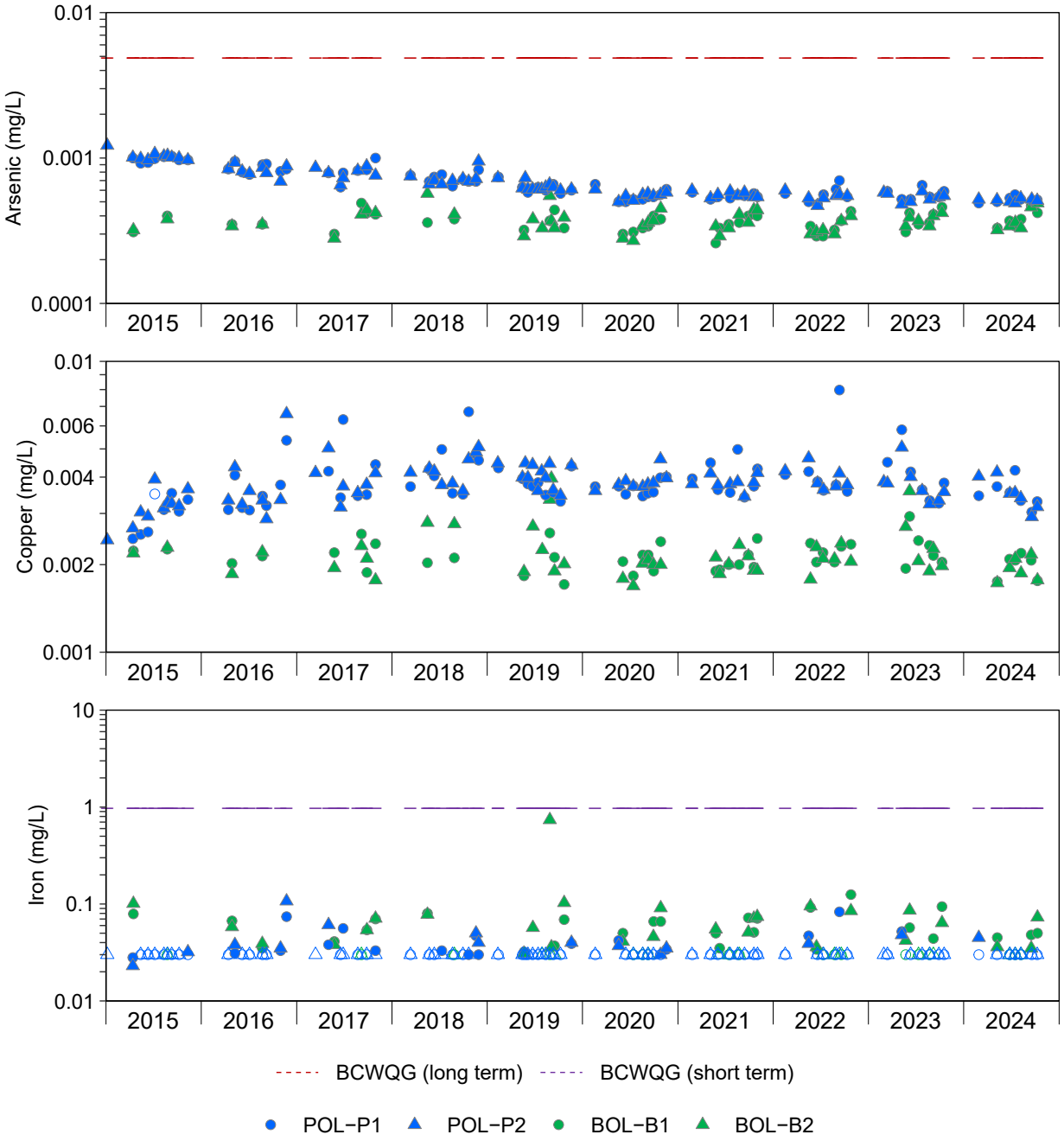

Figure C.1.4: Total Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B1, BOL−B2; Reference) Monitoring Stations, 2015 to 2024

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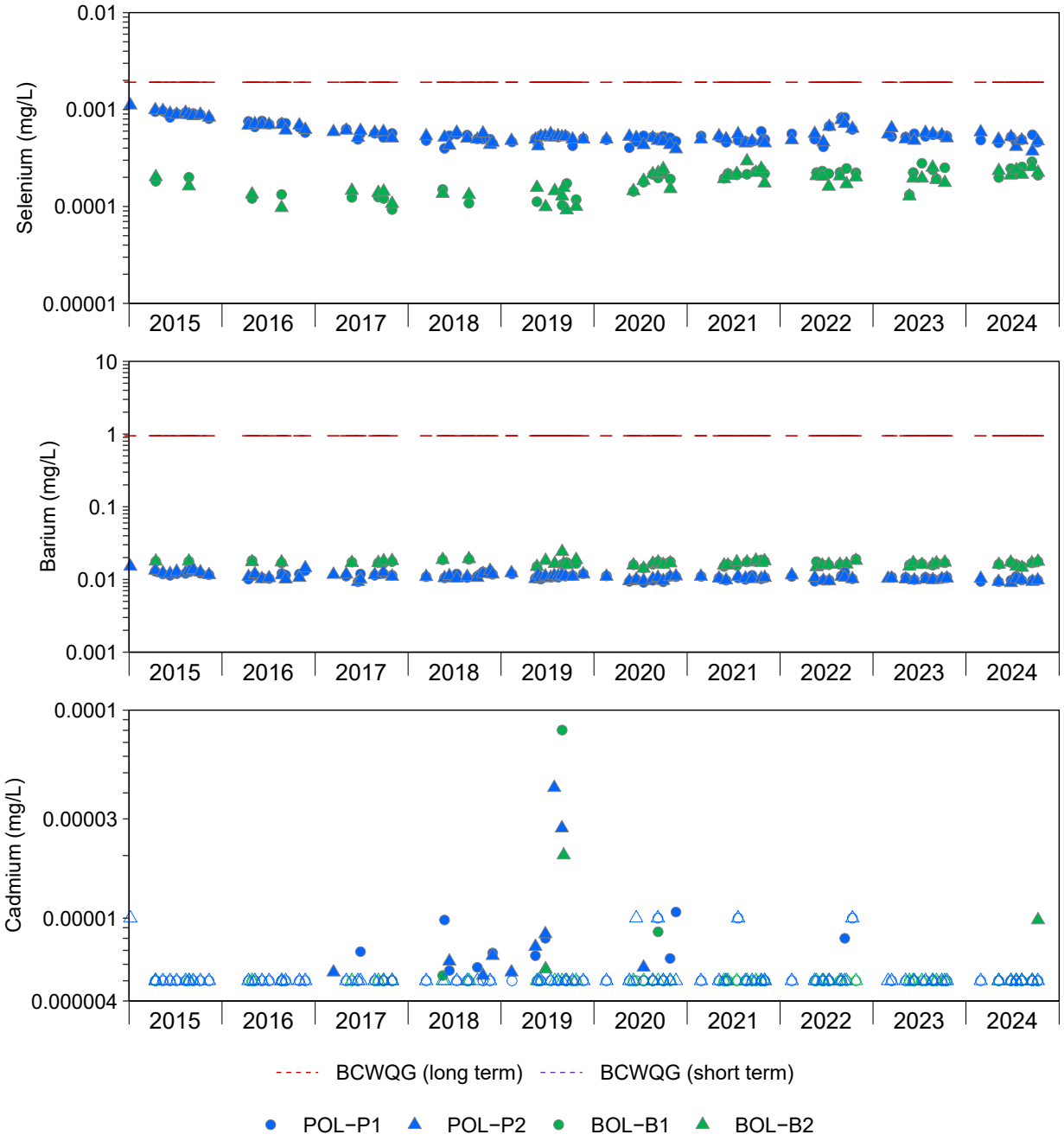

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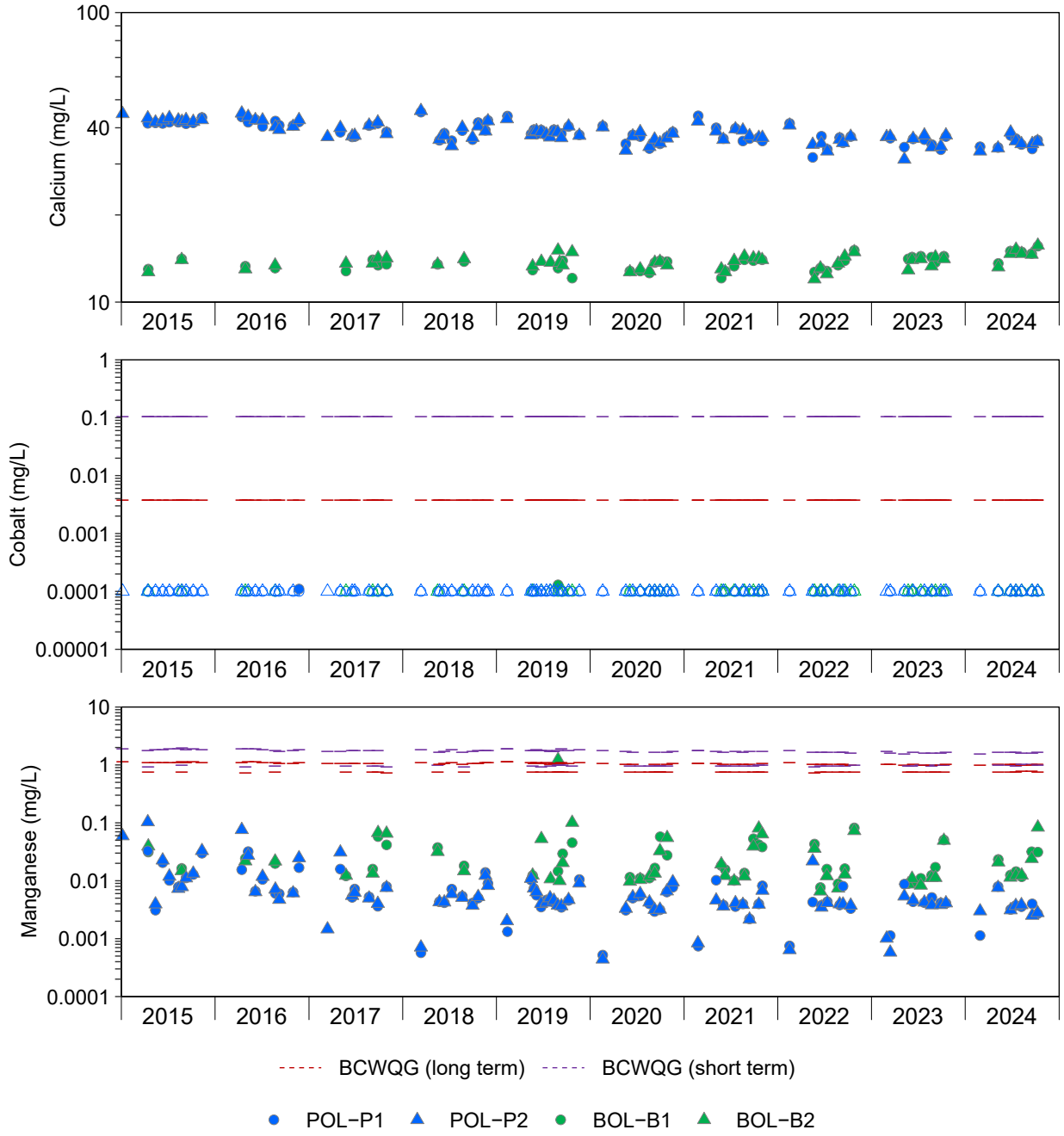

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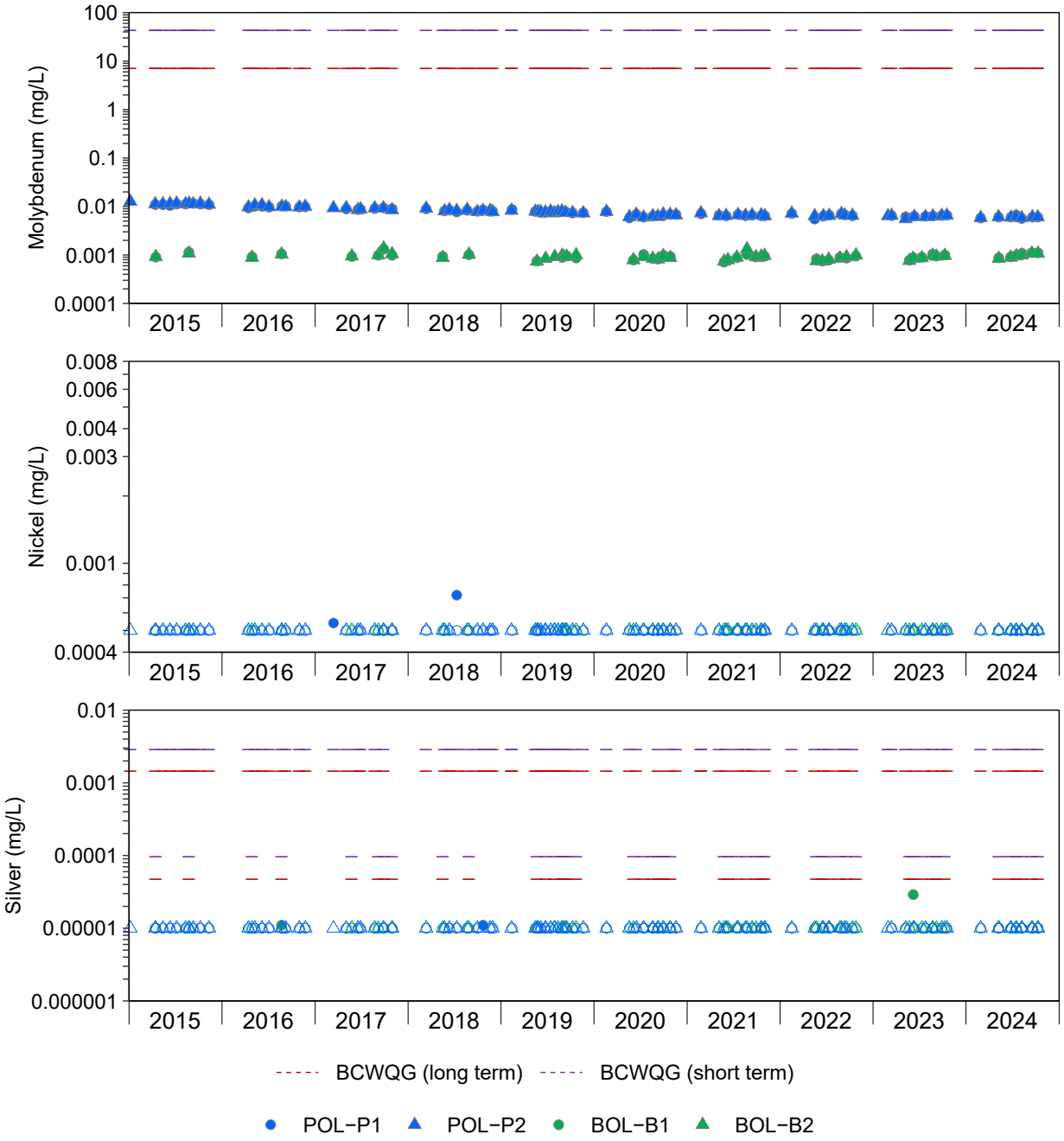

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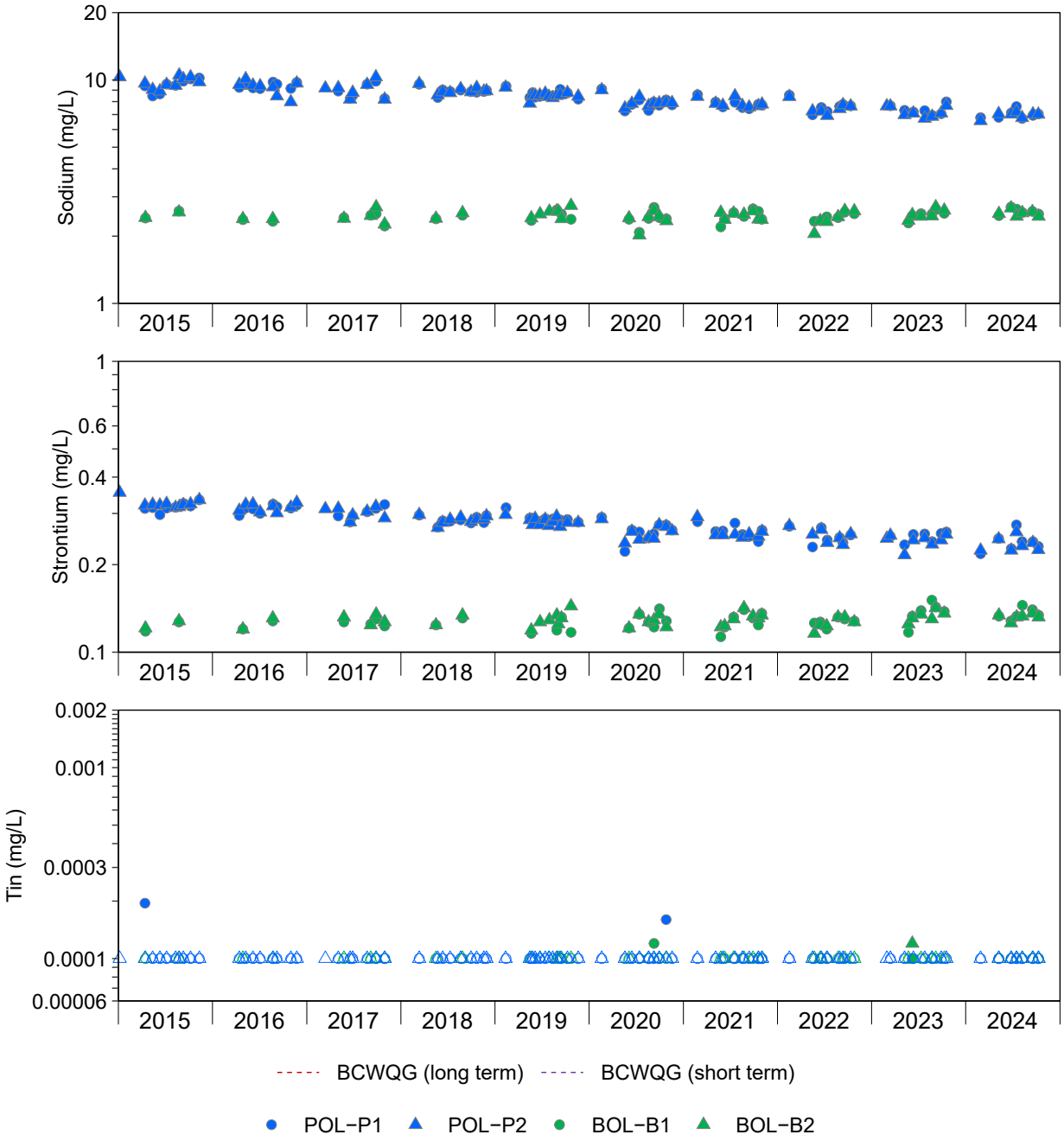

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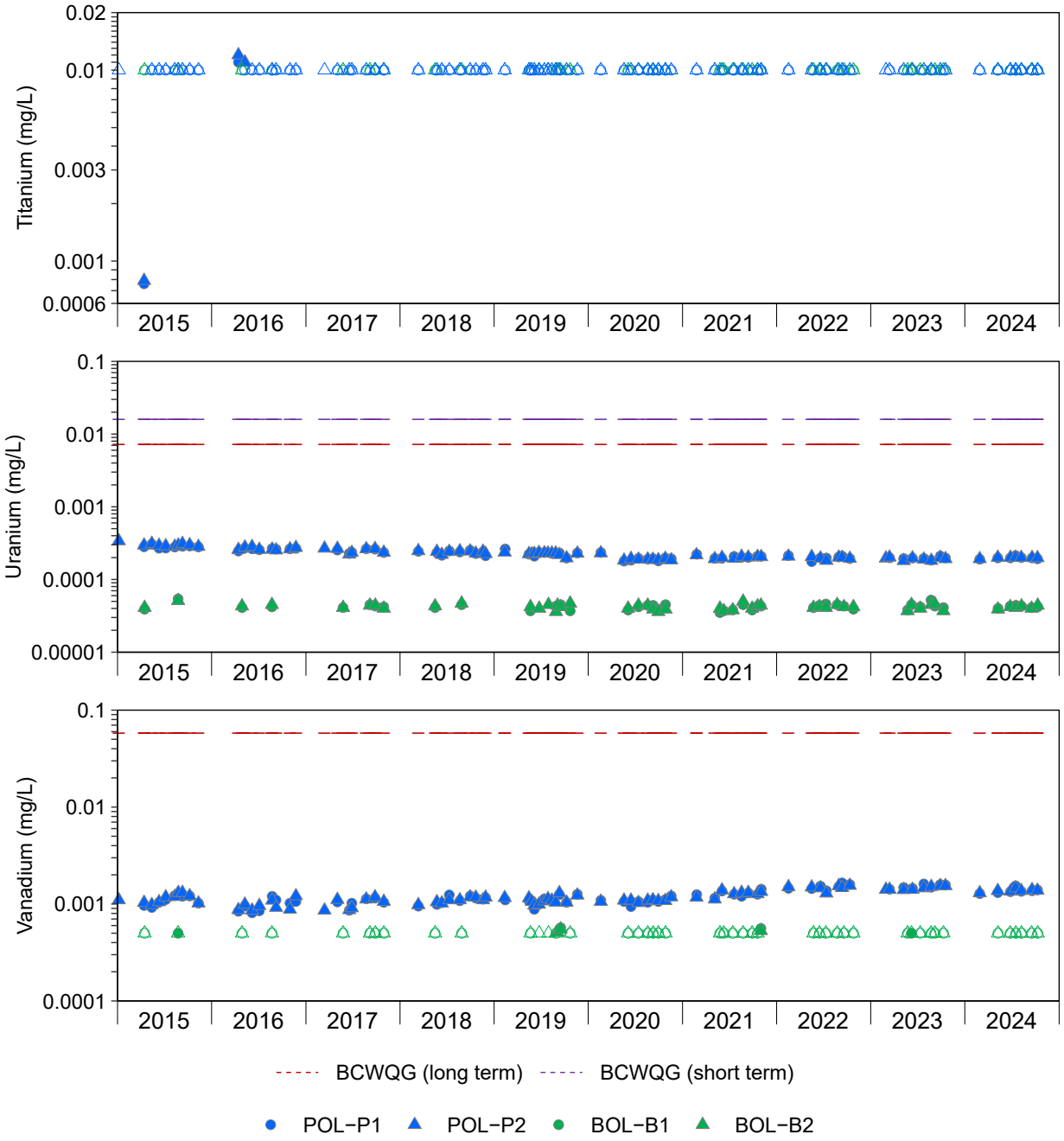

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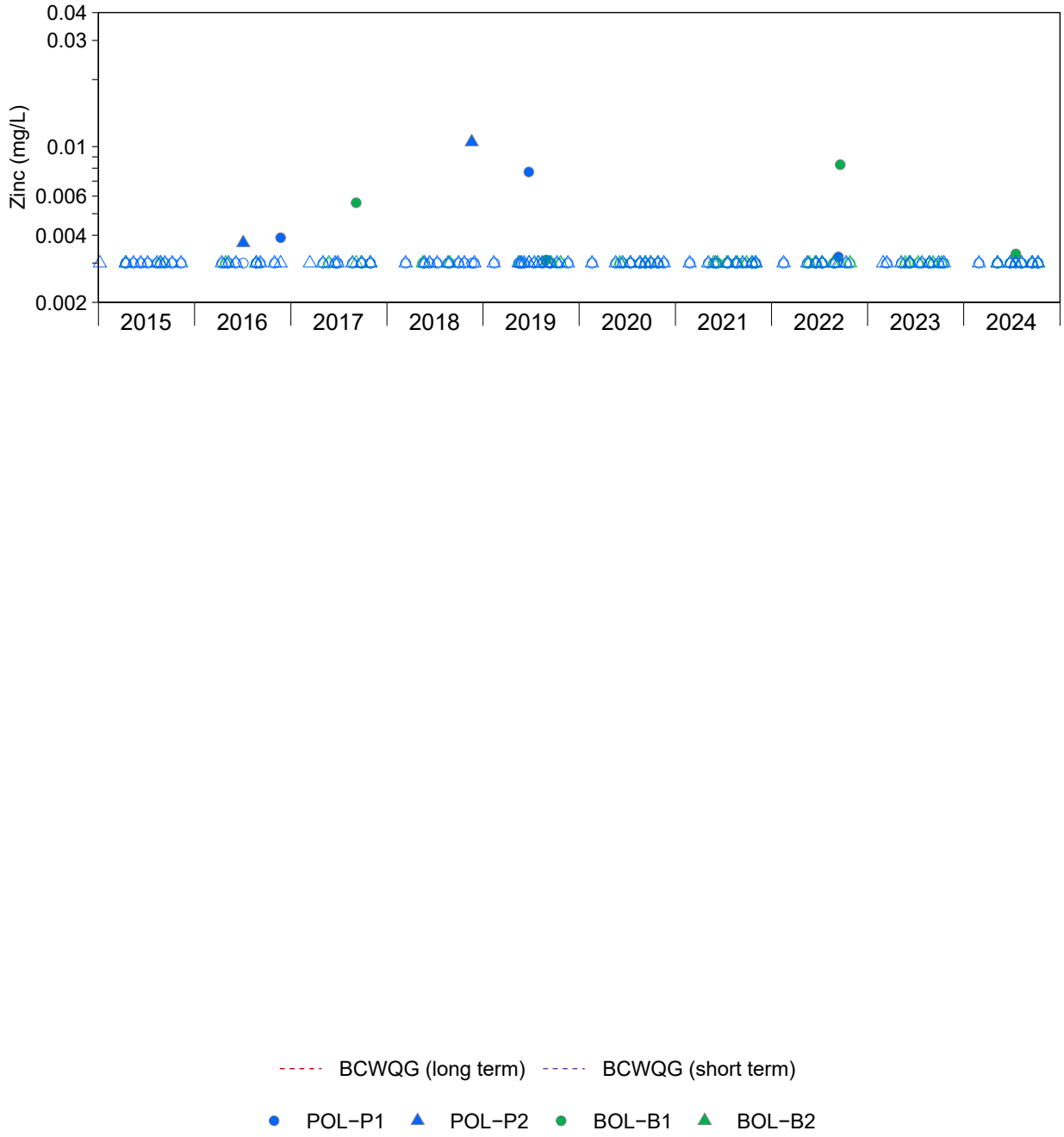

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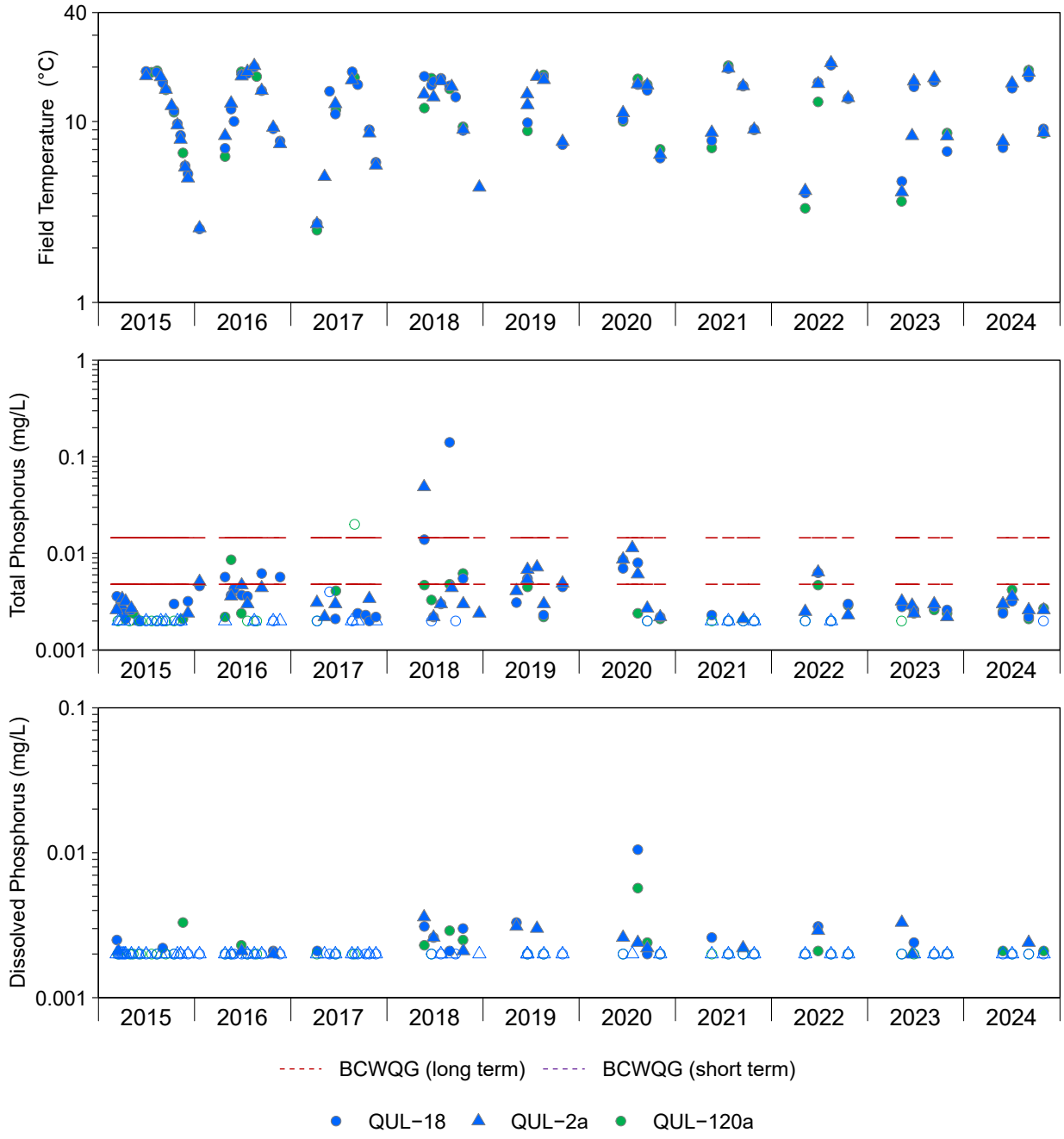
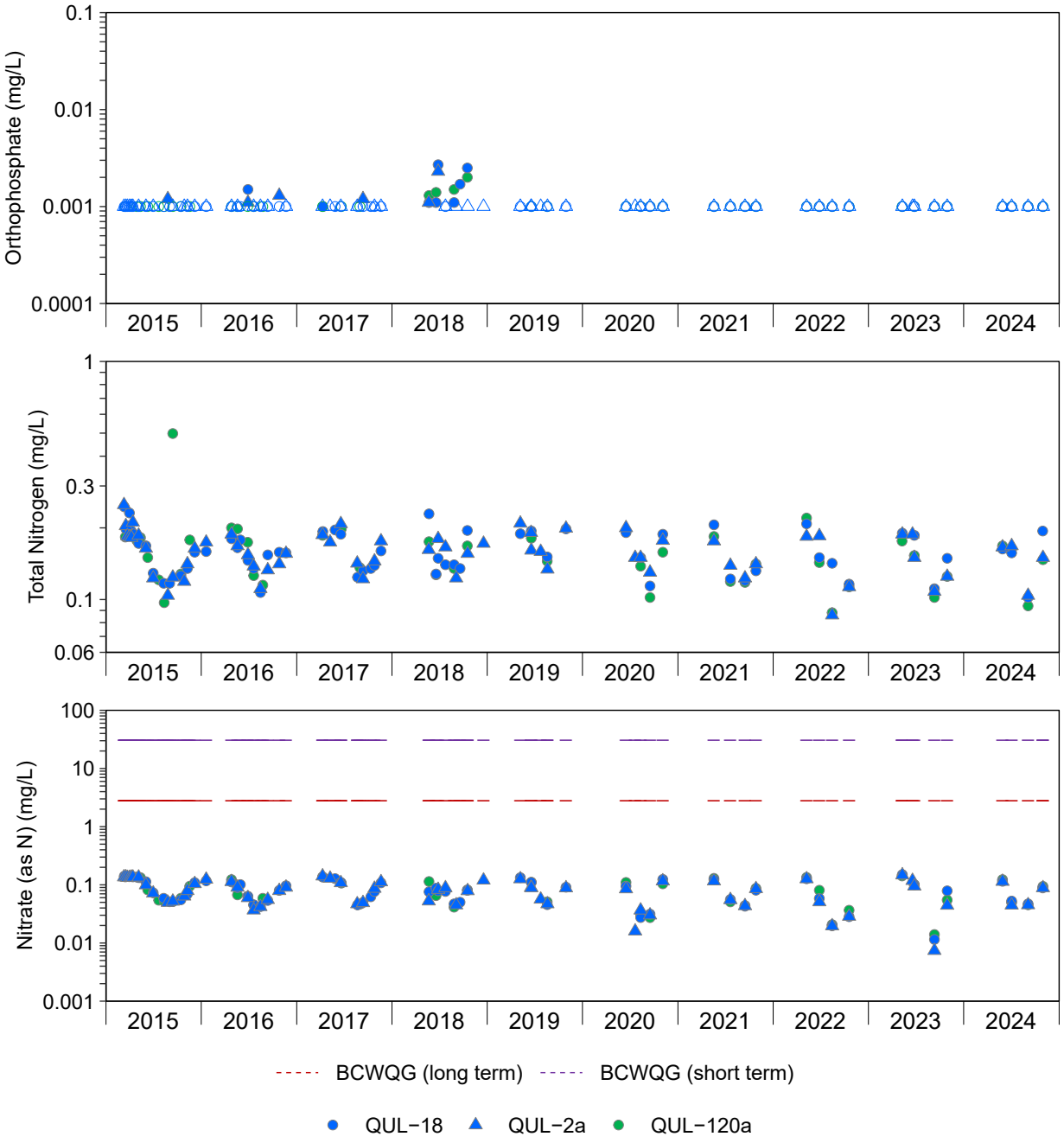


Figure C.1.5: Temperature and Nutrient Concentrations in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus guideline is shown as the guideline range (0.005 to 0.015 mg/L).



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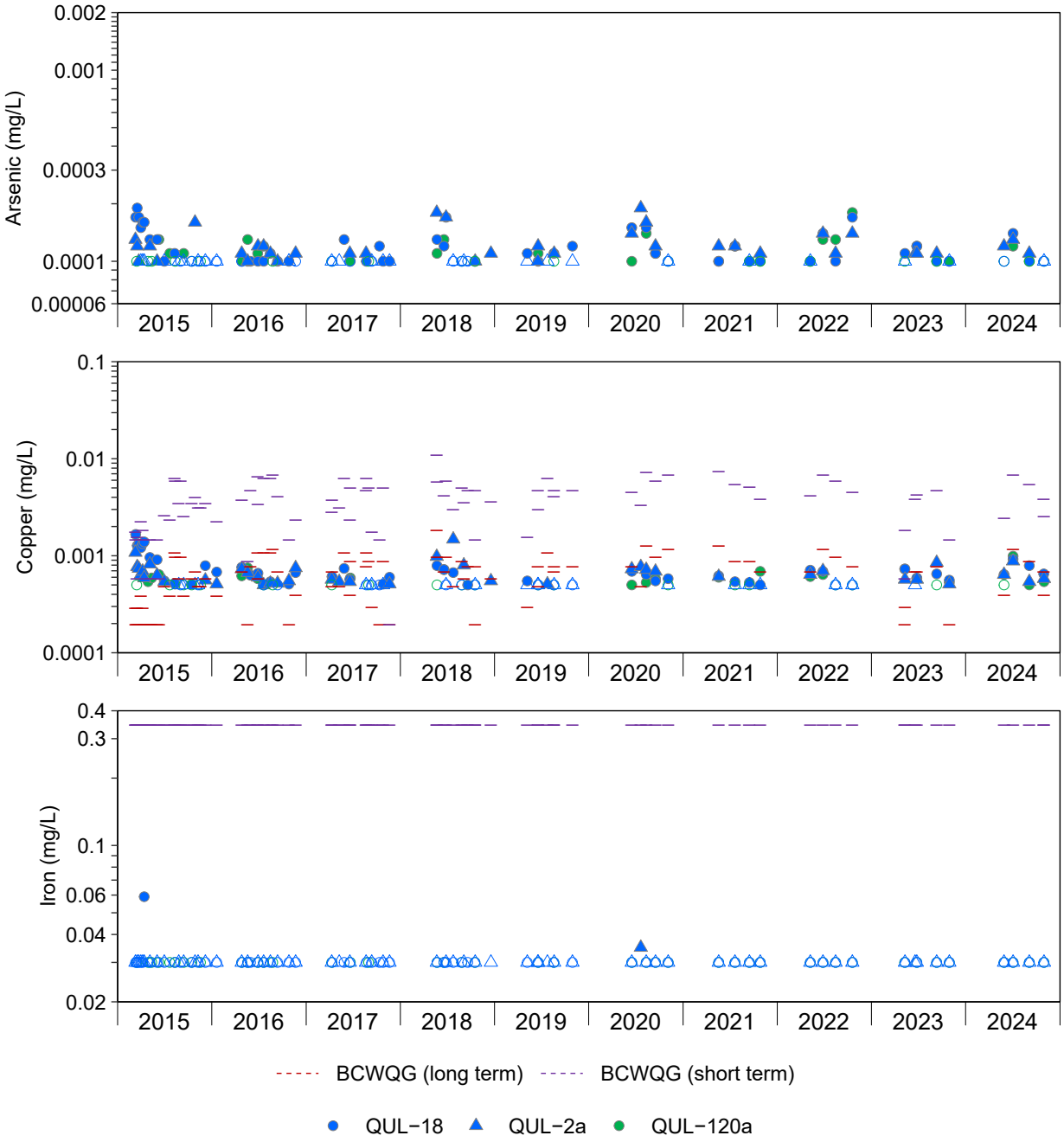
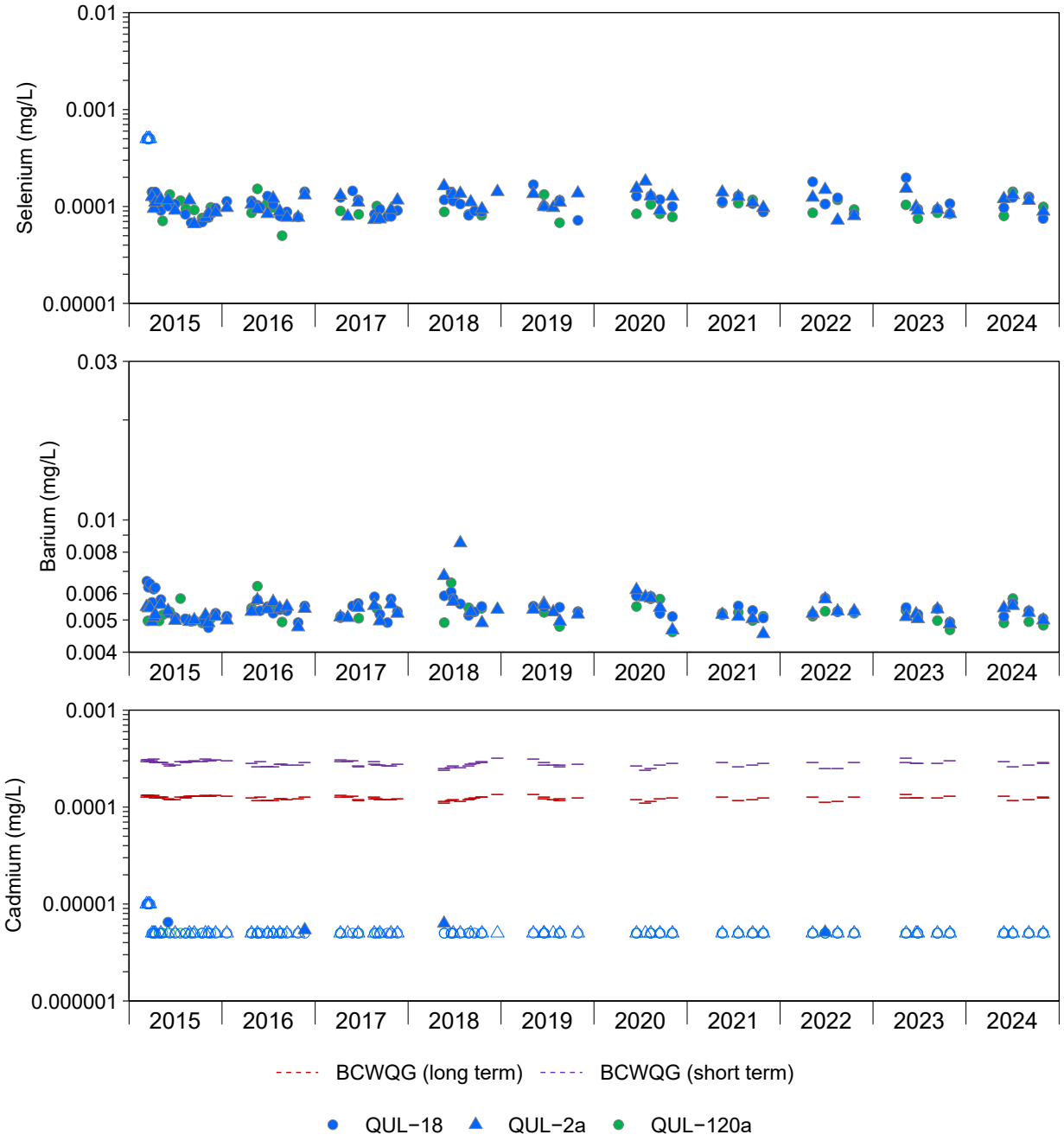


Figure C.1.6: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent or based on the Biotic Ligand Model) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Dissolved phosphorus data are plotted in Figure C.1.5. Dissolved mercury data were not collected.



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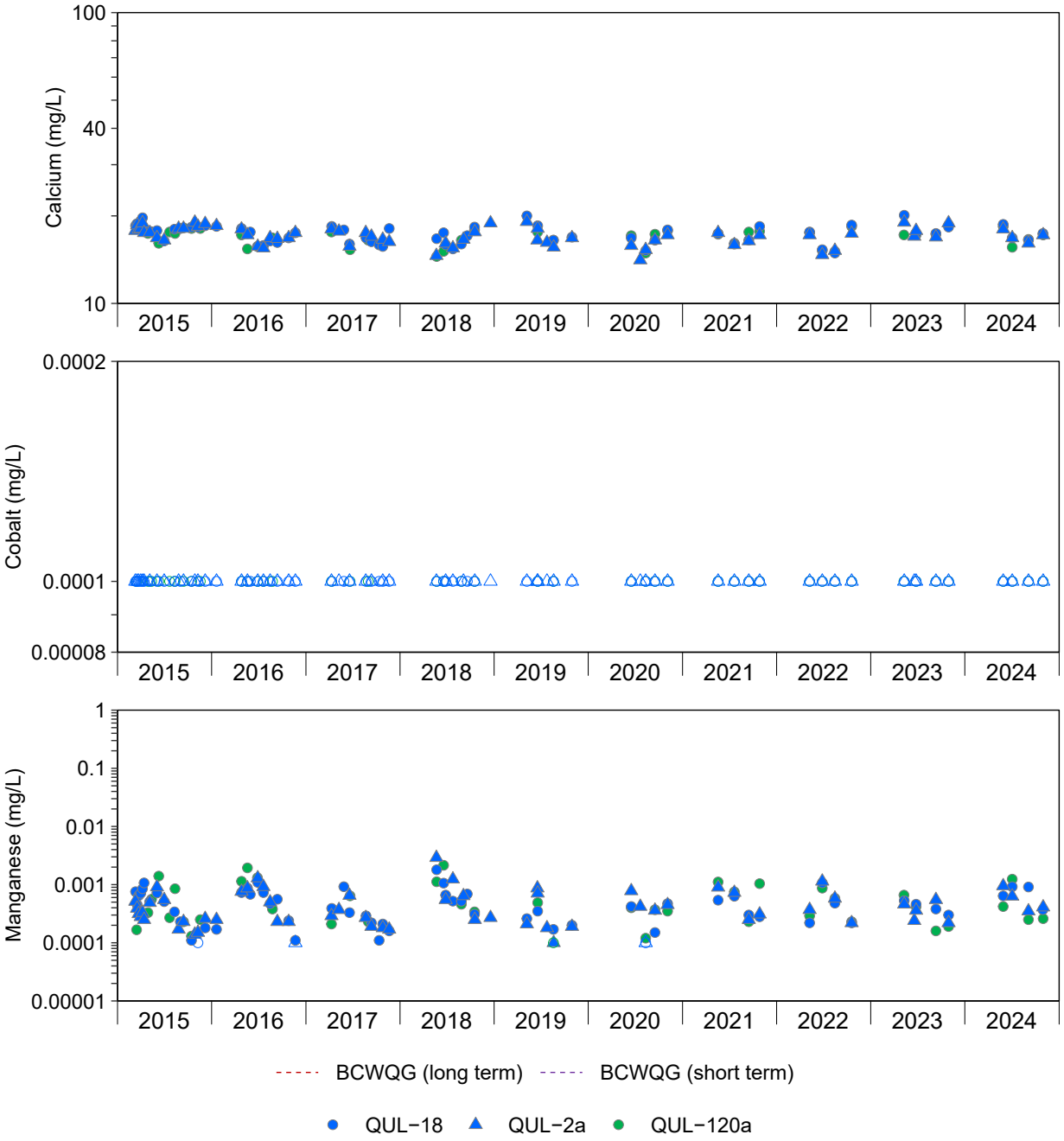

Figure C.1.6: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

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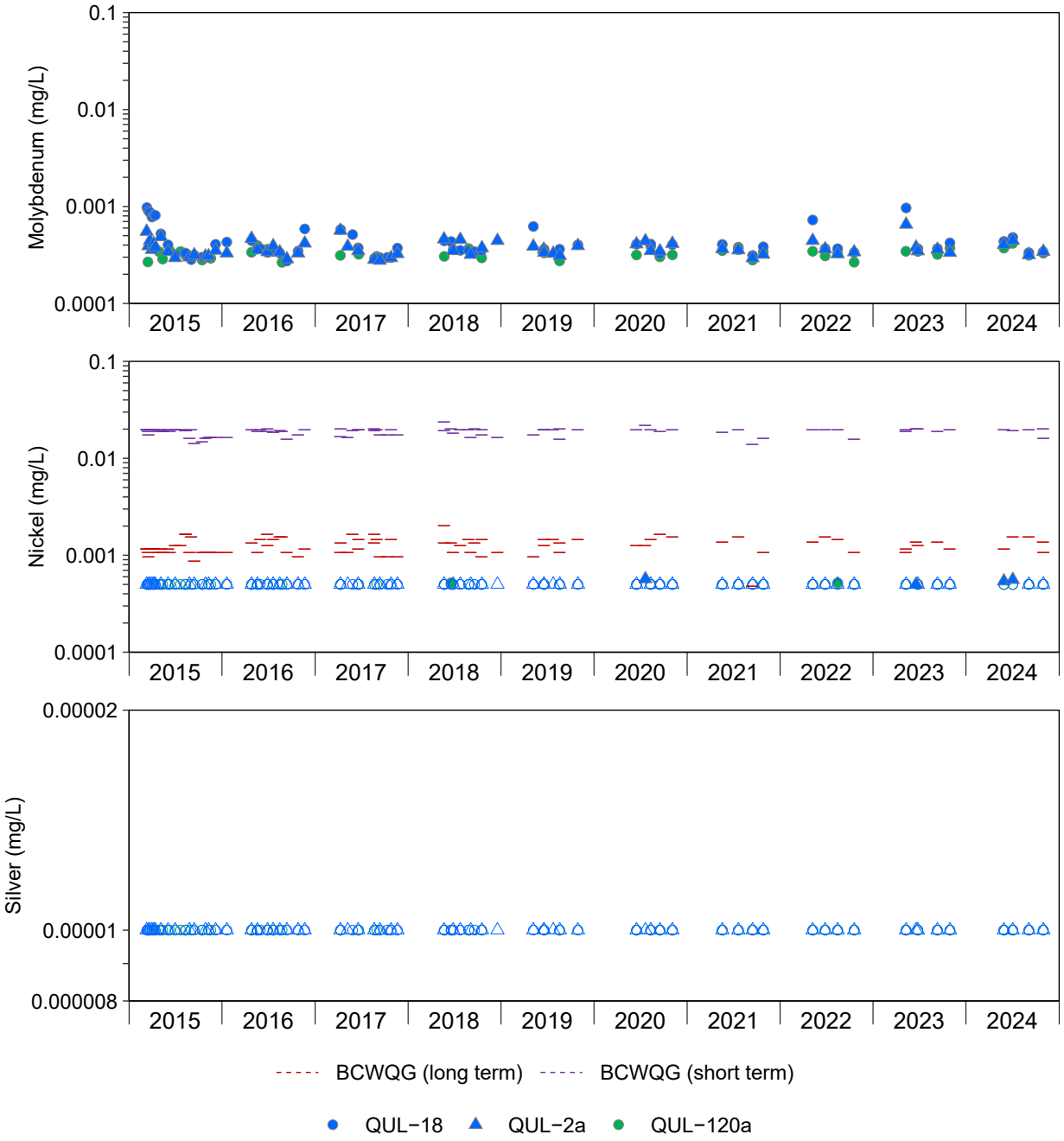

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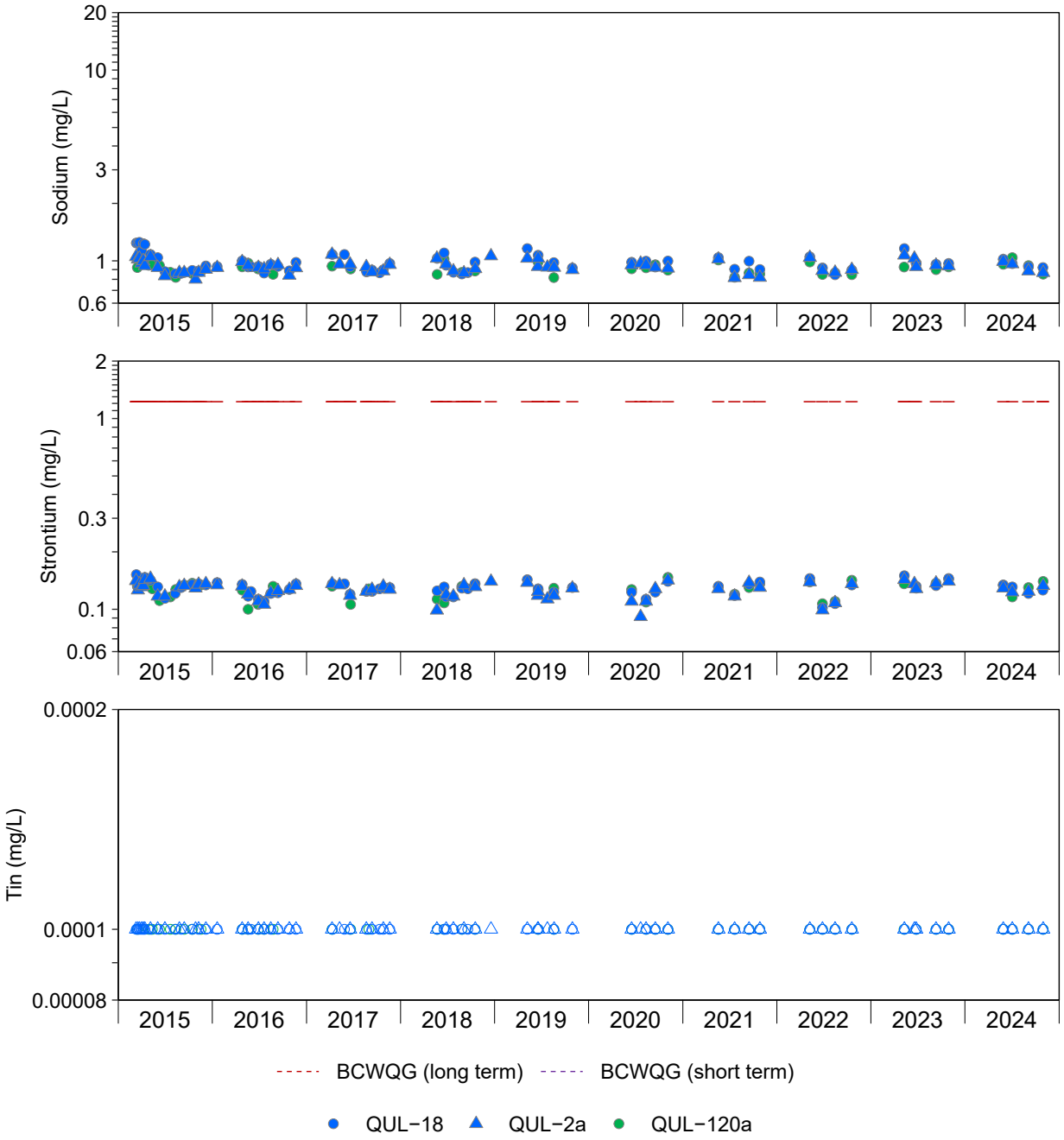

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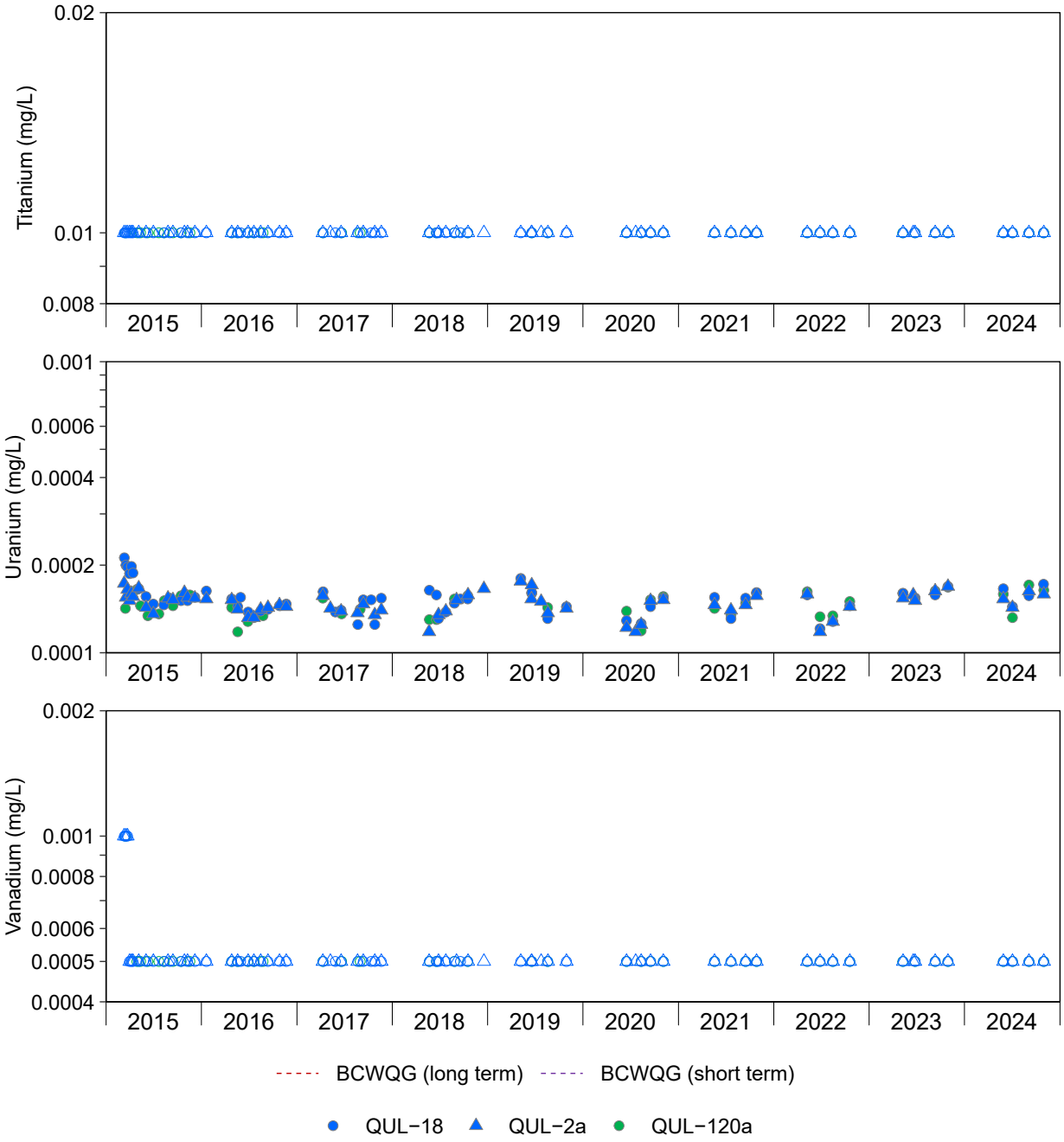


Figure C.1.6: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent or based on the Biotic Ligand Model) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Dissolved phosphorus data are plotted in Figure C.1.5. Dissolved mercury data were not collected.

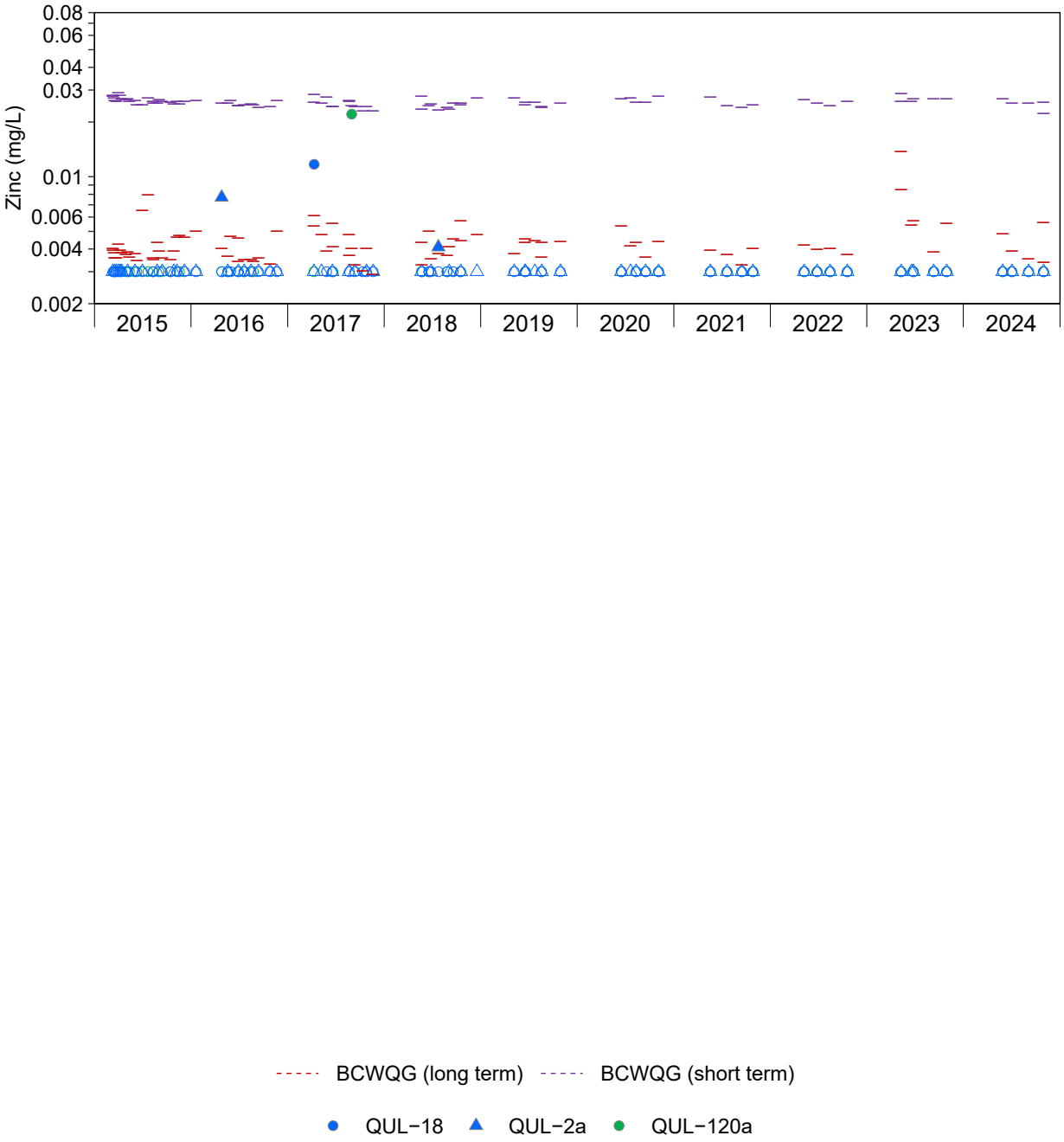


Figure C.1.6: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent or based on the Biotic Ligand Model) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Dissolved phosphorus data are plotted in Figure C.1.5. Dissolved mercury data were not collected.

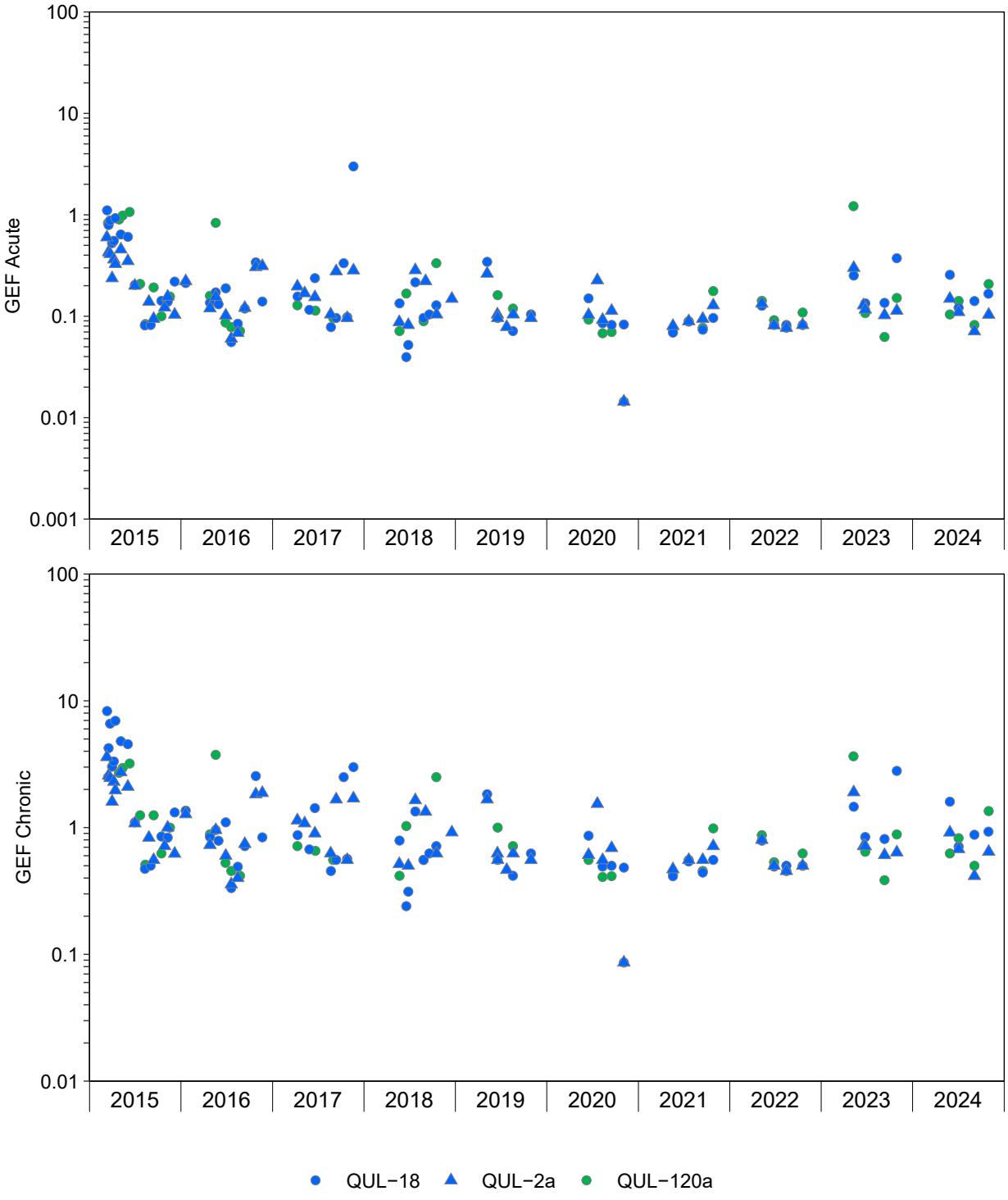


Figure C.1.7: Guideline Exceedance Factor (GEF) of Dissolved Copper in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: GEF = Guideline Exceedance Factor. Acute and Chronic GEF's calculated from monthly averages. Green represents reference stations and blue represents exposed stations. Station QUL−120 was named QUL−120a in 2021 to 2024.

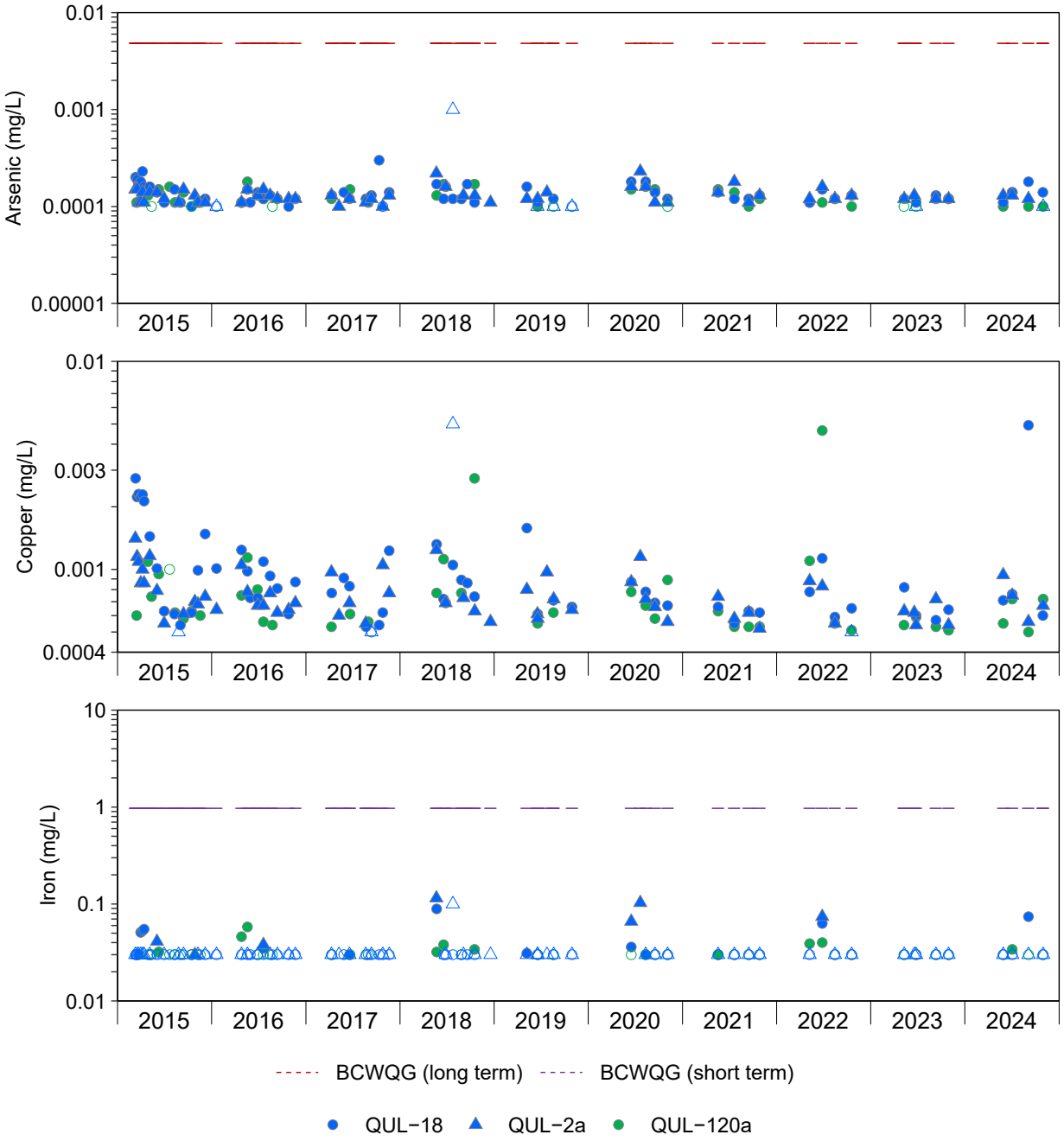


Figure C.1.8: Total Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.

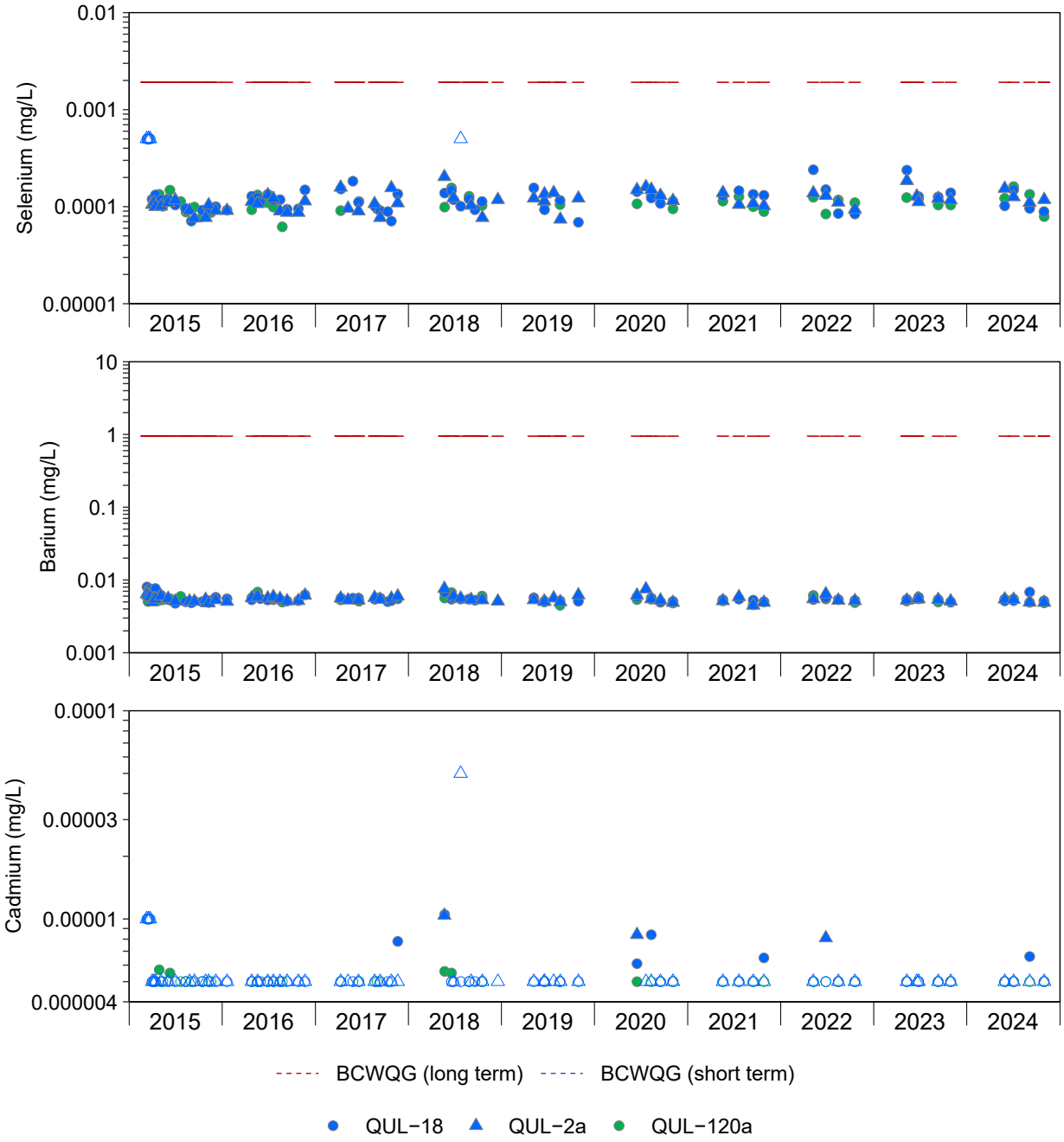
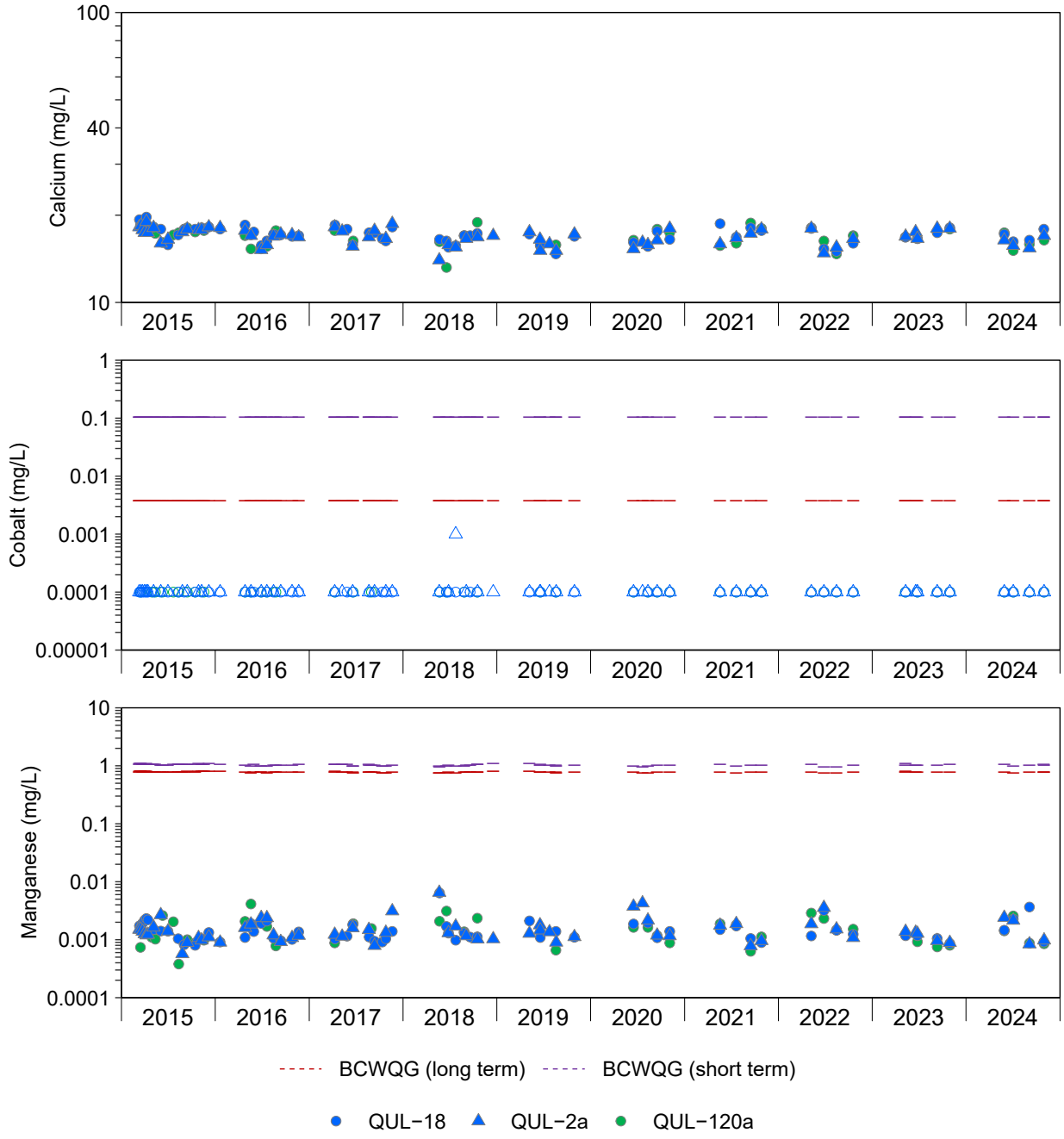


Figure C.1.8: Total Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.



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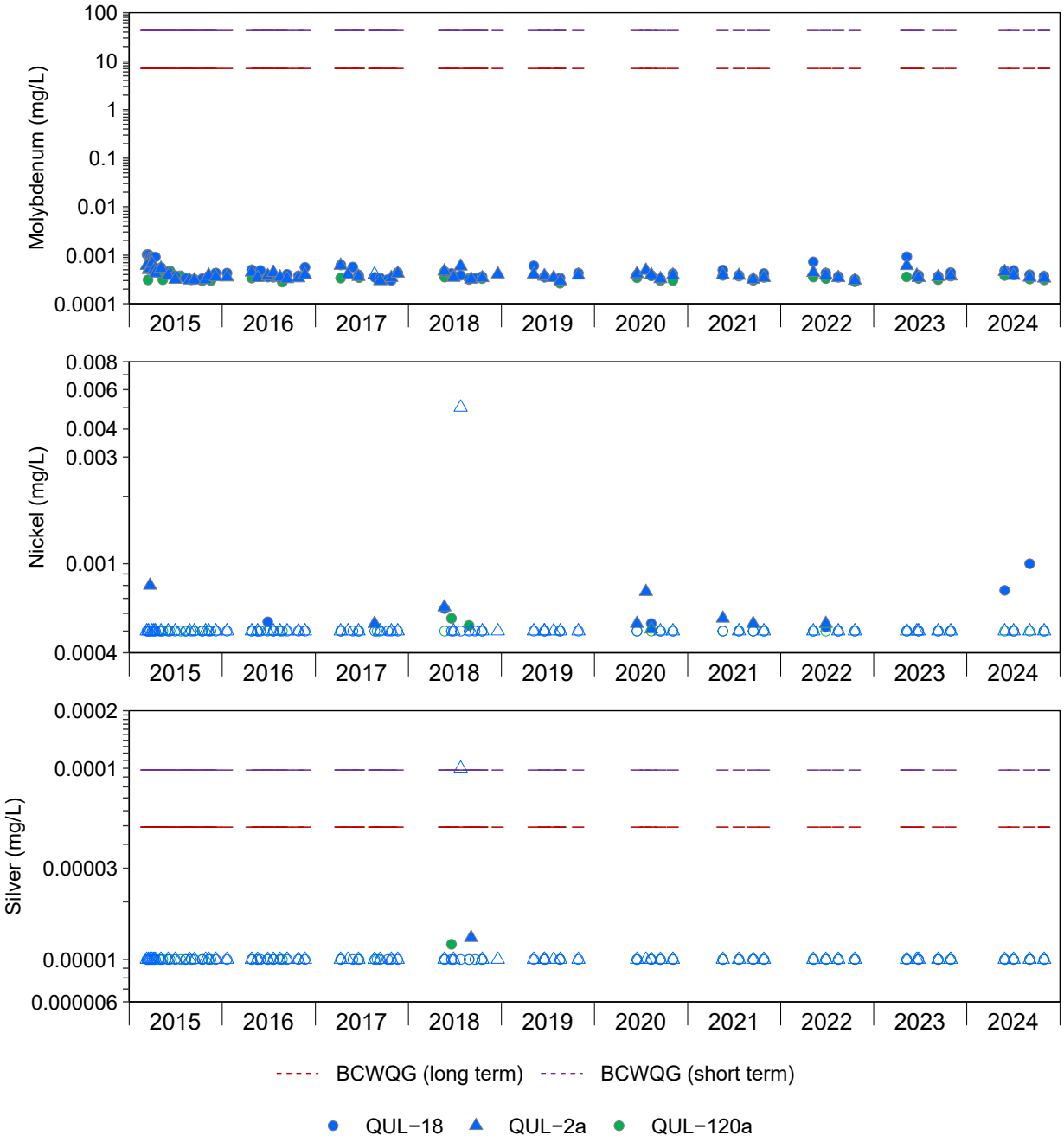
Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.



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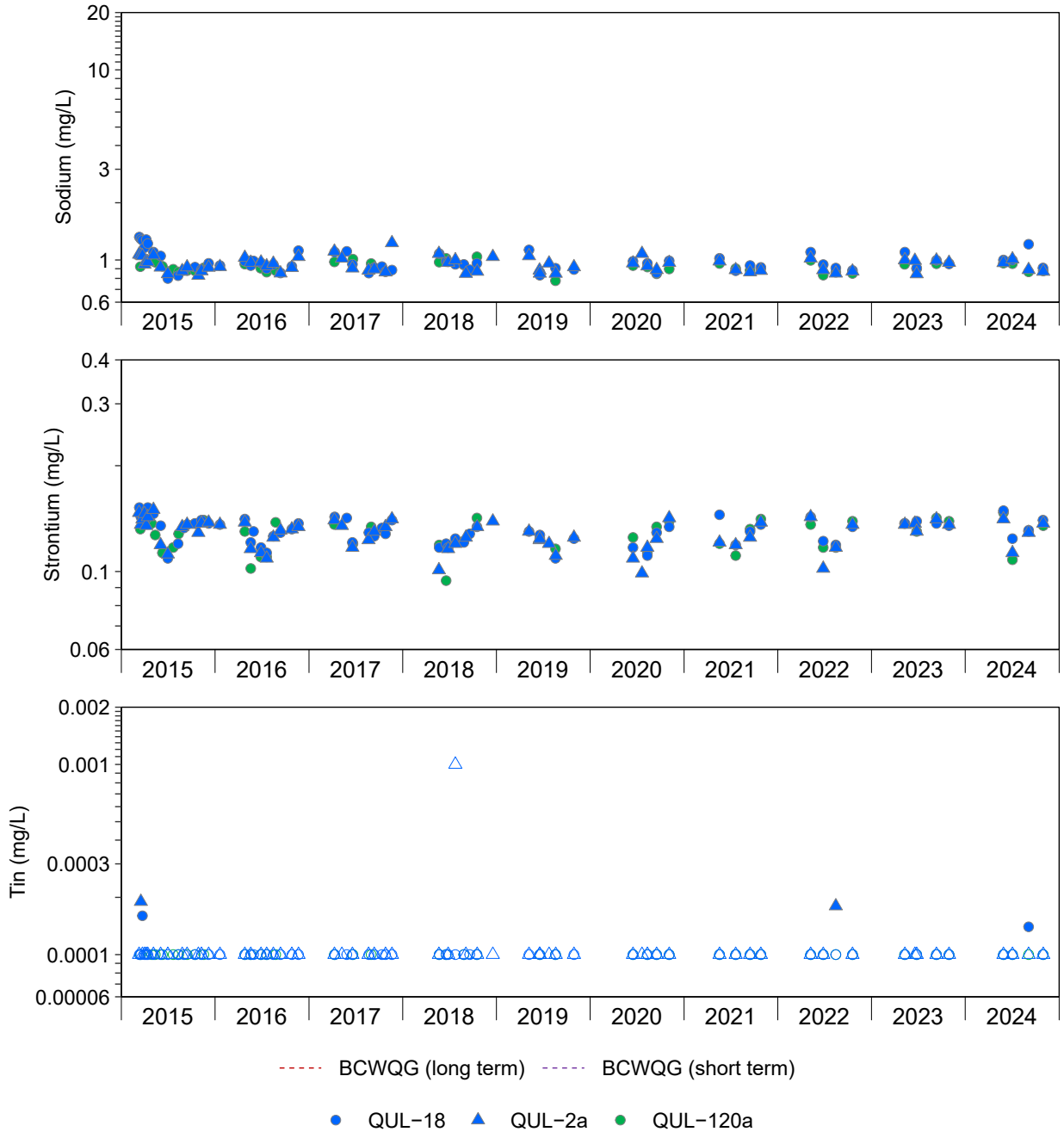
Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.



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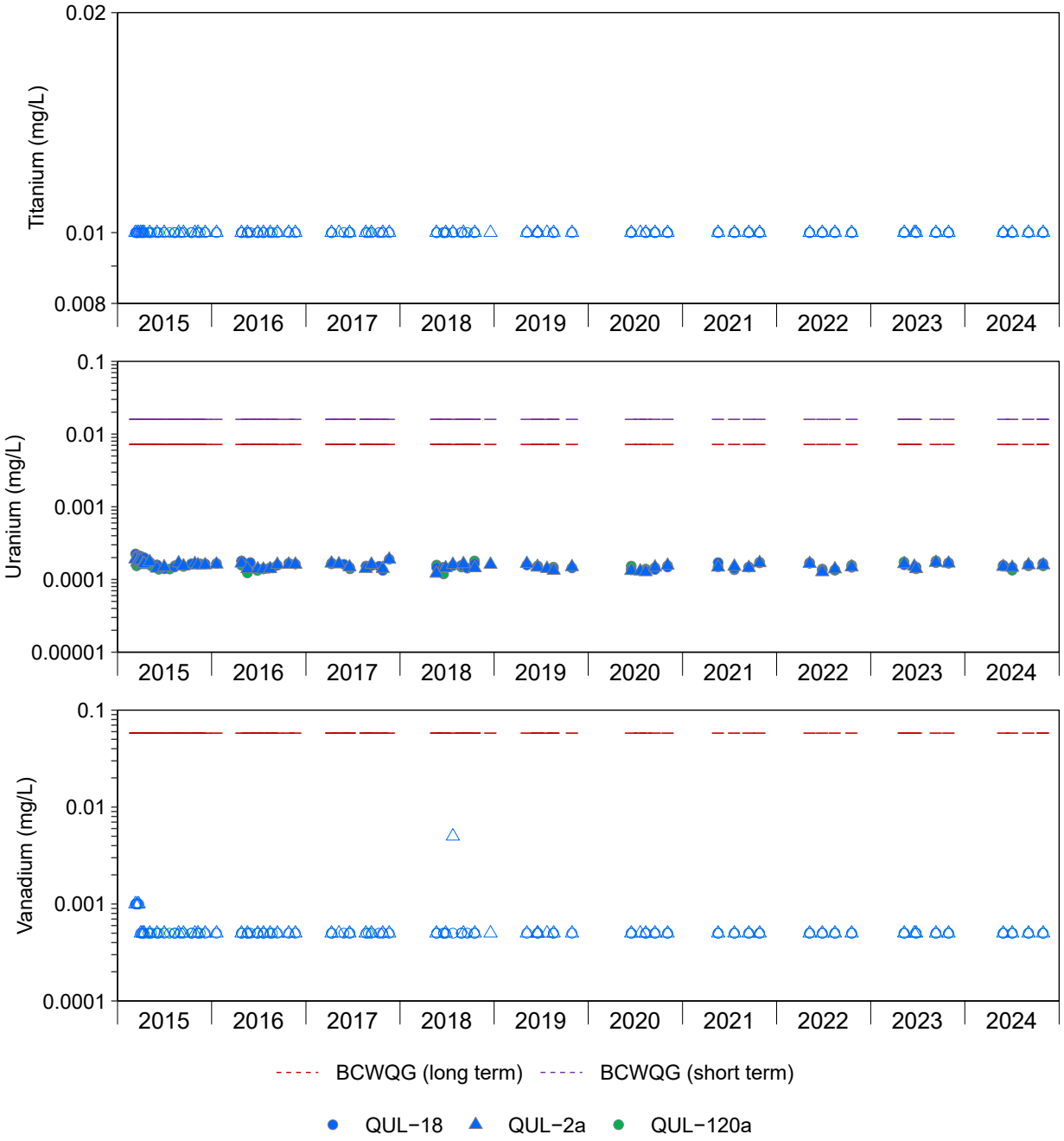

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Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.

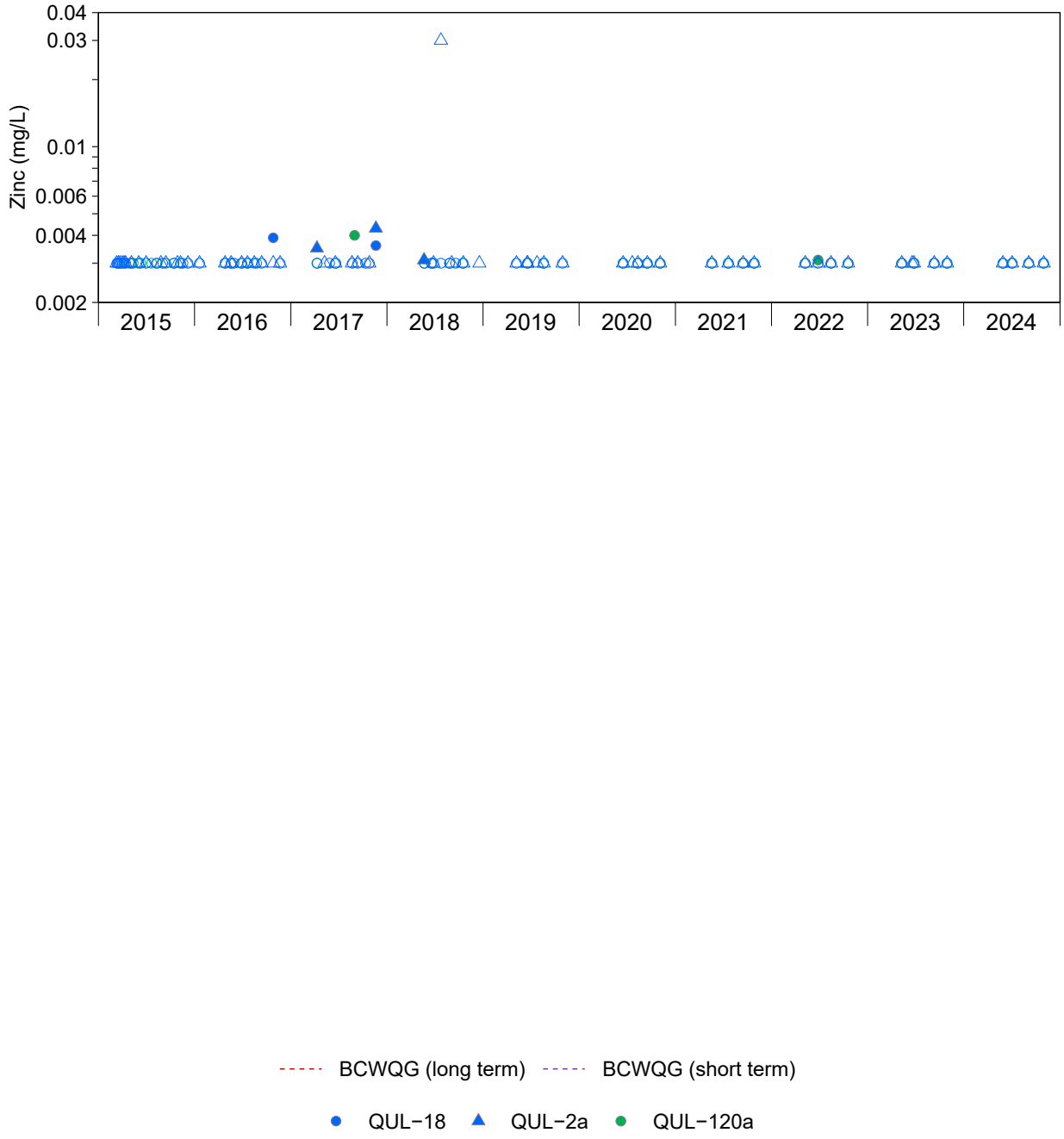


Figure C.1.8: Total Aqueous Concentrations of Primary and Secondary Analytes in Post−Breach Surface Water for Quesnel Lake at QUL−18 (Exposed), QUL−2a (Exposed), and QUL−120a (Reference) Monitoring Stations, 2015 to 2024

Notes: BCWQG = British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025). Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Values displayed for BCWQG that are condition specific (i.e., hardness dependent) are the most conservative (i.e., lowest) of those calculated for the multiple monitoring stations displayed. Station QUL−120 was named QUL−120a in 2021 to 2024. Total phosphorus data are plotted in Figure C.1.5. Total mercury data were not collected.

Table C.1.1: British Columbia Water Quality Guidelines for the Protection of Aquatic Life (BCMOWLRS 2024, 2025), 2024

Parameter	Units	Long-term Average	Short-term Maximum
Anions, Organics, Nutrients, and Physical Properties			
pH	pH units	6.5 - 9.0	
Temperature (*in situ*)[a]	°C	± 1	
Alkalinity ($CaCO_3$)	mg/L	> 20[b]	-
Conductivity	µS/cm	-	-
Dissolved Oxygen (*in situ*)[c]	mg/L	> 8	> 5
Dissolved Oxygen (*in situ*)[d]	mg/L	> 11	> 9
Total Suspended Solids[e]	mg/L	+ 5	+ 25
Turbidity[e]	NTU	+ 2	+ 8
Chloride	mg/L	150	600
Fluoride[f]	mg/L	-	For hardness ≤ 10 mg/L, WQG = 0.4 For hardness > 10 mg/L, WQG = [-51.73 + 92.57 × log10(hardness)]×0.01 Maximum applicable hardness = 385 mg/L
Sulphate[g]	mg/L	hardness dependent	-
Ammonia (as N)[h]	mg/L	temperature and pH dependent	temperature and pH dependent
Nitrate (as N)	mg/L	3.0	32.8
Nitrite (as N)[i]	mg/L	chloride dependent	chloride dependent
Phosphorus - Total[j]	mg/L	0.005 - 0.015	
Dissolved Organic Carbon[k]	mg/L	-	± 20%[k]
Total Metals			
Aluminum[f]	µg/L	For hardness 10 to 430 mg/L and pH 6 to 8.7 and DOC 0.08 to 12.3 mg/L, WQG = (exp([0.645 × ln(DOC)] + [2.255 × ln(hardness)] + [1.995 × pH] + [-0.284 × (ln(hardness) × pH)] -9.898))/3	-
Antimony	µg/L	74	250
Arsenic	µg/L	5	-
Barium	mg/L	1.0	
Beryllium	µg/L	0.13	-
Boron	mg/L	1.2	-
Chromium[l]	µg/L	For Cr VI, WQG = 0.0025 For Cr III, WQG = 0.0089	-
Cobalt	µg/L	4	110
Iron	mg/L	-	1
Manganese[f]	mg/L	For hardness 37 to 450 mg/L, WQG ≤ 0.004 × hardness + 0.605 Maximum applicable hardness = 450 mg/L	For hardness 25 to 259 mg/L, WQG ≤ 0.01102 × hardness + 0.54 Maximum applicable hardness = 259 mg/L
Molybdenum	mg/L	7.6	46
Selenium	µg/L	2	-
Silver[f]	mg/L	For hardness ≤ 100 mg/L, WQG = 0.00005 For hardness > 100 mg/L, WQG = 0.0015	For hardness ≤ 100 mg/L, WQG = 0.0001 For hardness > 100 mg/L, WQG = 0.003
Thallium	µg/L	0.3	-
Uranium	µg/L	7.5	16.5
Vanadium	mg/L	0.06	-
Dissolved Metals			
Cadmium[f]	mg/L	For hardness = 3.4 to 285 mg/L, WQG = {exp[0.736×ln - 4.943]} Maximum applicable hardness = 285 mg/L	For hardness = 7 to 455 mg/L, WQG = {exp[1.03×ln-5.274]} Maximum applicable hardness = 455 mg/L
Copper[m]	mg/L	Biotic Ligand Model	Biotic Ligand Model
Iron	mg/L	-	0.35
Lead[f]	µg/L	For Hardness 4.7 to 511 mg/L and Dissolved Organic Carbon 0.5 - 31.5 mg/L, WQG = {exp(0.514 [ln(DOC)] + 0.214[ln(hardness)] + 0. 4354)}/2	-
Nickel[m]	mg/L	Biotic Ligand Model	Biotic Ligand Model
Strontium	mg/L	1.25	-
Zinc[f]	µg/L	For hardness 23.4 to 399 mg/L, pH 6.5 to 8.13, and DOC 0.3 mg/L to 22.9 mg/L, WQG = (exp(0.947[ln(hardness)] − 0.815[pH] + 0.398[ln(DOC)] + 4.625))/2 Maximum applicable hardness = 399 mg/L	For hardness 13.8 to 250.5 mg/L and DOC 0.3 to 17.3 mg/L, WQG = (exp(0.833[ln(hardness)] + 0.240[ln(DOC)] + 0.526))/2 Maximum applicable hardness: 250.5 mg/L

Notes: "-" indicates no applicable guideline. BCMOWLRS = British Columbia Ministry of Water, Land and Resource Stewardship. WQG = Water Quality Guideline.

[a] Change from optimal. No guideline applied.

[b] For waterbodies with low sensitivity to acid inputs.

[c] Minimum for all life stages other than buried embryo / alevin.

[d] Minimum for buried embryo / alevin life stages.

[e] Increase relative to background; no guideline applied.

[f] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. If hardness values are lower than the minimum hardness, then guidelines were determined using the minimum hardness.

[g] 128 mg/L at hardness 0-30 mg/L; 218 mg/L at hardness 31-75 mg/L; 309 mg/L at hardness 76-180 mg/L; 429 mg/L at hardness > 250 mg/L.

[h] Used tables in BCMOWLRS 2025.

[i] When chloride < 2 mg/L, long-term = 0.02 mg/L and short-term = 0.06 mg/L; increase with increasing chloride.

[j] Aquatic Life - Lakes; minimum guideline was applied.

[k] ±20% of the background median; no guideline applied.

[l] Chromium VI is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[m] Guidelines calculated using the BLM model and calculated concurrently for each sample using the guideline lookup tables provided for dissolved copper and dissolved nickel (BCMOWLRS 2025).

Table C.1.2: Supporting Spot Water Quality Data Collected During Plankton Sampling in the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		BOL-B2 (Reference)			POL-P2 (Exposed)		
				June	July	August	June	July	August
		Long-term Average	Short-term Maximum	19-Jun-24	25-Jul-24	26-Aug-24	19-Jun-24	23-Jul-24	26-Aug-24
Anions, Organics, Nutrients, and Physical Properties									
Alkalinity (as $CaCO_3$)	mg/L	>20	-	43.4	42.9	44.3	95.1	91.4	92.2
Ammonia (as N)	mg/L	0.648 - 2.03	2.98 - 13.0	0.0132	0.00560	0.0156	0.00590	<0.005	<0.005
Chloride	mg/L	150	600	0.590	0.540	0.570	0.780	0.820	0.840
Conductivity	µS/cm	-	-	106	103	109	253	240	246
Specific Conductance (*in situ*)	µS/cm	-	-	77.3	94.9	109	67.2	224	249
Dissolved Organic Carbon[b]	mg/L	-	-	7.94	7.52	7.69	7.96	7.38	7.05
Dissolved Oxygen (*in situ*)	%	-	-	83.1	78.0	70.4	91.8	89.5	87.3
Dissolved Oxygen (*in situ*)	mg/L	>8	>5	8.35	7.68	6.93	9.23	8.77	8.56
Fluoride	mg/L	-	1.03 - 1.41	0.0530	0.0500	0.0560	0.0700	0.0760	0.0570
Hardness (as $CaCO_3$)	mg/L	-	-	46.2	46.1	48.8	112	107	115
Hardness, from Total CaMg (as $CaCO_3$)	mg/L	-	-	47.4	49.4	50.1	113	120	111
Nitrate (as N)	mg/L	3.00	32.8	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051	<0.0051
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.001	0.00210	0.0168	<0.001	<0.001	0.00130
pH (*in situ*)	pH units	6.5 - 9.0	-	7.73	7.45	7.73	8.23	8.09	8.29
pH	pH units	-	-	7.88	7.67	7.79	8.25	7.94	8.23
Phosphorus - Total Dissolved	mg/L	-	-	0.00520	0.0106	0.0218	0.0106	0.00620	0.00450
Phosphorus - Total	mg/L	0.00500		0.0116	0.0269	0.0361	0.0164	0.0125	0.0127
Sulphate	mg/L	218 - 309	-	8.67	8.50	8.78	32.9	33.7	33.4
Temperature (*in situ*)	°C	-	-	14.0	16.1	16.0	14.7	16.3	16.3
Total Dissolved Solids	mg/L	-	-	90.0	78.0	85.0	176	186	172
Total Nitrogen	mg/L	-	-	0.287	0.341	0.311	0.308	0.266	0.299
Total Suspended Solids[b]	mg/L	-	-	5.30	2.80	1.50	3.80	1.30	1.10
Turbidity[b]	NTU	-	-	1.35	1.50	1.24	1.43	0.760	1.14
Total Metals									
Aluminum	mg/L	0.302 - 0.585	-	0.0618	0.0503	0.0302	0.0559	0.0190	0.0552
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	0.000130	0.000110	<0.0001	0.000120
Arsenic	mg/L	0.00500	-	0.000400	0.000410	0.000500	0.000600	0.000550	0.000530
Barium	mg/L	1.00	-	0.0192	0.0183	0.0176	0.0115	0.0108	0.0101
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.20	-	0.0480	0.0460	0.0490	0.0200	0.0210	0.0210
Cadmium	mg/L	-	-	0.0000212	0.00000600	<0.000005	<0.00001	0.00000760	0.00000520
Calcium	mg/L	-	-	14.4	15.1	15.2	36.1	39.0	35.5
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	-	-	0.00405	0.00486	0.00346	0.00621	0.00399	0.00689
Iron	mg/L	-	1.00	0.0770	0.0820	0.135	0.0450	<0.03	0.0490
Lead	mg/L	-	-	0.0000890	<0.00005	0.0000660	<0.00005	<0.00005	0.0000980
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	2.78	2.83	2.95	5.59	5.41	5.48
Manganese	mg/L	0.814 - 1.13	1.06 - 1.86	0.0330	0.0725	0.201	0.00523	0.00433	0.00602
Molybdenum	mg/L	7.60	46.0	0.000928	0.000966	0.00105	0.00636	0.00624	0.00598
Nickel	mg/L	-	-	<0.0005	0.000610	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	0.497	0.475	0.465	1.14	0.970	0.973
Selenium	mg/L	0.00200	-	0.000225	0.000229	0.000228	0.000524	0.000457	0.000554
Silicon	mg/L	-	-	1.34	1.31	1.75	3.20	3.16	3.15
Silver	mg/L	0.0000500 - 0.00150	0.000100 - 0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000130
Sodium	mg/L	-	-	2.65	2.76	2.78	7.29	6.98	7.39
Strontium	mg/L	-	-	0.139	0.130	0.134	0.249	0.246	0.234
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	0.00750	0.0165	0.0000440	0.0000400	0.0000380	0.000205	0.000188	0.000200
Vanadium	mg/L	0.0600	-	<0.0005	<0.0005	<0.0005	0.00147	0.00140	0.00151
Zinc	mg/L	-	-	<0.003	0.00500	0.00390	<0.003	<0.003	0.00460

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Note: "-" indicates data not available.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table C.1.2: Supporting Spot Water Quality Data Collected During Plankton Sampling in the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		BOL-B2 (Reference)			POL-P2 (Exposed)		
				June	July	August	June	July	August
		Long-term Average	Short-term Maximum	19-Jun-24	25-Jul-24	26-Aug-24	19-Jun-24	23-Jul-24	26-Aug-24
Dissolved Metals									
Aluminum	mg/L	-	-	0.00740	0.00600	0.00380	0.00550	0.00330	0.00360
Antimony	mg/L	-	-	<0.0001	<0.0001	0.000100	0.000100	<0.0001	<0.0001
Arsenic	mg/L	-	-	0.000300	0.000350	0.000500	0.000500	0.000540	0.000550
Barium	mg/L	-	-	0.0166	0.0166	0.0167	0.00981	0.00937	0.00994
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	0.0440	0.0410	0.0420	0.0180	0.0220	0.0190
Cadmium	mg/L	0.000122 - 0.000242	0.000273 - 0.000710	0.0000123	<0.000005	<0.000005	<0.000005	<0.000015	<0.00001
Calcium	mg/L	-	-	14.2	14.2	14.9	35.4	35.1	36.8
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.00190 - 0.00540	0.0116 - 0.0317	0.00188	0.00199	0.00228	0.00409	0.00330	0.00445
Iron	mg/L	-	0.350	<0.03	<0.03	0.0400	<0.03	<0.03	<0.03
Lead	mg/L	0.00502 - 0.00617	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	2.61	2.58	2.83	5.64	4.71	5.64
Manganese	mg/L	-	-	0.0249	0.0476	0.185	0.00253	0.00178	0.00159
Molybdenum	mg/L	-	-	0.000944	0.000969	0.00108	0.00614	0.00621	0.00612
Nickel	mg/L	0.00210 - 0.00530	0.0304 - 0.0565	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	0.467	0.486	0.496	1.11	1.02	1.05
Selenium	mg/L	-	-	0.000199	0.000194	0.000257	0.000460	0.000604	0.000431
Silicon	mg/L	-	-	1.16	1.21	1.71	2.99	2.91	3.05
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	2.59	2.57	2.58	7.34	6.52	7.02
Strontium	mg/L	1.25	-	0.126	0.133	0.142	0.234	0.244	0.239
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	0.0000400	0.0000380	0.0000370	0.000206	0.000196	0.000205
Vanadium	mg/L	-	-	<0.0005	<0.0005	<0.0005	0.00128	0.00126	0.00130
Zinc	mg/L	0.00825 - 0.0144	0.0346 - 0.0737	<0.003	0.00400	<0.003	<0.003	<0.003	<0.003

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Note: "-" indicates data not available.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table C.1.3: Supporting Overlying Water Quality Data Collected During Sediment Quality Sampling in the Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		QUL-LREF1 (Reference)							QUL-LNF1 (Exposed; Near-Field)						
				QUL-LREF1-1	QUL-LREF1-2	QUL-LREF1-3	QUL-LREF1-4	QUL-LREF1-5	Mean	Standard Deviation	QUL-LNF-1	QUL-LNF-2	QUL-LNF-3	QUL-LNF-4	QUL-LNF-5	Mean	Standard Deviation
		Long-term Average	Short-term Maximum	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24			19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24		
Anions, Organics, Nutrients, and Physical Properties																	
Alkalinity (as $CaCO_3$)	mg/L	>20	-	47.5	46.2	46.6	46.9	45.8	46.6	0.652	47.1	47.0	46.9	46.8	47.0	47.0	0.114
Ammonia (as N)	mg/L	0.148 - 0.846	0.856 - 5.01	<0.005	0.00590	<0.005	<0.005	0.00560	0.00530	0.000170	<0.005	<0.005	0.00500	<0.005	<0.005	0.00500	-
Chloride	mg/L	150	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-
Conductivity	µS/cm	-	-	107	106	108	107	104	106	1.52	105	104	104	105	104	104	0.548
Specific Conductance (*in situ*)	µS/cm	-	-	89.3	88.5	88.8	89.1	88.1	88.8	0.477	105	105	105	171	105	118	29.3
Dissolved Organic Carbon[b]	mg/L	-	-	2.30	2.44	2.15	2.16	2.21	2.25	0.121	2.20	2.10	2.12	1.97	2.02	2.08	0.0896
Dissolved Oxygen (*in situ*)	%	-	-	102	111	104	119	146	116	17.8	99.2	98.1	98.7	98.6	98.1	98.5	0.462
Dissolved Oxygen (*in situ*)	mg/L	>8	>5	9.38	10.0	9.41	10.9	13.6	10.7	1.73	8.96	8.89	8.92	8.90	8.87	8.91	0.0342
Fluoride	mg/L	-	1.02 - 1.04	0.0320	0.0320	0.0320	0.0340	0.0330	0.0326	0.000894	0.0320	0.0320	0.0320	0.0320	0.0320	0.0320	0
Hardness (as $CaCO_3$)	mg/L	-	-	46.0	46.2	45.9	45.8	44.6	45.7	0.632	48.4	47.5	48.3	47.8	47.8	48.0	0.378
Hardness, from Total CaMg (as $CaCO_3$)	mg/L	-	-	48.6	47.2	47.2	47.8	46.8	47.5	0.701	47.6	47.5	48.7	48.1	46.2	47.6	0.926
Nitrate (as N)	mg/L	3.00	32.8	0.00790	0.0110	0.0150	0.00720	0.00660	0.00954	0.00349	0.0386	0.0397	0.0385	0.0387	0.0388	0.0389	0.000483
Nitrate and Nitrite (as N)	mg/L	-	-	0.00790	0.0110	0.0150	0.00720	0.00660	0.00954	0.00349	0.0386	0.0397	0.0385	0.0387	0.0388	0.0389	0.000483
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.001	<0.001	<0.001	0.00200	0.00290	0.00158	0.000509	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
pH (*in situ*)	pH units	6.5 - 9.0	-	8.48	8.60	8.47	8.92	8.88	8.67	0.217	8.08	8.08	8.07	8.05	8.10	8.08	0.0182
pH	pH units	-	-	7.98	7.97	7.94	7.95	8.05	7.98	0.0432	7.99	8.00	8.00	8.00	8.00	8.00	0.00447
Phosphorus - Total Dissolved	mg/L	-	-	0.00210	<0.002	<0.002	0.00220	0.00240	0.00214	0.000143	0.00200	<0.002	<0.002	0.00200	<0.002	0.00200	0
Phosphorus - Total	mg/L	0.00500		0.00510	0.00500	0.00620	0.0231	0.00700	0.00928	0.00777	<0.002	<0.002	0.00290	<0.002	<0.002	0.00218	-
Sulphate	mg/L	218	-	6.23	6.17	6.19	6.22	6.17	6.20	0.0279	6.20	6.18	6.20	6.25	6.24	6.21	0.0297
Temperature (*in situ*)	°C	-	-	19.9	20.2	20.1	19.6	20.2	20.0	0.242	20.3	20.2	20.3	20.4	20.2	20.3	0.0674
Total Dissolved Solids	mg/L	-	-	64.0	59.0	66.0	77.0	64.0	66.0	6.67	66.0	61.0	61.0	61.0	66.0	63.0	2.74
Total Nitrogen	mg/L	-	-	0.0890	0.0870	0.0950	0.104	0.157	0.106	0.0290	0.140	0.133	0.145	0.134	0.145	0.139	0.00577
Total Suspended Solids[b]	mg/L	-	-	1.20	<1	<1	1.20	1.10	1.10	0.0600	1.30	1.50	1.40	1.10	<1	1.26	0.185
Turbidity[b]	NTU	-	-	0.400	0.350	0.440	0.430	0.370	0.398	0.0383	0.170	0.170	0.190	0.200	0.190	0.184	0.0134
Total Metals																	
Aluminum	mg/L	0.217 - 0.420	-	0.0230	0.0141	0.0140	0.0302	0.0153	0.0193	0.00713	0.0112	0.00950	0.0125	0.0102	0.00920	0.0105	0.00135
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Arsenic	mg/L	0.00500	-	0.000200	0.000210	0.000200	0.000240	0.000260	0.000222	0.0000268	0.000130	0.000120	0.000140	0.000120	0.000130	0.000128	0.00000837
Barium	mg/L	1.00	-	0.00670	0.00660	0.00678	0.00689	0.00671	0.00674	0.000107	0.00547	0.00530	0.00561	0.00558	0.00534	0.00546	0.000139
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Boron	mg/L	1.20	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Cadmium	mg/L	-	-	0.00000530	<0.000005	<0.000005	0.00000630	<0.000005	0.00000532	0.000000566	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	-
Calcium	mg/L	-	-	15.8	15.2	15.2	15.3	15.0	15.3	0.300	15.7	15.7	16.1	15.9	15.3	15.7	0.297
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Copper	mg/L	-	-	0.000630	0.000630	0.000620	0.000700	0.000590	0.000634	0.0000404	0.000610	0.000510	0.000660	0.000590	0.000540	0.000582	0.0000589
Iron	mg/L	-	1.00	0.0550	0.0400	0.0350	0.0690	0.0490	0.0496	0.0133	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
Magnesium	mg/L	-	-	2.21	2.24	2.25	2.34	2.27	2.26	0.0487	2.04	2.02	2.06	2.04	1.95	2.02	0.0427
Manganese	mg/L	0.808 - 0.819	1.05 - 1.08	0.00429	0.00333	0.00335	0.00582	0.00393	0.00414	0.00102	0.00129	0.00111	0.00118	0.00146	0.00126	0.00126	0.000132
Molybdenum	mg/L	7.60	46.0	0.000527	0.000504	0.000510	0.000508	0.000489	0.000508	0.0000136	0.000387	0.000373	0.000375	0.000386	0.000384	0.000381	0.00000652
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Potassium	mg/L	-	-	0.449	0.461	0.487	0.458	0.403	0.452	0.0306	0.515	0.505	0.520	0.521	0.483	0.509	0.0158
Selenium	mg/L	0.00200	-	0.000195	0.000181	0.000184	0.000221	0.000167	0.000190	0.0000202	0.000109	0.000120	0.000118	0.000138	0.000148	0.000127	0.0000159
Silicon	mg/L	-	-	1.81	1.74	1.82	1.79	1.72	1.78	0.0439	1.59	1.56	1.56	1.54	1.53	1.56	0.0230
Silver	mg/L	0.0000500	0.000100	<0.00001	<0.00001	0.0000100	<0.00001	<0.00001	0.0000100	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Sodium	mg/L	-	-	1.03	1.02	1.03	1.08	1.04	1.04	0.0235	0.939	0.931	0.955	0.952	0.896	0.935	0.0237
Strontium	mg/L	-	-	0.111	0.112	0.112	0.108	0.105	0.110	0.00305	0.125	0.127	0.124	0.127	0.121	0.125	0.00249
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Uranium	mg/L	0.00750	0.0165	0.000136	0.000138	0.000139	0.000137	0.000134	0.000137	0.00000192	0.000142	0.000143	0.000151	0.000152	0.000147	0.000147	0.00000453
Vanadium	mg/L	0.0600	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Notes: "-" indicates data not available. Standard deviation was not calculated where all results were below the laboratory reporting limit.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table C.1.3: Supporting Overlying Water Quality Data Collected During Sediment Quality Sampling in the Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		QUL-LREF1 (Reference)							QUL-LNF1 (Exposed; Near-Field)						
				QUL-LREF1-1	QUL-LREF1-2	QUL-LREF1-3	QUL-LREF1-4	QUL-LREF1-5	Mean	Standard Deviation	QUL-LNF-1	QUL-LNF-2	QUL-LNF-3	QUL-LNF-4	QUL-LNF-5	Mean	Standard Deviation
		Long-term Average	Short-term Maximum	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24			19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24		
Dissolved Metals																	
Aluminum	mg/L	-	-	0.0109	0.0151	0.00780	0.00780	0.00730	0.00978	0.00330	0.00710	0.00710	0.00740	0.00770	0.00750	0.00736	0.000261
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Arsenic	mg/L	-	-	0.000180	0.000180	0.000160	0.000200	0.000200	0.000184	0.0000167	0.000110	0.000120	<0.0001	0.000100	0.000110	0.000108	0.00000864
Barium	mg/L	-	-	0.00651	0.00645	0.00630	0.00635	0.00668	0.00646	0.000149	0.00532	0.00530	0.00524	0.00528	0.00533	0.00529	0.0000358
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Boron	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Cadmium	mg/L	0.000120 - 0.000125	0.000266 - 0.000280	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	-
Calcium	mg/L	-	-	14.7	14.9	14.7	14.6	14.2	14.6	0.259	16.2	15.8	16.2	16.0	16.0	16.0	0.167
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Copper	mg/L	0.00100 - 0.00150	0.00610 - 0.00930	0.000590	0.000600	<0.0005	0.000620	0.000590	0.000580	0.0000135	<0.0005	<0.0005	<0.0005	0.000510	<0.0005	0.000502	-
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-
Lead	mg/L	0.00251 - 0.00279	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
Magnesium	mg/L	-	-	2.26	2.19	2.23	2.26	2.23	2.23	0.0288	1.92	1.96	1.90	1.92	1.90	1.92	0.0245
Manganese	mg/L	-	-	0.000680	0.000650	0.000650	0.000720	0.000620	0.000664	0.0000378	0.000890	0.000450	0.000550	0.000710	0.000680	0.000656	0.000167
Molybdenum	mg/L	-	-	0.000491	0.000486	0.000488	0.000525	0.000496	0.000497	0.0000160	0.000364	0.000360	0.000369	0.000356	0.000359	0.000362	0.00000503
Nickel	mg/L	0.000800 - 0.00160	0.0186 - 0.0204	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Potassium	mg/L	-	-	0.534	0.514	0.558	0.491	0.448	0.509	0.0421	0.545	0.543	0.519	0.521	0.519	0.529	0.0134
Selenium	mg/L	-	-	0.000138	0.000142	0.000147	0.000204	0.000168	0.000160	0.0000273	0.0000910	0.0000810	0.0000960	0.000134	0.000121	0.000105	0.0000221
Silicon	mg/L	-	-	1.69	1.65	1.68	1.65	1.64	1.66	0.0217	1.38	1.39	1.40	1.41	1.41	1.40	0.0130
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Sodium	mg/L	-	-	1.12	1.07	1.10	1.13	1.10	1.10	0.0230	0.899	0.905	0.875	0.890	0.877	0.889	0.0132
Strontium	mg/L	1.25	-	0.106	0.111	0.110	0.106	0.106	0.108	0.00249	0.125	0.128	0.126	0.126	0.121	0.125	0.00259
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Uranium	mg/L	-	-	0.000133	0.000131	0.000133	0.000131	0.000125	0.000131	0.00000329	0.000148	0.000146	0.000143	0.000144	0.000146	0.000145	0.00000195
Vanadium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-
Zinc	mg/L	0.00346 - 0.00379	0.0244 - 0.0263	0.00310	<0.003	<0.003	<0.003	<0.003	0.00302	-	0.00490	<0.003	<0.003	<0.003	<0.003	0.00338	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Notes: "-" indicates data not available. Standard deviation was not calculated where all results were below the laboratory reporting limit.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table C.1.4: Supporting Spot Water Quality Data Collected During Plankton Sampling in the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		QUL-ZOO-7 (Reference)			QUL-ZOO-1 (Exposed)		
				June	July	August	June	July	August
		Long-term Average	Short-term Maximum	20-Jun-24	24-Jul-24	25-Aug-24	20-Jun-24	24-Jul-24	25-Aug-24
Anions, Organics, Nutrients, and Physical Properties									
Alkalinity (as $CaCO_3$)	mg/L	>20	-	45.9	45.4	48.1	48.9	46.3	48.2
Ammonia (as N)	mg/L	0.754 - 1.83	3.94 - 11.0	0.00690	0.00520	0.00770	<0.005	0.00930	0.00720
Chloride	mg/L	150	600	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Conductivity	µS/cm	-	-	103	99.2	108	111	101	103
Specific Conductance (*in situ*)	µS/cm	-	-	49.2	95.5	106	59.5	98.4	107
Dissolved Organic Carbon[b]	mg/L	-	-	4.10	3.12	2.40	2.54	2.44	2.18
Dissolved Oxygen (*in situ*)	%	-	-	95.7	99.1	93.2	98.7	100	94.0
Dissolved Oxygen (*in situ*)	mg/L	>8	>5	10.5	9.41	8.74	10.9	9.65	8.85
Fluoride	mg/L	-	1.02 - 1.08	0.0350	0.0280	0.0350	0.0340	0.0280	0.0320
Hardness (as $CaCO_3$)	mg/L	-	-	48.1	45.4	49.1	50.4	47.4	48.5
Hardness, from Total CaMg (as $CaCO_3$)	mg/L	-	-	48.0	49.6	47.3	50.9	52.7	45.6
Nitrate (as N)	mg/L	3.00	32.8	0.0797	0.0455	0.0411	0.100	0.0584	0.0464
Nitrate and Nitrite (as N)	mg/L	-	-	0.0797	0.0455	0.0411	0.100	0.0584	0.0464
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Orthophosphate-Dissolved (as P)	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
pH (*in situ*)	pH units	6.5 - 9.0	-	7.60	8.16	8.15	7.88	8.14	8.11
pH	pH units	-	-	7.94	7.94	7.97	7.97	7.93	7.99
Phosphorus - Total Dissolved	mg/L	-	-	0.00230	<0.002	<0.002	<0.002	<0.002	<0.002
Phosphorus - Total	mg/L	0.00500		0.00500	0.00870	0.00330	<0.002	0.00370	0.00320
Sulphate	mg/L	218	-	5.65	5.56	6.15	6.09	5.55	5.98
Temperature (*in situ*)	°C	-	-	11.3	17.9	18.5	10.7	17.3	18.4
Total Dissolved Solids	mg/L	-	-	69.0	68.0	70.0	65.0	82.0	78.0
Total Nitrogen	mg/L	-	-	0.194	0.155	0.143	0.190	0.161	0.134
Total Suspended Solids[b]	mg/L	-	-	2.50	<1	<1	1.90	1.20	<1
Turbidity[b]	NTU	-	-	1.32	0.710	0.600	0.960	0.460	0.670
Total Metals									
Aluminum	mg/L	0.220 - 0.321	-	0.0491	0.0341	0.0676	0.0324	0.0261	0.0338
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.00500	-	0.000200	0.000140	0.000160	0.000160	0.000120	0.000120
Barium	mg/L	1.00	-	0.00809	0.00628	0.00688	0.00581	0.00562	0.00576
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.20	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	-	0.0000227	0.00000880	0.0000134	<0.000005	<0.000005	0.00000540
Calcium	mg/L	-	-	15.6	16.6	15.6	16.8	17.8	15.0
Chromium	mg/L	0.00250	-	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	-	-	0.00195	0.00155	0.00447	0.000990	0.00126	0.00156
Iron	mg/L	-	1.00	0.0710	0.0400	0.0630	0.0440	<0.03	<0.03
Lead	mg/L	-	-	0.0000810	<0.00005	0.0000730	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	2.19	1.98	2.03	2.18	2.00	1.98
Manganese	mg/L	0.806 - 0.837	1.04 - 1.12	0.00497	0.00304	0.00290	0.00736	0.00190	0.00164
Molybdenum	mg/L	7.60	46.0	0.000496	0.000384	0.000360	0.000411	0.000356	0.000355
Nickel	mg/L	-	-	0.000580	0.000700	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	0.586	0.515	0.515	0.537	0.502	0.486
Selenium	mg/L	0.00200	-	0.000159	0.000136	0.000108	0.000129	0.000142	0.000141
Silicon	mg/L	-	-	2.08	1.56	1.59	1.70	1.58	1.48
Silver	mg/L	0.0000500	0.000100	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	1.11	0.968	1.04	1.02	0.965	0.913
Strontium	mg/L	-	-	0.116	0.117	0.126	0.138	0.126	0.123
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	0.00750	0.0165	0.000132	0.000141	0.000160	0.000158	0.000147	0.000162
Vanadium	mg/L	0.0600	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	-	-	0.00560	<0.003	0.00350	<0.003	<0.003	<0.003

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Note: "-" indicates data not available.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table C.1.4: Supporting Spot Water Quality Data Collected During Plankton Sampling in the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		QUL-ZOO-7 (Reference)			QUL-ZOO-1 (Exposed)		
				June	July	August	June	July	August
		Long-term Average	Short-term Maximum	20-Jun-24	24-Jul-24	25-Aug-24	20-Jun-24	24-Jul-24	25-Aug-24
Dissolved Metals									
Aluminum	mg/L	-	-	0.0134	0.0102	0.00870	0.00880	0.0102	0.00800
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	-	0.000160	0.000130	0.000110	<0.0001	0.000100	0.000110
Barium	mg/L	-	-	0.00618	0.00555	0.00552	0.00547	0.00551	0.00527
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	0.000119 - 0.000132	0.000262 - 0.000304	0.0000115	0.00000880	0.0000137	0.00000990	<0.000005	<0.000005
Calcium	mg/L	-	-	15.9	15.1	16.3	16.8	15.9	16.2
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.00100 - 0.00160	0.00610 - 0.00950	0.000840	0.000660	0.00121	0.000640	0.000590	0.000560
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	0.00261 - 0.00365	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	2.04	1.87	2.03	2.04	1.88	1.96
Manganese	mg/L	-	-	0.00173	0.000670	0.000720	0.00118	0.000390	0.000700
Molybdenum	mg/L	-	-	0.000484	0.000391	0.000349	0.000424	0.000351	0.000369
Nickel	mg/L	0.00150 - 0.00170	0.0201 - 0.0243	<0.0005	0.000510	<0.0005	<0.0005	<0.0005	<0.0005
Potassium	mg/L	-	-	0.566	0.510	0.530	0.520	0.502	0.480
Selenium	mg/L	-	-	0.000174	0.000113	0.000129	0.000124	0.000106	0.000112
Silicon	mg/L	-	-	1.94	1.50	1.46	1.67	1.48	1.46
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	1.10	0.911	1.04	0.965	0.900	0.867
Strontium	mg/L	1.25	-	0.109	0.119	0.133	0.127	0.124	0.135
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	0.000129	0.000133	0.000149	0.000161	0.000137	0.000150
Vanadium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	0.00349 - 0.00714	0.0246 - 0.0299	0.00590	<0.003	<0.003	<0.003	<0.003	<0.003

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Note: "-" indicates data not available.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Table C.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

APPENDIX C.2
SEDIMENT QUALITY

Table C.2.1: Baseline and Pre-Breach Sediment Quality Data for Bootjack Lake, 1989 to 2012

Parameter	Units	1989		1995						May 1996						Oct 1996						1999						2009		2012		95th Percentile
		Imperial Metals (1990)[a]		HKP (1996)[b]						HKP (1997)						HKP (1997)[c]						Beak (2000)						Minnow (2011)		Minnow (2013a)		
		B1	B2	B1			B2			B1			B2			B1			B2			B1			B2			B1	B2	B1	B2	
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3					
Physical Characteristics																																
% Gravel (>2 mm)	%	-	-	-			-			-	-	-	-	-	-	-	-	-	-	-	-	-			-			<1.0	<1.0	<0.10	<0.10	<1.0
% Sand (2.0mm - 0.063 mm)	%	26.7	29.2	20.7			13.8			-	-	-	-	-	-	21.4	21.6	21.2	11.4	11.0	14.8	100			100			1.00	1.00	1.53	0.740	26.4
% Silt (0.063 mm - 4 µm)	%	30.7	27.7	53.8			57.5			-	-	-	-	-	-	64.6	56.5	68.7	66.7	73.0	69.2	-			-			60.0	57.0	88.8	90.7	88.0
% Clay (<4 µm)	%	42.6	43.1	25.5			28.7			-	-	-	-	-	-	14.0	21.9	10.1	21.9	16.0	16.0	-			-			38.0	42.0	9.67	8.52	42.6
Organic / Inorganic Carbon																																
Total Organic Carbon	%	-	-	17.9	17.9	18.1	18.6	18.5	18.5	20.4	20.2	20.6	21.3	21.5	21.7	-	-	-	-	-	-	11.0			20.0			17.8	18.6	17.5	16.1	21.5
Metals																																
Aluminum	mg/kg dw	12,800	13,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,000	9,800	11,000	15,000	16,000	16,000	-	-	17,700	19,500	18,690
Antimony	mg/kg dw	<0.050	<0.050	1.33	1.30	1.25	1.83	1.54	0.990	0.990	1.17	1.08	1.44	1.24	1.40	1.11	1.26	1.95	1.40	1.52	1.45	<0.20	<0.20	<0.20	0.200	0.200	0.200	<10.0	<10.0	0.930	1.11	1.70
Arsenic	mg/kg dw	6.00	7.00	4.38	4.72	5.17	6.31	6.28	6.65	4.73	5.80	5.05	7.65	7.96	7.05	4.32	7.16	6.10	5.80	6.76	6.11	5.30	5.10	4.40	5.70	5.70	5.70	6.90	6.10	6.47	7.52	7.59
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150	150	160	250	260	260	236	274	223	306	292
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.400	0.400	0.500	0.700	0.700	0.700	0.730	0.780	0.640	0.760	0.771
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	0.300	0.300	0.300	<0.20	0.300	-	-	<0.20	<0.20	0.300
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.0	11.0	13.0	16.0	17.0	17.0	-	-	-	-	17.0
Cadmium	mg/kg dw	<0.25	<0.25	0.400	0.400	0.400	0.600	0.600	0.500	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.300	0.300	0.300	0.400	0.300	0.200	0.300	0.300	0.300	0.400	0.400	0.500	0.900	0.810	0.419	0.476	0.715
Calcium	mg/kg dw	12,900	11,700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11,900	8,050	12,750
Chromium	mg/kg dw	50.6	50.4	42.0	41.0	43.0	44.0	40.0	46.0	45.0	45.0	45.0	55.0	54.0	55.0	33.0	36.0	51.0	32.0	37.0	32.0	32.0	29.0	24.0	32.0	34.0	38.0	41.1	40.8	38.6	37.9	54.6
Cobalt	mg/kg dw	16.1	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.90	8.70	8.80	9.20	9.50	9.70	11.9	10.6	11.6	12.1	16.4
Copper	mg/kg dw	645	625	434	458	467	480	457	492	458	457	459	610	599	609	501	368	435	366	466	373	180	170	200	300	310	310	460	440	425	388	618
Iron	mg/kg dw	22,500	27,300	27,800	27,100	27,600	28,700	26,200	28,400	24,400	25,000	25,300	29,500	29,100	29,300	16,900	21,000	18,100	17,000	20,000	18,500	21,000	21,000	21,000	28,000	28,000	28,000	-	-	26,900	28,000	29,230
Lead	mg/kg dw	10.0	12.0	13.0	12.0	11.0	15.0	16.0	16.0	15.0	12.0	12.0	13.0	16.0	15.0	9.00	8.00	10.0	11.0	12.0	11.0	9.30	9.60	10.0	13.0	12.0	16.0	<30.0	<30.0	7.97	12.3	16.0
Lithium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	12.2	12.2
Magnesium	mg/kg dw	8,800	8,600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,020	5,400	8,770
Manganese	mg/kg dw	540	763	835	805	840	933	895	921	710	736	744	923	931	920	525	564	562	646	701	707	670	660	630	1,800	1,600	1,700	-	-	1,730	1,280	1,720
Mercury	mg/kg dw	0.290	0.300	0.230	0.230	0.230	0.300	0.290	0.290	0.207	0.222	0.220	0.283	0.283	0.281	0.293	0.237	0.286	0.251	0.285	0.247	0.160	0.150	0.170	0.320	0.330	0.350	0.363	0.387	-	-	0.358
Molybdenum	mg/kg dw	7.31	9.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	1.10	1.20	1.90	2.00	2.10	5.00	<4.0	4.05	3.77	8.26
Nickel	mg/kg dw	36.8	38.0	30.0	29.0	30.0	32.0	30.0	34.0	30.0	30.0	28.0	36.0	36.0	37.0	22.0	25.0	32.0	23.0	27.0	24.0	22.0	21.0	18.0	25.0	26.0	28.0	27.5	28.9	28.5	28.8	36.9
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,530	2,640	2,585
Phosphorus, Total	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,280	2,410	2,354
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,360	1,420	1,417
Selenium	mg/kg dw	-	-	2.10	1.90	1.90	1.90	1.60	1.80	2.40	2.20	2.30	3.10	3.10	3.00	1.60	1.60	1.90	1.40	1.90	1.50	<1.0	<1.0	<1.0	1.50	1.90	1.40	2.20	2.04	2.71	2.28	3.07
Silver	mg/kg dw	<0.25	<0.25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.400	0.300	0.500	0.500	0.500	0.400	0.200	0.200	0.300	0.400	0.400	0.400	<2.0	<2.0	0.390	0.400	0.500
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	210	210
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89.0	83.0	94.0	140	140	150	-	-	128	98.9	147
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,830	4,320	7,300	5,900	7,090
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	0.124	0.140	0.134
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.700	0.600	0.800	0.500	0.600	0.600	<5.0	<5.0	<2.0	<2.0	0.755
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	380	390	390	330	290	330	-	-	712	517	644
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	1.30	1.60	2.70	2.90	2.90	-	-	2.45	2.39	2.90
Vanadium	mg/kg dw	69.4	72.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.0	38.0	41.0	42.0	45.0	45.0	74.7	71.7	68.1	76.2	75.4
Zinc	mg/kg dw	102	110	88.0	92.0	95.0	101	94.0	103	90.0	88.0	88.0	105	104	104	95.0	92.0	86.0	74.0	84.0	74.0	59.0	56.0	58.0	69.0	71.0	74.0	74.2	73.3	79.3	78.4	105

Notes: mg/kg dw = milligrams per kilogram dry weight. Sediment metal concentrations are based predominantly on bulk sediment samples. Concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. "-" indicates no data available.

[a] Stations were named LN (north basin) and LS (south basin) in 1989, and are approximately equivalent to stations B1 and B2 assessed in following sampling years, respectively. These are therefore displayed as B1 and B2. Concentrations reported in 1989 were for the <0.149 mm fraction only. Particle size fractions for these samples are as follows: sand (0.053 mm-2.0 mm), silt (0.002 mm-0.053 mm), clay (<0.002 mm).

[b] Particle size results are based on one composite sample and the size fractions are as follows: sand (2.0 mm - 0.065 mm), silt (0.065 mm - 0.0041 mm), clay (<0.0041 mm).

[c] Concentrations reported in October 1996 are for the silt and clay (<63 µm) fraction only. Particle size fractions for these samples are as follows: sand (2.0 mm - 0.063 mm), silt (0.063 mm - 0.0039 or 0.0038 mm), clay (<0.0039 or < 0.0038 mm).

Table C.2.2: Baseline and Pre-Breach Sediment Quality Data for Polley Lake, 1989 to 2012

Parameter	Units	1989	May 1995						May 1996						Oct 1996						1999						2009		2012		95th Percentile
		Imperial Metals (1990)[a]	HKP (1996)						HKP (1997)						HKP (1997)[d]						Beak (2000)						Minnow (2011)		Minnow (2013a)		
		P2	P1[b]			P2[c]			P1			P2			P1			P2			P1 (0-2cm)			P2 (0-2cm)			P1	P2	P1	P2	
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3					
Physical Characteristics																															
% Gravel (>2 mm)	%	-	-			-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand (2.0 mm - 0.063 mm)	%	32.3	21.0			29.9			-	-	-	-	-	-	30.6	26.6	23.4	32.2	29.0	25.2	100	-	-	100	-	-	1.00	1.00	0.910	0.660	32.2
% Silt (0.063 mm - 4 µm)	%	32.3	49.6			46.8			-	-	-	-	-	-	57.0	61.4	59.2	54.8	58.2	62.8	-	-	-	-	-	-	56.0	53.0	87.8	87.0	87.3
% Clay (<4 µm)	%	35.5	29.4			23.3			-	-	-	-	-	-	12.4	12.0	17.4	13.0	12.8	12.0	-	-	-	-	-	-	43.0	46.0	11.3	12.3	44.2
Organic / Inorganic Carbon																															
Total Organic Carbon	%	-	18.2	18.6	18.5	18.7	18.8	19.1	20.9	20.7	20.6	20.8	20.6	20.7	-	-	-	-	-	-	14.0	-	-	18.0	-	-	15.5	16.9	12.7	14.6	20.8
Metals																															
Aluminum	mg/kg dw	13,100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,000	15,000	16,000	13,000	15,000	16,000	-	-	21,900	18,700	20,620
Antimony	mg/kg dw	-	0.740	0.890	0.810	0.900	0.740	1.07	0.720	0.860	0.780	0.810	0.840	0.870	0.500	1.27	0.260	0.920	1.65	0.740	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<10.0	<10.0	0.460	0.430	1.22
Arsenic	mg/kg dw	15.5	5.59	5.12	5.95	5.39	6.28	5.84	5.77	5.30	4.84	5.99	4.27	3.83	4.45	4.66	4.85	4.93	6.07	6.20	8.30	9.00	7.10	5.10	5.60	5.20	5.50	6.40	8.86	7.18	8.94
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150	190	170	130	130	140	145	167	212	239	227
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.600	0.600	0.500	0.400	0.500	0.500	<0.50	0.580	0.660	0.550	0.633
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	0.200	0.300	0.200	0.200	0.400	-	-	<0.20	<0.20	0.365
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.0	15.0	15.0	16.0	16.0	17.0	-	-	-	-	17.0
Cadmium	mg/kg dw	-	0.600	0.700	0.600	0.600	0.500	0.600	<0.10	0.700	<0.10	<0.10	<0.10	0.600	0.300	0.200	0.500	0.200	0.200	0.300	0.400	0.400	0.400	0.300	0.500	0.400	0.670	0.630	0.574	0.418	0.690
Calcium	mg/kg dw	15,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15,800	13,200	15,890
Chromium	mg/kg dw	60.8	59.0	59.0	59.0	60.0	63.0	64.0	68.0	69.0	67.0	65.0	66.0	64.0	46.0	53.0	56.0	44.0	61.0	62.0	38.0	38.0	41.0	35.0	53.0	41.0	36.5	50.4	46.9	41.4	67.6
Cobalt	mg/kg dw	18.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.0	11.0	11.0	9.50	10.0	11.0	9.80	11.9	14.3	12.0	16.4
Copper	mg/kg dw	282	337	355	345	376	382	397	374	376	360	341	349	352	245	242	300	257	282	327	160	180	180	170	200	210	239	313	369	253	380
Iron	mg/kg dw	60,600	33,200	27,800	31,200	30,500	27,900	27,700	29,700	30,100	29,000	28,600	28,900	29,200	19,100	17,000	19,000	17,400	19,700	22,100	28,000	35,000	30,000	22,000	24,000	25,000	-	-	35,100	41,000	39,230
Lead	mg/kg dw	9.50	17.0	19.0	18.0	17.0	11.0	15.0	16.0	15.0	16.0	11.0	13.0	17.0	9.00	5.00	9.00	8.00	11.0	12.0	11.0	13.0	12.0	13.0	16.0	16.0	<30.0	<30.0	14.4	12.1	17.7
Lithium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.0	13.3	17.8
Magnesium	mg/kg dw	12,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,380	7,560	12,548
Manganese	mg/kg dw	2,140	1,680	1,510	1,550	1,880	1,400	1,770	1,650	1,660	1,600	1,540	1,550	1,560	674	547	713	833	925	1,280	3,000	3,400	3,100	2,000	2,600	2,000	-	-	1,630	3,850	3,310
Mercury	mg/kg dw	0.210	0.280	0.260	0.240	0.270	0.220	0.260	0.243	0.220	0.241	0.200	0.206	0.223	0.296	0.183	0.214	0.164	0.192	0.198	0.200	0.200	0.210	0.230	0.240	0.240	0.219	0.288	-	-	0.286
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.40	1.20	1.40	1.30	1.30	2.00	4.60	5.70	6.34	5.57	6.05
Nickel	mg/kg dw	41.8	40.0	38.0	38.0	41.0	40.0	43.0	41.0	44.0	42.0	40.0	36.0	38.0	29.0	31.0	35.0	28.0	38.0	38.0	26.0	26.0	28.0	26.0	37.0	30.0	26.0	33.5	33.7	29.6	42.6
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,790	3,490	3,405
Phosphorus, Total	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,680	9,390	9,055
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,600	1,420	1,591
Selenium	mg/kg dw	-	1.70	1.60	1.90	1.80	2.00	1.90	2.60	2.40	2.80	2.50	2.30	2.40	1.80	1.60	1.70	1.70	2.10	2.20	1.60	1.90	1.90	1.70	1.80	1.70	2.50	3.71	6.26	6.92	5.37
Silver	mg/kg dw	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.400	0.300	0.500	0.400	0.300	0.400	0.300	0.200	0.300	0.300	0.300	0.300	<2.0	<2.0	0.410	0.310	0.415
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	570	360	560
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120	110	100	97.0	110	110	-	-	127	117	125
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,530	8,470	10,600	13,400	12,980
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	0.113	0.0960	0.112
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.500	0.600	0.500	0.800	0.800	0.700	<5.0	<5.0	<2.0	<2.0	0.800
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	390	400	410	300	360	390	-	-	855	660	787
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.30	1.40	1.40	1.30	1.40	1.50	-	-	1.21	1.09	1.47
Vanadium	mg/kg dw	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55.0	58.0	58.0	42.0	47.0	54.0	87.5	93.3	112	90.2	111
Zinc	mg/kg dw	99.0	94.0	96.0	92.0	95.0	98.0	105	98.0	99.0	96.0	92.0	94.0	94.0	74.0	73.0	83.0	70.0	84.0	93.0	62.0	62.0	62.0	59.0	67.0	69.0	58.5	74.3	90.7	70.8	99.0

Notes: mg/kg dw = milligrams per kilogram dry weight. Sediment metal concentrations are based predominantly on bulk sediment samples. Concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. "-" indicates no data available.

[a] Station was named L in 1989, and is approximately equivalent to station P2 assessed in following sampling years. The station is therefore displayed as P2. Concentrations reported in 1989 were for the <0.149 mm fraction only. Particle size fractions for these samples are as follows: sand (0.053 mm-2.0 mm), silt (0.002 mm-0.053 mm), clay (<0.002 mm).

[b] Particle size results for this station are based on one composite sample and the size fractions are as follows: sand (2.0 mm - 0.0705 mm), silt (0.0705 mm - 0.0041 mm), clay (<0.0041 mm).

[c] Particle size results for this station are based on one composite sample, and the size fractions are as follows: sand (2.0 mm - 0.0675 mm), silt (0.0675 mm - 0.0041 mm), clay (<0.0041 mm).

[d] Concentrations reported in October 1996 were for the silt and clay (<63µm) fraction only. Particle size fractions for these samples are as follows: sand (2.0 mm - 0.063 mm), silt (0.063 mm - 0.0040 mm or 0.0039 mm), clay (<0.0040 mm or 0.0039 mm).

Table C.2.3: Sediment Quality Data for the Bootjack Lake (BOL-B2; Reference) Deep Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2014			2015					2016					2018				
		Lower	Upper	1	2	3	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
				23-Oct-14	23-Oct-14	23-Oct-14	16-Aug-15	16-Aug-15	16-Aug-15	16-Aug-15	16-Aug-15	16-Aug-16	16-Aug-16	16-Aug-16	16-Aug-16	16-Aug-16	25-Sep-18	25-Sep-18	25-Sep-18	25-Sep-18	25-Sep-18
Physical Tests																					
Moisture	%	-	-	93.9	93.3	92.9	94.1	***96.1***	95.7	-	-	95.3	95.0	93.5	94.2	94.4	93.2	93.4	93.3	93.6	93.0
pH (1:2 soil:water)	pH	-	-	6.21	5.99	6.08	6.44	6.71	6.60	-	-	6.22	6.28	5.99	6.17	***5.70***	-	-	-	-	-
Particle Size																					
% Gravel (>2 mm)	%	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0
% Sand (2.0 mm - 0.063 mm)	%	-	-	0.480	0.410	0.590	0.120	0.150	0.220	0.160	0.630	0.370	0.580	0.460	0.800	0.380	<1.0	<1.0	<1.0	<1.0	***5.50***
% Silt (0.063 mm - 4 µm)	%	-	-	83.6	84.4	82.4	80.6	83.9	81.8	83.9	82.6	84.4	86.1	82.7	84.9	82.2	85.1	***88.4***	82.7	85.2	82.5
% Clay (<4 µm)	%	-	-	15.9	15.2	17.0	19.3	16.0	17.9	15.9	16.8	15.3	13.3	16.8	14.3	17.4	14.6	11.0	16.8	14.0	12.1
Organic / Inorganic Carbon (<63 µm)																					
Total Organic Carbon	%	-	-	***16.8***	15.7	14.7	14.8	15.5	15.1	-	-	13.9	15.0	14.3	14.5	15.6	15.0	16.0	15.0	16.3	15.0
Nutrients (Bulk sediment)																					
Total Nitrogen	%	-	-	1.59	1.48	1.55	1.60	1.67	1.65	-	-	1.48	1.61	1.52	1.53	1.62	1.59	1.68	1.65	***1.74***	1.60
Metals, Metalloids, and Non-Metals (<63 µm)																					
Aluminum	mg/kg dw	-	-	18,000	18,300	16,800	18,700	19,700	17,600	-	-	18,700	20,000	18,500	19,100	19,200	18,300	18,500	18,800	18,700	20,300
Antimony	mg/kg dw	-	-	0.740	0.860	0.800	0.930	1.05	0.910	-	-	0.910	1.04	0.910	0.990	1.09	1.03	1.12	1.08	***1.14***	1.00
Arsenic	mg/kg dw	5.9	17	5.89	6.25	6.12	7.46	8.48	7.23	-	-	6.75	7.80	6.72	6.68	6.91	7.00	7.57	7.14	7.33	7.26
Barium	mg/kg dw	-	-	236	250	242	311	277	280	-	-	299	230	264	284	269	329	279	281	250	305
Beryllium	mg/kg dw	-	-	0.680	0.700	0.690	0.700	0.710	0.700	-	-	0.740	0.770	0.710	0.750	0.780	0.760	***0.800***	0.770	0.790	0.770
Bismuth	mg/kg dw	-	-	0.110	***0.150***	0.140	0.140	0.140	0.130	-	-	0.130	0.140	0.120	0.120	0.120	0.140	0.140	0.140	0.140	0.140
Boron	mg/kg dw	-	-	13.0	13.0	14.0	16.0	16.0	14.0	-	-	15.0	16.0	14.0	16.0	17.0	***18.0***	17.0	17.0	16.0	17.0
Cadmium	mg/kg dw	0.6	3.5	0.381	0.407	0.395	0.492	***0.602***	0.493	-	-	0.386	0.458	0.388	0.387	0.425	0.457	0.496	0.500	0.522	0.476
Calcium	mg/kg dw	-	-	7,410	7,830	7,020	7,970	9,140	8,140	-	-	7,440	9,210	7,530	8,540	8,120	8,010	***10,600***	9,340	9,580	8,290
Chromium	mg/kg dw	37.3	90	35.4	***117***	33.4	45.4	47.5	42.2	-	-	34.1	36.8	35.8	35.1	34.3	37.8	39.9	39.2	44.0	42.8
Cobalt	mg/kg dw	-	-	10.9	11.9	10.2	13.1	***14.0***	12.7	-	-	11.0	12.4	11.0	11.6	10.9	12.0	13.1	12.5	12.3	12.8
Copper	mg/kg dw	35.7	197	333	381	305	375	409	363	-	-	333	373	328	335	357	359	399	388	378	390
Iron	mg/kg dw	21,200	43,766	29,000	25,300	25,500	33,400	29,300	27,500	-	-	32,500	29,600	28,200	25,300	24,900	31,900	27,700	25,700	25,100	28,500
Lead	mg/kg dw	35	91.3	9.67	10.5	10.1	10.6	***11.8***	10.4	-	-	9.98	11.7	10.1	9.87	9.62	10.3	11.3	11.3	11.4	10.7
Lithium	mg/kg dw	-	-	11.0	11.2	11.1	10.6	10.8	10.4	-	-	12.5	***13.7***	12.3	13.3	12.6	11.7	12.6	12.1	11.8	12.2
Magnesium	mg/kg dw	-	-	5,000	5,060	4,410	5,230	5,400	5,190	-	-	5,250	5,630	5,220	5,410	4,890	5,320	5,890	5,610	5,200	5,660
Manganese	mg/kg dw	460	1,100	1,580	1,080	1,250	***3,850***	2,890	3,240	-	-	1,770	1,150	1,330	1,040	1,080	2,020	1,080	1,070	997	1,590
Mercury	mg/kg dw	0.17	0.486	0.234	0.240	0.292	0.291	0.330	0.285	-	-	0.296	0.343	0.305	0.298	0.309	0.303	0.318	0.344	0.349	***0.362***
Molybdenum	mg/kg dw	25	23,000	2.88	4.62	3.35	3.88	4.85	4.23	-	-	3.02	4.48	3.21	3.55	4.22	3.18	4.30	4.02	***5.50***	3.42
Nickel	mg/kg dw	16	75	27.8	***89.5***	25.6	32.7	34.8	32.4	-	-	26.1	28.8	26.2	26.5	26.6	28.3	30.7	29.9	32.5	32.1
Phosphorus	mg/kg dw	-	-	2,730	1,760	2,230	3,550	1,990	2,070	-	-	3,250	1,660	2,170	1,430	1,480	3,200	1,490	1,440	1,310	1,770
Potassium	mg/kg dw	-	-	1,240	1,260	1,260	***1,760***	1,750	1,570	-	-	1,450	1,530	1,400	1,450	1,340	1,390	1,440	1,480	1,300	1,530
Selenium	mg/kg dw	2	-	2.52	2.40	2.18	2.91	2.76	2.59	-	-	2.79	2.77	2.51	2.68	2.62	2.98	2.92	2.76	2.65	2.83
Silver	mg/kg dw	0.5	-	0.356	0.387	0.323	0.367	0.391	0.372	-	-	0.363	***0.420***	0.365	0.380	0.389	0.373	0.408	0.385	0.402	0.377
Sodium	mg/kg dw	-	-	180	190	200	770	***1,090***	840	-	-	240	250	230	250	230	212	234	221	206	222
Strontium	mg/kg dw	-	-	88.1	97.3	81.2	97.4	106	94.9	-	-	88.6	104	88.9	97.2	98.3	92.3	114	104	105	94.7
Sulphur[c]	mg/kg dw	-	-	-	-	-	6,200	7,700	7,100	-	-	6,700	9,100	7,300	7,700	7,100	6,600	8,000	7,700	7,900	6,500
Thallium	mg/kg dw	-	-	0.101	0.131	0.112	0.134	***0.142***	0.119	-	-	0.118	0.140	0.115	0.123	0.122	0.124	0.139	0.138	0.136	0.135
Tin	mg/kg dw	-	-	0.380	1.23	***1.47***	0.780	0.670	0.640	-	-	0.630	0.650	0.680	0.630	0.520	1.02	1.16	0.980	1.07	0.870
Titanium	mg/kg dw	-	-	386	397	439	487	507	389	-	-	492	519	490	519	484	470	478	517	410	499
Uranium	mg/kg dw	-	-	1.91	2.02	1.87	2.14	2.40	2.07	-	-	2.13	***2.47***	2.13	2.15	2.22	2.14	2.31	2.27	2.27	2.23
Vanadium	mg/kg dw	-	-	63.7	63.3	64.0	81.4	***83.8***	75.6	-	-	70.7	73.8	69.3	69.9	69.2	73.9	75.1	75.4	70.8	81.2
Zinc	mg/kg dw	123	315	68.7	***108***	65.6	82.2	86.9	79.4	-	-	68.1	74.4	66.7	68.5	69.2	74.0	80.3	78.6	75.9	83.8
Zirconium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics:*** Value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. The reference 95th percentile value was calculated using data from 2014 to 2024.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.3: Sediment Quality Data for the Bootjack Lake (BOL-B2; Reference) Deep Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2021					2024					95th Percentile (2014 to 2024)[b]
		Lower	Upper	1	2	3	4	5	1	2	3	4	5	
				24-Aug-21	25-Aug-21	25-Aug-21	25-Aug-21	25-Aug-21	19-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	
Physical Tests														
Moisture	%	-	-	95.8	94.6	96.0	94.0	94.0	94.6	94.6	94.4	94.4	94.1	96.0
pH (1:2 soil:water)	pH	-	-	5.88	5.94	5.91	5.87	5.74	5.85	6.02	5.87	5.80	5.75	5.74
Particle Size														
% Gravel (>2 mm)	%	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.1
% Sand (2.0 mm - 0.063 mm)	%	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.10	<1.0	<1.0	1.10
% Silt (0.063 mm - 4 µm)	%	-	-	82.5	85.0	84.7	82.9	81.8	80.7	81.4	79.9	80.0	80.7	86.1
% Clay (<4 µm)	%	-	-	16.6	14.9	15.2	17.0	18.0	18.7	17.9	19.0	***19.6***	18.8	19.3
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	15.7	16.6	16.4	15.8	14.8	13.6	15.6	14.9	14.8	14.2	16.6
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	1.51	1.65	1.60	1.62	1.56	1.64	1.69	1.60	1.59	1.56	1.69
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	20,600	21,200	***22,300***	20,100	22,000	22,100	22,200	21,000	20,400	19,900	22,200
Antimony	mg/kg dw	-	-	0.960	0.990	1.10	0.940	0.920	0.870	1.07	0.820	0.900	0.810	1.12
Arsenic	mg/kg dw	5.9	17	6.88	7.20	7.89	7.43	7.50	8.22	***9.80***	7.94	7.90	7.66	8.48
Barium	mg/kg dw	-	-	***377***	352	318	300	309	252	306	314	312	300	352
Beryllium	mg/kg dw	-	-	0.730	0.760	0.770	0.720	0.760	0.790	0.770	0.740	0.720	0.710	0.790
Bismuth	mg/kg dw	-	-	0.130	0.130	0.130	0.130	0.120	0.140	0.130	0.120	0.130	0.120	0.140
Boron	mg/kg dw	-	-	16.2	17.1	16.6	12.8	16.3	16.0	17.7	14.3	14.3	13.7	17.7
Cadmium	mg/kg dw	0.6	3.5	0.380	0.457	0.454	0.432	0.406	0.535	0.445	0.395	0.404	0.380	0.535
Calcium	mg/kg dw	-	-	7,670	8,800	9,820	8,260	7,920	9,020	9,400	8,080	8,310	7,750	9,820
Chromium	mg/kg dw	37.3	90	36.1	37.3	39.8	35.7	38.1	41.3	38.7	36.1	35.2	33.6	47.5
Cobalt	mg/kg dw	-	-	10.9	12.1	12.2	11.5	11.6	13.4	13.3	12.0	12.3	11.6	13.4
Copper	mg/kg dw	35.7	197	334	381	***416***	387	379	408	375	350	342	334	409
Iron	mg/kg dw	21,200	43,766	***35,000***	31,700	27,500	26,200	30,000	28,700	32,900	28,800	28,200	28,000	33,400
Lead	mg/kg dw	35	91.3	8.97	9.72	10.5	10.0	9.75	10.4	10.4	8.73	9.59	9.03	11.7
Lithium	mg/kg dw	-	-	11.6	12.1	12.5	11.0	12.2	13.3	13.0	11.9	11.8	11.7	13.3
Magnesium	mg/kg dw	-	-	5,310	5,660	5,910	5,490	5,640	***6,180***	5,920	5,730	5,810	5,490	5,920
Manganese	mg/kg dw	460	1,100	2,450	1,590	1,190	1,150	1,690	1,360	1,360	1,280	1,240	1,440	3,240
Mercury	mg/kg dw	0.17	0.486	0.225	0.250	0.263	0.242	0.244	0.278	0.265	0.218	0.212	0.224	0.349
Molybdenum	mg/kg dw	25	23,000	2.88	3.28	4.55	3.78	3.30	3.78	4.23	3.15	3.35	3.05	4.85
Nickel	mg/kg dw	16	75	26.6	28.9	30.5	28.5	29.3	31.3	29.4	27.4	27.8	26.6	34.8
Phosphorus	mg/kg dw	-	-	3,550	1,870	1,370	1,370	2,100	1,550	1,540	1,510	1,520	1,890	3,550
Potassium	mg/kg dw	-	-	1,560	1,530	1,480	1,200	1,500	1,570	1,640	1,510	1,470	1,420	1,750
Selenium	mg/kg dw	2	-	2.85	3.11	***3.17***	2.63	2.99	2.93	2.88	2.70	2.56	2.36	3.11
Silver	mg/kg dw	0.5	-	0.326	0.356	0.378	0.351	0.353	0.383	0.360	0.342	0.347	0.342	0.408
Sodium	mg/kg dw	-	-	260	240	254	206	235	298	292	282	271	268	840
Strontium	mg/kg dw	-	-	102	111	***118***	105	104	96.2	105	89.3	95.6	89.2	114
Sulphur[c]	mg/kg dw	-	-	6,110	8,340	7,410	7,940	6,280	8,650	***9,830***	8,170	8,100	7,170	9,100
Thallium	mg/kg dw	-	-	0.118	0.122	0.129	0.117	0.125	0.132	0.136	0.110	0.121	0.119	0.140
Tin	mg/kg dw	-	-	0.850	0.760	0.910	0.780	0.740	0.990	0.620	0.390	0.510	0.500	1.23
Titanium	mg/kg dw	-	-	520	524	556	382	517	515	***672***	566	558	514	566
Uranium	mg/kg dw	-	-	1.86	1.98	2.10	1.99	1.95	2.36	2.36	2.07	2.19	2.10	2.40
Vanadium	mg/kg dw	-	-	69.8	72.3	75.4	68.5	72.7	80.7	78.2	74.9	73.3	70.3	81.4
Zinc	mg/kg dw	123	315	75.0	79.0	80.9	77.0	76.8	90.6	78.4	72.5	73.6	72.5	90.6
Zirconium	mg/kg dw	-	-	2.90	3.80	4.20	4.60	3.70	4.60	4.00	4.00	4.10	3.90	4.60

Value is > BC Lower Working Sediment Quality Guideline.
Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. **Bold/Italics:** Value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. The reference 95th percentile value was calculated using data from 2014 to 2024.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.4: Sediment Quality Data for the Bootjack Lake (BOL-B2; Reference) Deep Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]		BOL-B2									
		Lower	Upper	Pre-Breach (Bootjack Lake)	Reference (BOL-B2; 2014 to 2024)	BOL-B2-1	BOL-B2-2	BOL-B2-3	BOL-B2-4	BOL-B2-5	Mean	Median	Standard Deviation	Minimum	Maximum
						19-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24					
Physical Tests															
Moisture	%	-	-	-	96.0	94.6	94.6	94.4	94.4	94.1	94.4	94.4	0.205	94.1	94.6
pH (1:2 soil:water)	pH	-	-	-	5.74	5.85	6.02	5.87	5.80	5.75	5.86	5.85	0.102	5.75	6.02
Particle Size															
% Gravel (>2 mm)	%	-	-	<1.0	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
% Sand (2.0 mm - 0.063 mm)	%	-	-	26.4	1.10	<1.0	<1.0	1.10	<1.0	<1.0	1.02	<1.05	-	<1.0	1.10
% Silt (0.063 mm - 4 µm)	%	-	-	88.0	86.1	80.7	81.4	79.9	80.0	80.7	80.5	80.7	0.611	79.9	81.4
% Clay (<4 µm)	%	-	-	42.6	19.3	18.7	17.9	19.0	19.6	18.8	18.8	18.8	0.612	17.9	19.6
Organic / Inorganic Carbon (<63 µm)[c]															
Total Organic Carbon	%	-	-	21.5	16.6	13.6	15.6	14.9	14.8	14.2	14.6	14.8	0.756	13.6	15.6
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	-	1.69	1.64	1.69	1.60	1.59	1.56	1.62	1.60	0.0503	1.56	1.69
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg dw	-	-	18,690	22,200	22,100	22,200	21,000	20,400	19,900	21,120	21,000	1,018	19,900	22,200
Antimony	mg/kg dw	-	-	1.70	1.12	0.870	1.07	0.820	0.900	0.810	0.894	0.870	0.105	0.810	1.07
Arsenic	mg/kg dw	5.9	17	7.59	8.48	8.22	***9.80***	7.94	7.90	7.66	8.30	7.94	0.860	7.66	***9.80***
Barium	mg/kg dw	-	-	292	352	252	306	314	312	300	297	306	25.6	252	314
Beryllium	mg/kg dw	-	-	0.771	0.790	0.790	0.770	0.740	0.720	0.710	0.746	0.740	0.0336	0.710	0.790
Bismuth	mg/kg dw	-	-	0.300	0.140	0.140	0.130	0.120	0.130	0.120	0.128	0.130	0.00837	0.120	0.140
Boron	mg/kg dw	-	-	17.0	17.7	16.0	17.7	14.3	14.3	13.7	15.2	14.3	1.64	13.7	17.7
Cadmium	mg/kg dw	0.6	3.5	0.715	0.535	0.535	0.445	0.395	0.404	0.380	0.432	0.404	0.0625	0.380	0.535
Calcium	mg/kg dw	-	-	12,750	9,820	9,020	9,400	8,080	8,310	7,750	8,512	8,310	681	7,750	9,400
Chromium	mg/kg dw	37.3	90	54.6	47.5	41.3	38.7	36.1	35.2	33.6	37.0	36.1	3.04	33.6	41.3
Cobalt	mg/kg dw	-	-	16.4	13.4	13.4	13.3	12.0	12.3	11.6	12.5	12.3	0.798	11.6	13.4
Copper	mg/kg dw	35.7	197	618	409	408	375	350	342	334	362	350	30.1	334	408
Iron	mg/kg dw	21,200	43,766	29,230	33,400	28,700	32,900	28,800	28,200	28,000	29,320	28,700	2,029	28,000	32,900
Lead	mg/kg dw	35	91.3	16.0	11.7	10.4	10.4	8.73	9.59	9.03	9.63	9.59	0.768	8.73	10.4
Lithium	mg/kg dw	-	-	12.2	13.3	13.3	13.0	11.9	11.8	11.7	12.3	11.9	0.750	11.7	13.3
Magnesium	mg/kg dw	-	-	8,770	5,920	6,180	5,920	5,730	5,810	5,490	5,826	5,810	253	5,490	6,180
Manganese	mg/kg dw	460	1,100	1,720	3,240	1,360	1,360	1,280	1,240	1,440	1,336	1,360	78	1,240	1,440
Mercury	mg/kg dw	0.17	0.486	0.358	0.349	0.278	0.265	0.218	0.212	0.224	0.239	0.224	0.0300	0.212	0.278
Molybdenum	mg/kg dw	25	23,000	8.26	4.85	3.78	4.23	3.15	3.35	3.05	3.51	3.35	0.489	3.05	4.23
Nickel	mg/kg dw	16	75	36.9	34.8	31.3	29.4	27.4	27.8	26.6	28.5	27.8	1.87	26.6	31.3
Phosphorus	mg/kg dw	-	-	2,585	3,550	1,550	1,540	1,510	1,520	1,890	1,602	1,540	162	1,510	1,890
Potassium	mg/kg dw	-	-	1,417	1,750	1,570	1,640	1,510	1,470	1,420	1,522	1,510	85.8	1,420	1,640
Selenium	mg/kg dw	2	-	3.07	3.11	2.93	2.88	2.70	2.56	2.36	2.69	2.70	0.234	2.36	2.93
Silver	mg/kg dw	0.5	-	0.500	0.408	0.383	0.360	0.342	0.347	0.342	0.355	0.347	0.0174	0.342	0.383
Sodium	mg/kg dw	-	-	210	840	298	292	282	271	268	282	282	13.0	268	298
Strontium	mg/kg dw	-	-	147	114	96.2	105	89.3	95.6	89.2	95.1	95.6	6.48	89.2	105
Sulphur[d]	mg/kg dw	-	-	7,090	9,100	8,650	***9,830***	8,170	8,100	7,170	8,384	8,170	970	7,170	***9,830***
Thallium	mg/kg dw	-	-	0.134	0.140	0.132	0.136	0.110	0.121	0.119	0.124	0.121	0.0105	0.110	0.136
Tin	mg/kg dw	-	-	0.755	1.23	0.990	0.620	0.390	0.510	0.500	0.602	0.510	0.232	0.390	0.990
Titanium	mg/kg dw	-	-	644	566	515	***672***	566	558	514	565	558	64.4	514	***672***
Uranium	mg/kg dw	-	-	2.9	2.40	2.36	2.36	2.07	2.19	2.10	2.22	2.19	0.139	2.07	2.36
Vanadium	mg/kg dw	-	-	75.4	81.4	80.7	78.2	74.9	73.3	70.3	75.5	74.9	4.08	70.3	80.7
Zinc	mg/kg dw	123	315	105	90.6	90.6	78.4	72.5	73.6	72.5	77.5	73.6	7.71	72.5	90.6
Zirconium	mg/kg dw	-	-	-	4.60	4.60	4.00	4.00	4.10	3.90	4.12	4.00	0.277	3.90	4.60

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. "-" = no current BC Working Sediment Quality Guidelines/ no data. ***Bold/ Italics*** indicates value is > pre-breach and is > reference 95th percentile value (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. The 5th percentile is reported and screened for the pH reference data. For calculation of pre-breach and reference 95th percentile values see Appendix Tables C.2.1 and C.2.3, respectively.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Tables C.2.1).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.5: Sediment Quality for the Polley Lake (POL-P1, POL-P2; Exposed) Deep Monitoring Areas, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]		POL-P1									
						POL-P1-1	POL-P1-2	POL-P1-3	POL-P1-4	POL-P1-5	Mean	Median	Standard Deviation	Minimum	Maximum
		Lower	Upper	Pre-Breach (Polley Lake)	Reference (BOL-B2; 2014 to 2024)	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24					
Physical Tests															
Moisture	%	-	-	-	96.0	90.0	90.7	90.6	89.1	87.3	89.5	90.0	1.40	87.3	90.7
pH (1:2 soil:water)	pH	-	-	-	5.74	6.85	6.88	6.99	7.01	6.90	6.93	6.90	0.0702	6.85	7.01
Particle Size															
% Gravel (>2 mm)	%	-	-	<1.0	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
% Sand (2.0 mm - 0.063 mm)	%	-	-	32.2	1.10	<1.0	<1.0	1.60	<1.0	<1.0	1.12	<1.3	-	<1.0	1.60
% Silt (0.063 mm - 4 µm)	%	-	-	87.3	86.1	73.6	79.4	77.2	78.8	63.4	74.5	77.2	6.59	63.4	79.4
% Clay (<4 µm)	%	-	-	44.2	19.3	26.0	20.0	21.2	20.4	36.4	24.8	21.2	6.92	20.0	36.4
Organic / Inorganic Carbon (<63 µm)[c]															
Total Organic Carbon	%	-	-	20.8	16.6	10.8	10.5	9.34	9.04	9.04	9.74	9.34	0.843	9.04	10.8
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	-	1.69	1.21	1.19	1.06	0.851	0.977	1.06	1.06	0.150	0.851	1.21
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg dw	-	-	20,620	22,200	***26,800***	***24,200***	***26,400***	***27,200***	***26,300***	***26,180***	***26,400***	1,163	***24,200***	***27,200***
Antimony	mg/kg dw	-	-	1.22	1.12	0.640	0.480	0.430	0.520	0.540	0.522	0.520	0.0782	0.430	0.640
Arsenic	mg/kg dw	5.9	17	8.94	8.48	***10.8***	***10.5***	***10.2***	***11.0***	***10.6***	***10.6***	***10.6***	0.303	***10.2***	***11.0***
Barium	mg/kg dw	-	-	227	352	254	226	271	273	268	258	268	19.6	226	273
Beryllium	mg/kg dw	-	-	0.633	0.790	0.760	0.740	0.790	0.790	0.740	0.764	0.760	0.0251	0.740	0.790
Bismuth	mg/kg dw	-	-	0.365	0.140	0.120	0.100	0.110	0.120	0.120	0.114	0.120	0.00894	0.100	0.120
Boron	mg/kg dw	-	-	17.0	17.7	17.5	13.2	13.9	14.5	13.9	14.6	13.9	1.69	13.2	17.5
Cadmium	mg/kg dw	0.6	3.5	0.690	0.535	0.423	0.390	0.398	0.373	0.391	0.395	0.391	0.0182	0.373	0.423
Calcium	mg/kg dw	-	-	15,890	9,820	14,800	15,200	15,600	15,700	14,600	15,180	15,200	482	14,600	15,700
Chromium	mg/kg dw	37.3	90	67.6	47.5	42.0	37.4	35.2	37.4	36.2	37.6	37.4	2.61	35.2	42.0
Cobalt	mg/kg dw	-	-	16.4	13.4	***18.3***	***16.5***	***18.4***	***19.0***	***18.2***	***18.1***	***18.3***	0.936	***16.5***	***19.0***
Copper	mg/kg dw	35.7	197	380	409	***497***	***470***	***501***	***538***	***498***	***501***	***498***	24.3	***470***	***538***
Iron	mg/kg dw	21,200	43,766	39,230	33,400	33,700	30,600	31,800	33,400	32,700	32,440	32,700	1,262	30,600	33,700
Lead	mg/kg dw	35	91.3	17.7	11.7	7.90	6.68	7.56	7.97	7.65	7.55	7.65	0.516	6.68	7.97
Lithium	mg/kg dw	-	-	17.8	13.3	***19.8***	***19.0***	***21.0***	***21.2***	***19.9***	***20.2***	***19.9***	0.912	***19.0***	***21.2***
Magnesium	mg/kg dw	-	-	12,548	5,920	11,700	10,400	12,400	***12,600***	11,900	11,800	11,900	863	10,400	***12,600***
Manganese	mg/kg dw	460	1,100	3,310	3,240	1,690	1,200	1,710	1,590	2,010	1,640	1,690	292	1,200	2,010
Mercury	mg/kg dw	0.17	0.486	0.286	0.349	0.136	0.130	0.121	0.134	0.120	0.128	0.130	0.00736	0.120	0.136
Molybdenum	mg/kg dw	25	23,000	6.05	4.85	5.56	4.90	4.76	5.01	4.89	5.02	4.90	0.312	4.76	5.56
Nickel	mg/kg dw	16	75	42.6	34.8	31.9	27.9	28.3	28.7	28.7	29.1	28.7	1.60	27.9	31.9
Phosphorus	mg/kg dw	-	-	3,405	3,550	1,650	1,590	1,380	1,550	1,380	1,510	1,550	124	1,380	1,650
Potassium	mg/kg dw	-	-	1,591	1,750	***2,030***	***1,780***	***2,000***	***2,080***	***1,990***	***1,976***	***2,000***	115	***1,780***	***2,080***
Selenium	mg/kg dw	2	-	5.37	3.11	4.17	3.10	3.30	3.58	3.59	3.55	3.58	0.404	3.10	4.17
Silver	mg/kg dw	0.5	-	0.415	0.408	0.353	0.338	0.320	0.326	0.326	0.333	0.326	0.0131	0.320	0.353
Sodium	mg/kg dw	-	-	560	840	***841***	799	***899***	***940***	***879***	***872***	***879***	54.1	799	***940***
Strontium	mg/kg dw	-	-	125	114	***179***	***168***	***181***	***185***	***179***	***178***	***179***	6.31	***168***	***185***
Sulphur[d]	mg/kg dw	-	-	12,980	9,100	8,520	6,870	7,560	5,950	7,150	7,210	7,150	941	5,950	8,520
Thallium	mg/kg dw	-	-	0.112	0.140	0.0970	0.0840	0.0790	0.0860	0.0830	0.0858	0.0840	0.00676	0.0790	0.0970
Tin	mg/kg dw	-	-	0.800	1.23	1.07	***1.26***	1.16	***1.32***	***1.29***	1.22	***1.26***	0.103	1.07	***1.32***
Titanium	mg/kg dw	-	-	787	566	***1,250***	***1,120***	***886***	***1,210***	***1,050***	***1,103***	***1,120***	144	***886***	***1,250***
Uranium	mg/kg dw	-	-	1.47	2.40	1.44	1.39	1.32	1.34	1.41	1.38	1.39	0.0495	1.32	1.44
Vanadium	mg/kg dw	-	-	111	81.4	***115***	***112***	108	***118***	***113***	***113***	***113***	3.70	108	***118***
Zinc	mg/kg dw	123	315	99.0	90.6	89.2	80.2	87.5	89.3	89.0	87.0	89.0	3.89	80.2	89.3
Zirconium	mg/kg dw	-	-	-	4.60	***8.50***	***6.40***	***5.90***	***7.30***	***7.20***	***7.06***	***7.20***	0.991	***5.90***	***8.50***

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. "-" = no current BC Working Sediment Quality Guidelines/ no data. ***Bold/ Italics*** indicates value is > pre-breach and is > reference 95th percentile value (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. The 5th percentile is reported and screened for the pH reference data. For calculation of pre-breach and reference 95th percentile values see Appendix Tables C.2.2 and C.2.3, respectively.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2021) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table C.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.5: Sediment Quality for the Polley Lake (POL-P1, POL-P2; Exposed) Deep Monitoring Areas, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]		POL-P2									
		Lower	Upper	Pre-Breach (Polley Lake)	Reference (BOL-B2; 2014 to 2024)	POL-P2-1	POL-P2-2	POL-P2-3	POL-P2-4	POL-P2-5	Mean	Median	Standard Deviation	Minimum	Maximum
						21-Aug-24	21-Aug-24	21-Aug-24	24-Aug-24	24-Aug-24					
Physical Tests															
Moisture	%	-	-	-	96.0	86.7	89.8	84.2	89.9	88.8	87.9	88.8	2.43	84.2	89.9
pH (1:2 soil:water)	pH	-	-	-	5.74	7.23	7.04	7.03	7.13	7.16	7.12	7.13	0.0841	7.03	7.23
Particle Size															
% Gravel (>2 mm)	%	-	-	<1.0	<0.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
% Sand (2.0 mm - 0.063 mm)	%	-	-	32.2	1.10	<1.0	<1.0	<1.0	<1.0	1.20	1.04	<1.1	-	<1.0	1.20
% Silt (0.063 mm - 4 µm)	%	-	-	87.3	86.1	71.3	77.5	73.1	70.9	80.5	74.7	73.1	4.18	70.9	80.5
% Clay (<4 µm)	%	-	-	44.2	19.3	27.9	22.0	26.5	28.3	18.3	24.6	26.5	4.32	18.3	28.3
Organic / Inorganic Carbon (<63 µm)[c]															
Total Organic Carbon	%	-	-	20.8	16.6	6.36	10.2	6.75	9.13	8.34	8.16	8.34	1.61	6.36	10.2
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	-	1.69	0.808	1.16	0.845	1.04	0.974	0.965	0.974	0.144	0.808	1.16
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg dw	-	-	20,620	22,200	***27,400***	***26,700***	***28,600***	***28,200***	***30,900***	***28,360***	***28,200***	1,598	***26,700***	***30,900***
Antimony	mg/kg dw	-	-	1.22	1.12	0.480	0.410	0.460	0.630	0.600	0.516	0.480	0.0945	0.410	0.630
Arsenic	mg/kg dw	5.9	17	8.94	8.48	***11.6***	***10.4***	***11.2***	***11.7***	***13.0***	***11.6***	***11.6***	0.944	***10.4***	***13.0***
Barium	mg/kg dw	-	-	227	352	292	250	299	260	313	283	292	26.7	250	313
Beryllium	mg/kg dw	-	-	0.633	0.790	***0.860***	0.760	***0.870***	***0.820***	***0.860***	***0.834***	***0.860***	0.0456	0.760	***0.870***
Bismuth	mg/kg dw	-	-	0.365	0.140	0.100	0.110	0.110	0.110	0.120	0.110	0.110	0.00707	0.100	0.120
Boron	mg/kg dw	-	-	17.0	17.7	12.2	13.4	13.0	17.2	17.5	14.7	13.4	2.50	12.2	17.5
Cadmium	mg/kg dw	0.6	3.5	0.690	0.535	0.281	0.350	0.286	0.351	0.373	0.328	0.350	0.0419	0.281	0.373
Calcium	mg/kg dw	-	-	15,890	9,820	***17,400***	***16,600***	***16,500***	***16,100***	***17,400***	***16,800***	***16,600***	579	***16,100***	***17,400***
Chromium	mg/kg dw	37.3	90	67.6	47.5	28.1	36.3	28.9	38.0	38.2	33.9	36.3	4.99	28.1	38.2
Cobalt	mg/kg dw	-	-	16.4	13.4	***20.8***	***18.6***	***20.8***	***19.2***	***21.0***	***20.1***	***20.8***	1.10	***18.6***	***21.0***
Copper	mg/kg dw	35.7	197	380	409	***624***	***524***	***598***	***559***	***595***	***580***	***595***	38.9	***524***	***624***
Iron	mg/kg dw	21,200	43,766	39,230	33,400	32,400	31,900	31,900	31,800	35,200	32,640	31,900	1,450	31,800	35,200
Lead	mg/kg dw	35	91.3	17.7	11.7	7.56	7.41	7.72	7.49	7.72	7.58	7.56	0.138	7.41	7.72
Lithium	mg/kg dw	-	-	17.8	13.3	***23.3***	***21.0***	***23.3***	***21.8***	***22.6***	***22.4***	***22.6***	0.997	***21.0***	***23.3***
Magnesium	mg/kg dw	-	-	12,548	5,920	***14,600***	12,300	***14,800***	***12,900***	***14,600***	***13,840***	***14,600***	1,155	12,300	***14,800***
Manganese	mg/kg dw	460	1,100	3,310	3,240	2,090	1,820	2,010	1,940	2,880	2,148	2,010	421	1,820	2,880
Mercury	mg/kg dw	0.17	0.486	0.286	0.349	0.106	0.132	0.113	0.134	0.131	0.123	0.131	0.0128	0.106	0.134
Molybdenum	mg/kg dw	25	23,000	6.05	4.85	5.22	***6.73***	3.98	5.66	3.51	5.02	5.22	1.30	3.51	***6.73***
Nickel	mg/kg dw	16	75	42.6	34.8	23.4	30.4	24.1	28.8	29.8	27.3	28.8	3.30	23.4	30.4
Phosphorus	mg/kg dw	-	-	3,405	3,550	1,320	1,240	1,260	1,400	1,970	1,438	1,320	304	1,240	1,970
Potassium	mg/kg dw	-	-	1,591	1,750	***2,020***	***1,970***	***2,090***	***2,250***	***2,510***	***2,168***	***2,090***	218	***1,970***	***2,510***
Selenium	mg/kg dw	2	-	5.37	3.11	2.75	3.47	2.86	3.98	3.88	3.39	3.47	0.567	2.75	3.98
Silver	mg/kg dw	0.5	-	0.415	0.408	0.320	0.340	0.323	0.336	0.345	0.333	0.336	0.0108	0.320	0.345
Sodium	mg/kg dw	-	-	560	840	***1,060***	***842***	***1,090***	***984***	***1,100***	***1,015***	***1,060***	107	***842***	***1,100***
Strontium	mg/kg dw	-	-	125	114	***209***	***182***	***214***	***194***	***210***	***202***	***209***	13.4	***182***	***214***
Sulphur[d]	mg/kg dw	-	-	12,980	9,100	5,240	8,070	4,790	6,110	5,200	5,882	5,240	1,314	4,790	8,070
Thallium	mg/kg dw	-	-	0.112	0.140	0.0630	0.0830	0.0670	0.0860	0.0840	0.0766	0.0830	0.0107	0.0630	0.0860
Tin	mg/kg dw	-	-	0.800	1.23	***1.29***	0.940	***1.25***	***1.40***	***1.53***	***1.28***	***1.29***	0.220	0.940	***1.53***
Titanium	mg/kg dw	-	-	787	566	***1,110***	***892***	***1,160***	***1,550***	***1,710***	***1,284***	***1,160***	336	***892***	***1,710***
Uranium	mg/kg dw	-	-	1.47	2.40	1.31	1.56	1.25	1.49	1.33	1.39	1.33	0.131	1.25	1.56
Vanadium	mg/kg dw	-	-	111	81.4	***112***	102	***114***	***119***	***132***	***116***	***114***	11.0	102	***132***
Zinc	mg/kg dw	123	315	99.0	90.6	87.5	86.3	88.3	87.8	96.5	89.3	87.8	4.10	86.3	96.5
Zirconium	mg/kg dw	-	-	-	4.60	***5.00***	***6.60***	***5.80***	***8.50***	***8.00***	***6.78***	***6.60***	1.47	***5.00***	***8.50***

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. "-" = no current BC Working Sediment Quality Guidelines/ no data. ***Bold/ Italics*** indicates value is > pre-breach and is > reference 95th percentile value (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. The 5th percentile is reported and screened for the pH reference data. For calculation of pre-breach and reference 95th percentile values see Appendix Tables C.2.2 and C.2.3, respectively.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2021) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table C.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.6: Sediment Quality Data for the Quesnel Lake (QUL-PREF1; Reference) Deep Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2014					2015					2016					2018				
		Lower	Upper	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
				13-Sep-14	14-Sep-14	17-Sep-14	18-Sep-14	18-Sep-14	18-Aug-15	24-Aug-15	19-Aug-15	24-Aug-15	24-Aug-15	9-Aug-16	10-Aug-16	10-Aug-16	10-Aug-16	11-Aug-16	23-Sep-18	24-Sep-18	24-Sep-18	24-Sep-18	24-Sep-18
Physical Tests																							
Moisture	%	-	-	51.8	47.6	53.3	54.3	52.0	52.6	-	53.3	-	54.2	54.2	54.2	55.9	55.8	54.9	55.7	62.2	***65.1***	55.3	54.8
pH (1:2 soil:water)	pH	-	-	6.89	6.86	7.03	6.84	6.90	7.36	-	6.69	-	7.01	6.52	6.49	6.53	6.52	6.56	6.80	6.79	6.85	6.67	6.78
Particle Size																							
% Gravel (>2 mm)	%	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1	<1	<1	<1
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	***31.7***	21.4	16.7	17.1	21.1	28.1	15.2	18.7	14.3	29.1	23.5	20.2	13.5	12.7	15.1	17.8	13.4	15.3	14.1
% Silt (0.063 mm - 4 µm)	%	-	-	58.8	60.9	69.3	74.1	74.1	67.7	62.5	73.0	71.7	74.3	60.8	66.4	69.2	76.4	73.9	75.2	73.7	77.2	75.6	76.8
% Clay (<4 µm)	%	-	-	10.7	7.43	9.31	9.18	8.79	11.2	9.34	11.8	9.64	11.4	10.1	10.1	10.6	10.1	***13.4***	9.70	8.50	9.30	9.10	9.10
Organic / Inorganic Carbon (<63 µm)																							
Total Organic Carbon	%	-	-	1.62	1.70	1.72	1.64	1.71	1.76	-	1.71	-	1.98	2.02	2.01	2.03	1.67	1.89	2.07	2.22	2.13	***2.26***	1.92
Nutrients (Bulk sediment)																							
Total Nitrogen	%	-	-	0.140	0.127	0.141	0.149	0.145	0.169	-	0.158	-	0.182	0.164	0.170	0.162	0.146	0.146	***0.191***	0.180	0.170	0.181	0.164
Metals, Metalloids, and Non-Metals (<63 µm)																							
Aluminum	mg/kg dw	-	-	15,300	14,000	15,400	15,300	13,900	16,900	-	17,300	-	15,500	16,800	15,800	16,800	16,200	14,700	14,300	15,800	15,100	15,100	14,100
Antimony	mg/kg dw	-	-	0.430	0.400	0.400	0.440	0.410	0.470	-	0.430	-	0.410	0.460	0.440	0.440	0.440	0.400	0.410	0.390	0.390	0.390	0.390
Arsenic	mg/kg dw	5.9	17	7.15	6.95	8.60	8.15	7.89	8.64	-	8.98	-	9.02	9.89	9.57	***11.0***	9.05	8.37	8.47	8.47	7.99	7.50	7.39
Barium	mg/kg dw	-	-	147	140	152	144	135	147	-	151	-	143	167	164	172	169	142	150	139	153	147	134
Beryllium	mg/kg dw	-	-	0.450	0.410	0.390	0.410	0.400	0.520	-	0.500	-	0.450	0.470	0.430	0.480	0.450	0.450	0.450	0.460	0.460	0.440	0.450
Bismuth	mg/kg dw	-	-	0.150	0.140	0.140	0.140	0.130	0.170	-	0.150	-	0.150	0.160	0.150	0.160	0.150	0.150	0.150	0.140	0.140	0.140	0.140
Boron	mg/kg dw	-	-	<10	<10	<10	<10	<10	<10	-	<10	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	mg/kg dw	0.6	3.5	0.416	0.346	0.404	0.390	0.363	0.475	-	0.422	-	0.364	***0.476***	0.457	0.471	0.435	0.384	0.442	0.436	0.409	0.422	0.392
Calcium	mg/kg dw	-	-	8,050	7,650	7,970	7,740	7,300	8,780	-	8,840	-	8,620	8,130	7,500	8,080	7,950	7,840	7,570	7,850	8,050	7,720	7,810
Chromium	mg/kg dw	37.3	90	56.3	50.2	53.6	52.1	47.9	60.1	-	59.5	-	53.6	59.8	57.6	59.4	56.3	50.3	53.4	55.9	53.9	53.9	51.6
Cobalt	mg/kg dw	-	-	14.0	12.7	13.8	13.3	12.5	15.2	-	15.0	-	13.4	15.1	14.3	***15.7***	14.5	13.3	13.8	13.5	13.3	13.1	13.1
Copper	mg/kg dw	35.7	197	46.7	39.1	44.0	42.2	38.8	59.4	-	55.8	-	50.0	***61.1***	56.4	59.4	56.3	47.5	48.9	46.8	45.3	46.7	43.2
Iron	mg/kg dw	21,200	43,766	29,200	26,900	29,900	29,500	27,400	32,300	-	32,700	-	28,900	30,900	29,000	32,100	30,700	29,400	29,500	29,200	28,400	28,100	28,300
Lead	mg/kg dw	35	91.3	7.09	6.84	7.27	7.11	6.68	8.06	-	7.51	-	7.39	7.97	7.53	***8.11***	7.59	7.03	7.00	6.67	6.41	6.60	6.49
Lithium	mg/kg dw	-	-	12.8	13.0	13.9	13.4	12.6	15.5	-	15.2	-	12.6	13.7	12.8	14.4	13.2	13.6	13.8	13.2	13.5	13.2	13.2
Magnesium	mg/kg dw	-	-	8,040	7,350	8,020	7,720	7,200	8,410	-	8,660	-	7,380	8,450	7,930	8,510	8,130	7,390	7,640	7,560	7,410	7,250	7,150
Manganese	mg/kg dw	460	1,100	456	421	484	494	496	477	-	479	-	516	469	457	495	451	480	416	397	425	405	449
Mercury	mg/kg dw	0.17	0.486	0.0461	0.0474	0.0517	0.0506	0.0473	0.0627	-	0.0515	-	0.0594	0.0519	0.0557	0.0535	0.0574	0.0572	0.0552	0.0578	0.0525	0.0555	0.0521
Molybdenum	mg/kg dw	25	23,000	0.960	0.840	0.940	0.910	0.900	***1.20***	-	1.02	-	1.01	1.08	0.980	1.07	0.990	0.930	1.05	0.910	0.890	0.850	0.880
Nickel	mg/kg dw	16	75	38.1	33.8	36.9	36.0	33.2	41.2	-	40.1	-	36.1	41.2	38.9	***42.3***	39.3	35.1	37.1	36.2	35.6	35.4	34.6
Phosphorus	mg/kg dw	-	-	1,110	1,070	1,110	1,130	1,050	1,150	-	1,190	-	1,200	1,350	1,280	1,400	1,340	1,200	1,260	1,310	1,220	1,250	1,140
Potassium	mg/kg dw	-	-	1,370	1,230	1,370	1,350	1,240	1,550	-	1,570	-	1,430	1,580	1,440	1,560	1,510	1,370	1,240	1,300	1,290	1,290	1,290
Selenium	mg/kg dw	2	-	0.950	0.820	0.900	0.870	0.760	1.10	-	0.930	-	0.880	0.970	0.980	1.04	0.880	0.970	1.06	1.01	0.840	0.950	0.870
Silver	mg/kg dw	0.5	-	0.205	0.172	0.196	0.191	0.177	0.238	-	0.216	-	0.189	***0.239***	0.220	0.228	0.226	0.202	0.212	0.193	0.189	0.191	0.191
Sodium	mg/kg dw	-	-	420	370	420	390	380	470	-	520	-	500	480	420	440	430	410	339	379	390	378	364
Strontium	mg/kg dw	-	-	75.6	71.3	78.6	76.0	71.4	82.0	-	84.5	-	88.9	81.4	76.2	82.3	80.3	76.3	73.6	73.7	74.4	75.1	73.8
Sulphur[c]	mg/kg dw	-	-	-	-	-	-	-	1,400	-	1,300	-	800	1,400	1,200	1,100	900	1,300	1,200	1,200	900	1,000	900
Thallium	mg/kg dw	-	-	0.147	0.161	0.161	0.167	0.149	***0.194***	-	0.171	-	0.158	0.170	0.162	0.175	0.159	0.166	0.149	0.148	0.145	0.146	0.144
Tin	mg/kg dw	-	-	0.470	0.350	0.380	0.460	0.380	0.490	-	0.460	-	0.410	***0.660***	0.390	0.450	0.420	0.410	0.350	0.410	0.510	0.370	0.370
Titanium	mg/kg dw	-	-	1,090	1,010	1,060	1,050	969	1,160	-	1,190	-	1,040	1,100	1,050	1,060	1,080	954	816	963	961	959	928
Uranium	mg/kg dw	-	-	1.32	1.30	1.36	1.30	1.22	1.57	-	1.43	-	1.39	1.50	1.43	1.51	1.41	1.36	1.30	1.34	1.25	1.27	1.26
Vanadium	mg/kg dw	-	-	66.8	60.5	64.1	62.1	57.4	73.0	-	72.3	-	64.9	71.7	67.9	70.2	67.6	61.9	59.8	63.5	61.9	62.2	59.9
Zinc	mg/kg dw	123	315	74.1	71.4	77.6	75.3	70.3	85.1	-	82.6	-	71.6	84.4	80.6	***87.7***	80.7	68.4	77.7	75.8	73.3	72.9	71.9
Zirconium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics:*** Value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. QUL-PREF1 was not sampled in 2017, 2021 or 2013; therefore the reference 95th percentile value was calculated using data from 2014 to 2024.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.6: Sediment Quality Data for the Quesnel Lake (QUL-PREF1; Reference) Deep Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2019					2021					2024					95th Percentile (2014 to 2024)[b]
		Lower	Upper	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
				26-Aug-19	30-Aug-19	30-Aug-19	31-Aug-19	31-Aug-19	29-Aug-21	29-Aug-21	30-Aug-21	30-Aug-21	30-Aug-21	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	
Physical Tests																			
Moisture	%	-	-	56.9	53.7	57.2	56.5	56.0	52.5	52.0	53.8	55.6	54.4	53.4	53.5	54.3	56.4	55.4	62.2
pH (1:2 soil:water)	pH	-	-	6.45	6.50	6.50	6.48	6.45	6.52	6.44	6.50	6.40	6.64	6.46	6.35	6.44	***6.32***	6.35	6.35
Particle Size																			
% Gravel (>2 mm)	%	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
% Sand (2.0 mm - 0.063 mm)	%	-	-	10.1	19.8	11.5	13.9	11.8	20.0	22.8	20.1	17.9	19.5	21.2	21.6	21.3	14.5	17.1	30.6
% Silt (0.063 mm - 4 µm)	%	-	-	***80.4***	71.5	79.4	77.0	79.3	67.9	66.5	68.2	71.5	69.4	66.8	67.5	67.0	73.9	71.7	79.4
% Clay (<4 µm)	%	-	-	9.50	8.70	9.10	9.10	8.90	12.1	10.7	11.7	10.6	11.1	12.0	10.9	11.7	11.6	11.2	12.1
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon	%	-	-	2.07	1.78	1.56	1.71	1.88	2.13	2.07	2.03	2.08	2.17	1.73	1.77	1.78	1.78	1.67	2.22
Nutrients (Bulk sediment)																			
Total Nitrogen	%	-	-	0.182	0.148	0.155	0.164	0.157	0.137	0.149	0.161	0.175	0.150	0.164	0.163	0.175	0.169	0.177	0.182
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	16,300	16,100	15,700	16,200	15,200	17,100	15,700	17,100	15,700	16,800	18,900	17,100	18,200	19,000	***20,100***	19,000
Antimony	mg/kg dw	-	-	0.410	0.420	0.400	0.400	0.400	0.470	0.440	0.440	0.440	0.440	0.450	0.410	0.440	0.400	0.420	0.470
Arsenic	mg/kg dw	5.9	17	8.49	8.18	7.74	7.86	7.23	8.00	9.50	9.66	8.55	9.38	9.15	8.21	9.83	8.89	9.34	9.89
Barium	mg/kg dw	-	-	159	164	157	159	155	158	152	166	146	165	***176***	161	171	167	169	172
Beryllium	mg/kg dw	-	-	0.470	0.480	0.470	0.450	0.460	0.480	0.440	0.500	0.420	0.440	***0.550***	0.480	0.520	0.510	0.540	0.540
Bismuth	mg/kg dw	-	-	0.150	0.150	0.140	0.140	0.140	0.130	0.120	0.140	0.120	0.130	0.170	0.150	0.160	0.160	0.160	0.170
Boron	mg/kg dw	-	-	<10	<10	<10	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	mg/kg dw	0.6	3.5	0.442	0.429	0.408	0.414	0.375	0.432	0.392	0.418	0.387	0.381	0.437	0.416	0.417	0.395	0.414	0.475
Calcium	mg/kg dw	-	-	7,320	7,590	7,330	7,400	7,210	8,030	7,860	8,350	7,520	8,310	9,480	8,470	9,120	9,150	9,480	9,480
Chromium	mg/kg dw	37.3	90	54.9	56.4	53.4	54.4	52.3	58.0	55.7	56.4	54.8	56.7	***62.5***	57.7	59.6	60.1	61.9	61.9
Cobalt	mg/kg dw	-	-	14.0	14.0	13.6	13.5	13.4	14.4	13.9	14.4	13.4	13.8	15.1	14.1	15.0	14.4	14.9	15.2
Copper	mg/kg dw	35.7	197	49.7	50.2	48.8	49.4	46.9	50.0	44.4	46.3	43.5	42.4	49.3	45.2	47.9	45.9	47.1	59.4
Iron	mg/kg dw	21,200	43,766	30,700	30,700	29,300	30,600	28,900	30,400	30,500	31,000	29,600	30,800	34,100	32,000	33,700	33,800	***34,600***	34,100
Lead	mg/kg dw	35	91.3	7.25	7.27	7.09	7.03	6.80	6.80	6.43	6.70	6.52	6.46	7.92	7.43	7.84	7.71	7.85	8.06
Lithium	mg/kg dw	-	-	14.9	14.5	14.5	14.3	14.0	15.1	13.4	15.2	13.9	14.1	***16.4***	14.7	16.1	15.4	15.9	16.1
Magnesium	mg/kg dw	-	-	8,250	8,180	7,860	7,840	7,730	8,330	7,990	8,500	7,960	8,080	***9,270***	8,590	9,030	8,970	8,920	9,030
Manganese	mg/kg dw	460	1,100	401	413	399	408	445	416	441	485	440	572	507	456	515	496	***578***	572
Mercury	mg/kg dw	0.17	0.486	0.0493	0.0458	0.0473	0.0466	0.0472	0.0477	0.0440	0.0558	***0.0971***	0.0446	0.0522	0.0488	0.0519	0.0484	0.0627	0.0627
Molybdenum	mg/kg dw	25	23,000	1.06	0.980	0.990	0.870	0.920	1.11	0.990	1.01	0.990	0.990	1.07	0.920	1.10	0.930	1.01	1.11
Nickel	mg/kg dw	16	75	38.4	38.0	36.8	36.8	35.6	39.4	37.5	38.9	37.4	37.5	42.0	39.1	41.1	39.4	40.4	42.0
Phosphorus	mg/kg dw	-	-	1,300	1,330	1,230	1,310	1,200	1,290	***1,460***	1,340	1,320	1,370	1,300	1,260	1,300	1,370	1,360	1,400
Potassium	mg/kg dw	-	-	1,290	1,260	1,280	1,280	1,240	1,440	1,290	1,430	1,320	1,470	1,710	1,470	1,610	1,640	***1,780***	1,710
Selenium	mg/kg dw	2	-	0.990	0.970	0.920	0.920	0.900	1.25	1.07	***1.44***	1.28	1.23	1.32	1.24	1.34	1.23	1.28	1.34
Silver	mg/kg dw	0.5	-	0.221	0.219	0.209	0.211	0.210	0.231	0.191	0.196	0.201	0.200	0.210	0.195	0.226	0.199	0.207	0.238
Sodium	mg/kg dw	-	-	373	376	388	393	390	449	421	461	400	478	541	458	515	520	***553***	541
Strontium	mg/kg dw	-	-	73.4	78.9	78.6	75.3	77.7	87.2	81.8	81.3	82.7	90.0	88.4	80.4	85.9	87.6	***91.9***	90.0
Sulphur[c]	mg/kg dw	-	-	***1,500***	1,300	1,300	1,200	1,100	940	830	850	950	760	1,320	1,150	1,130	1,210	1,040	1,400
Thallium	mg/kg dw	-	-	0.156	0.155	0.151	0.154	0.145	0.157	0.139	0.152	0.145	0.149	0.183	0.161	0.184	0.176	0.187	0.187
Tin	mg/kg dw	-	-	0.370	0.380	0.400	0.400	0.400	0.490	0.440	0.460	0.450	0.500	0.360	0.300	0.350	0.330	0.350	0.510
Titanium	mg/kg dw	-	-	899	977	959	1,000	944	974	937	1,000	934	1,100	1,140	1,020	1,110	1,080	***1,280***	1,190
Uranium	mg/kg dw	-	-	1.41	1.40	1.40	1.39	1.37	1.35	1.25	1.30	1.24	1.33	1.60	1.46	1.59	1.56	***1.69***	1.60
Vanadium	mg/kg dw	-	-	62.9	65.1	62.6	63.2	61.3	66.2	64.7	66.1	61.5	67.1	72.4	67.1	70.3	70.4	***74.4***	73.0
Zinc	mg/kg dw	123	315	85.0	82.5	79.3	80.1	75.4	84.9	78.2	81.7	76.9	78.6	83.8	77.4	80.8	79.3	80.7	85.1
Zirconium	mg/kg dw	-	-	-	-	-	-	-	4.20	4.00	3.60	3.90	3.80	4.60	4.60	4.30	4.60	4.80	4.80

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** : Value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. QUL-PREF1 was not sampled in 2017, 2021 or 2013; therefore the reference 95th percentile value was calculated using data from 2014 to 2024.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.7: Sediment Quality Data for the Quesnel Lake (QUL-PREF1; Reference) Deep Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	QUL-PREF1									
		Lower	Upper	QUL-PREF1 (2014 to 2024)	QUL-PREF1-1	QUL-PREF1-2	QUL-PREF1-3	QUL-PREF1-4	QUL-PREF1-5	Mean	Median	Standard Deviation	Minimum	Maximum
					22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24					
Physical Tests														
Moisture	%	-	-	62.2	53.4	53.5	54.3	56.4	55.4	54.6	54.3	1.29	53.4	56.4
pH (1:2 soil:water)	pH	-	-	6.35	6.46	6.35	6.44	***6.32***	6.35	6.38	6.35	0.0619	6.32	6.46
Particle Size														
% Gravel (>2 mm)	%	-	-	<0.1	***<1***	***<1***	***<1***	***<1***	***<1***	***<1***	***<1***	-	***<1***	***<1***
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	21.2	21.6	21.3	14.5	17.1	19.1	21.2	3.19	14.5	21.6
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	66.8	67.5	67.0	73.9	71.7	69.4	67.5	3.23	66.8	73.9
% Clay (<4 µm)	%	-	-	12.1	12.0	10.9	11.7	11.6	11.2	11.5	11.6	0.432	10.9	12.0
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	2.22	1.73	1.77	1.78	1.78	1.67	1.75	1.77	0.0472	1.67	1.78
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.182	0.164	0.163	0.175	0.169	0.177	0.170	0.169	0.00631	0.163	0.177
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	19,000	18,900	17,100	18,200	19,000	***20,100***	18,660	18,900	1,106	17,100	***20,100***
Antimony	mg/kg dw	-	-	0.470	0.450	0.410	0.440	0.400	0.420	0.424	0.420	0.0207	0.400	0.450
Arsenic	mg/kg dw	5.9	17	9.89	9.15	8.21	9.83	8.89	9.34	9.08	9.15	0.597	8.21	9.83
Barium	mg/kg dw	-	-	172	***176***	161	171	167	169	169	169	5.50	161	***176***
Beryllium	mg/kg dw	-	-	0.540	***0.550***	0.480	0.520	0.510	0.540	0.520	0.520	0.0274	0.480	***0.550***
Bismuth	mg/kg dw	-	-	0.170	0.170	0.150	0.160	0.160	0.160	0.160	0.160	0.00707	0.150	0.170
Boron	mg/kg dw	-	-	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
Cadmium	mg/kg dw	0.6	3.5	0.475	0.437	0.416	0.417	0.395	0.414	0.416	0.416	0.0149	0.395	0.437
Calcium	mg/kg dw	-	-	9,480	9,480	8,470	9,120	9,150	9,480	9,140	9,150	412	8,470	9,480
Chromium	mg/kg dw	37.3	90	61.9	***62.5***	57.7	59.6	60.1	61.9	60.4	60.1	1.92	57.7	***62.5***
Cobalt	mg/kg dw	-	-	15.2	15.1	14.1	15.0	14.4	14.9	14.7	14.9	0.430	14.1	15.1
Copper	mg/kg dw	35.7	197	59.4	49.3	45.2	47.9	45.9	47.1	47.1	47.1	1.62	45.2	49.3
Iron	mg/kg dw	21,200	43,766	34,100	34,100	32,000	33,700	33,800	***34,600***	33,640	33,800	981	32,000	***34,600***
Lead	mg/kg dw	35	91.3	8.06	7.92	7.43	7.84	7.71	7.85	7.75	7.84	0.194	7.43	7.92
Lithium	mg/kg dw	-	-	16.1	***16.4***	14.7	16.1	15.4	15.9	15.7	15.9	0.667	14.7	***16.4***
Magnesium	mg/kg dw	-	-	9,030	***9,270***	8,590	9,030	8,970	8,920	8,956	8,970	245	8,590	***9,270***
Manganese	mg/kg dw	460	1,100	572	507	456	515	496	***578***	510	507	44.1	456	***578***
Mercury	mg/kg dw	0.17	0.486	0.0627	0.0522	0.0488	0.0519	0.0484	0.0627	0.0528	0.0519	0.00580	0.0484	0.0627
Molybdenum	mg/kg dw	25	23,000	1.11	1.07	0.920	1.10	0.930	1.01	1.01	1.01	0.0808	0.920	1.10
Nickel	mg/kg dw	16	75	42.0	42.0	39.1	41.1	39.4	40.4	40.4	40.4	1.20	39.1	42.0
Phosphorus	mg/kg dw	-	-	1,400	1,300	1,260	1,300	1,370	1,360	1,318	1,300	46.0	1,260	1,370
Potassium	mg/kg dw	-	-	1,710	1,710	1,470	1,610	1,640	***1,780***	1,642	1,640	116	1,470	***1,780***
Selenium	mg/kg dw	2	-	1.34	1.32	1.24	1.34	1.23	1.28	1.28	1.28	0.0482	1.23	1.34
Silver	mg/kg dw	0.5	-	0.238	0.210	0.195	0.226	0.199	0.207	0.207	0.207	0.0120	0.195	0.226
Sodium	mg/kg dw	-	-	541	541	458	515	520	***553***	517	520	36.6	458	***553***
Strontium	mg/kg dw	-	-	90.0	88.4	80.4	85.9	87.6	***91.9***	86.8	87.6	4.21	80.4	***91.9***
Sulphur[c]	mg/kg dw	-	-	1,400	1,320	1,150	1,130	1,210	1,040	1,170	1,150	104	1,040	1,320
Thallium	mg/kg dw	-	-	0.187	0.183	0.161	0.184	0.176	0.187	0.178	0.183	0.0104	0.161	0.187
Tin	mg/kg dw	-	-	0.510	0.360	0.300	0.350	0.330	0.350	0.338	0.350	0.0239	0.300	0.360
Titanium	mg/kg dw	-	-	1,190	1,140	1,020	1,110	1,080	***1,280***	1,126	1,110	96.9	1,020	***1,280***
Uranium	mg/kg dw	-	-	1.60	1.60	1.46	1.59	1.56	***1.69***	1.58	1.59	0.0828	1.46	***1.69***
Vanadium	mg/kg dw	-	-	73.0	72.4	67.1	70.3	70.4	***74.4***	70.9	70.4	2.72	67.1	***74.4***
Zinc	mg/kg dw	123	315	85.1	83.8	77.4	80.8	79.3	80.7	80.4	80.7	2.35	77.4	83.8
Zirconium	mg/kg dw	-	-	4.80	4.60	4.60	4.30	4.60	4.80	4.58	4.60	0.179	4.30	4.80

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. "-" = no current BC Working Sediment Quality Guidelines/ no data. ***Bold/ Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH).

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation reference 95th percentile values see Appendix Table C.2.6.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.8: **Sediment Quality Data for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed) Deep Monitoring Areas, 2024**

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	QUL-PNF									
		Lower	Upper	QUL-PREF1 (2014 to 2024)	QUL-PNF-1 23-Aug-24	QUL-PNF-2 23-Aug-24	QUL-PNF-3 24-Aug-24	QUL-PNF-4 24-Aug-24	QUL-PNF-5 24-Aug-24	Mean	Median	Standard Deviation	Minimum	Maximum
Physical Tests														
Moisture	%	-	-	62.2	59.3	***62.6***	52.4	60.0	***63.0***	59.5	60.0	4.26	52.4	***63.0***
pH (1:2 soil:water)	pH	-	-	6.35	7.94	7.98	8.21	8.05	8.05	8.05	8.05	0.103	7.94	8.21
Particle Size														
% Gravel (>2 mm)	%	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	4.50	4.70	5.90	8.40	1.00	4.90	4.70	2.68	1.00	8.40
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	48.6	51.0	47.9	46.4	49.2	48.6	48.6	1.69	46.4	51.0
% Clay (<4 µm)	%	-	-	12.1	***46.9***	***44.3***	***46.2***	***45.2***	***49.8***	***46.5***	***46.2***	2.10	***44.3***	***49.8***
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	2.22	0.654	0.702	0.351	0.719	0.748	0.635	0.702	0.162	0.351	0.748
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.182	0.0800	0.0830	0.0590	0.0910	0.112	0.0850	0.0830	0.0192	0.0590	0.112
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	19,000	***30,200***	***31,700***	***29,600***	***31,000***	***32,600***	***31,020***	***31,000***	1,188	***29,600***	***32,600***
Antimony	mg/kg dw	-	-	0.470	***0.520***	***0.500***	***0.570***	***0.580***	***0.510***	***0.536***	***0.520***	0.0365	***0.500***	***0.580***
Arsenic	mg/kg dw	5.9	17	9.89	***15.3***	***15.6***	***15.4***	***15.7***	***15.2***	***15.4***	***15.4***	0.207	***15.2***	***15.7***
Barium	mg/kg dw	-	-	172	***283***	***288***	***288***	***286***	***303***	***290***	***288***	7.77	***283***	***303***
Beryllium	mg/kg dw	-	-	0.540	***1.01***	***1.06***	***0.960***	***0.980***	***1.05***	***1.01***	***1.01***	0.0432	***0.960***	***1.06***
Bismuth	mg/kg dw	-	-	0.170	***0.180***	***0.180***	0.170	***0.200***	***0.200***	***0.186***	***0.180***	0.0134	0.170	***0.200***
Boron	mg/kg dw	-	-	<5	10.0	10.5	11.5	10.5	10.8	10.7	10.5	0.550	10.0	11.5
Cadmium	mg/kg dw	0.6	3.5	0.475	0.238	0.250	0.226	0.271	0.267	0.250	0.250	0.0190	0.226	0.271
Calcium	mg/kg dw	-	-	9,480	***20,000***	***23,600***	***22,400***	***18,000***	***18,600***	***20,520***	***20,000***	2,415	***18,000***	***23,600***
Chromium	mg/kg dw	37.3	90	61.9	31.6	30.7	29.4	36.3	34.5	32.5	31.6	2.83	29.4	36.3
Cobalt	mg/kg dw	-	-	15.2	***25.1***	***27.8***	***24.0***	***24.5***	***25.3***	***25.3***	***25.1***	1.47	***24.0***	***27.8***
Copper	mg/kg dw	35.7	197	59.4	***804***	***927***	***818***	***730***	***789***	***814***	***804***	71.7	***730***	***927***
Iron	mg/kg dw	21,200	43,766	34,100	***44,000***	***43,500***	***43,200***	***41,700***	***41,700***	***42,820***	***43,200***	1,062	***41,700***	***44,000***
Lead	mg/kg dw	35	91.3	8.06	***12.6***	***13.1***	***12.7***	***14.3***	***14.6***	***13.5***	***13.1***	0.929	***12.6***	***14.6***
Lithium	mg/kg dw	-	-	16.1	***31.5***	***34.8***	***29.5***	***31.1***	***31.8***	***31.7***	***31.5***	1.93	***29.5***	***34.8***
Magnesium	mg/kg dw	-	-	9,030	***17,200***	***19,700***	***16,200***	***16,500***	***17,200***	***17,360***	***17,200***	1,379	***16,200***	***19,700***
Manganese	mg/kg dw	460	1,100	572	***1,300***	***1,340***	***1,300***	***1,510***	***1,620***	***1,414***	***1,340***	144	***1,300***	***1,620***
Mercury	mg/kg dw	0.17	0.486	0.0627	***0.0974***	***0.106***	***0.0954***	***0.106***	***0.114***	***0.104***	***0.106***	0.00750	***0.0954***	***0.114***
Molybdenum	mg/kg dw	25	23,000	1.11	***3.52***	***3.59***	***3.22***	***3.65***	***3.53***	***3.50***	***3.53***	0.166	***3.22***	***3.65***
Nickel	mg/kg dw	16	75	42.0	28.8	29.3	26.9	32.9	32.6	30.1	29.3	2.58	26.9	32.9
Phosphorus	mg/kg dw	-	-	1,400	1,190	1,220	1,250	1,160	1,130	1,190	1,190	47.4	1,130	1,250
Potassium	mg/kg dw	-	-	1,710	***2,680***	***2,860***	***2,870***	***3,100***	***3,240***	***2,950***	***2,870***	220	***2,680***	***3,240***
Selenium	mg/kg dw	2	-	1.34	1.12	1.18	0.970	1.07	1.02	1.07	1.07	0.0823	0.970	1.18
Silver	mg/kg dw	0.5	-	0.238	***0.353***	***0.394***	***0.358***	***0.359***	***0.375***	***0.368***	***0.359***	0.0168	***0.353***	***0.394***
Sodium	mg/kg dw	-	-	541	***1,100***	***1,160***	***1,220***	***1,190***	***1,230***	***1,180***	***1,190***	52.4	***1,100***	***1,230***
Strontium	mg/kg dw	-	-	90.0	***203***	***215***	***221***	***224***	***235***	***220***	***221***	11.8	***203***	***235***
Sulphur[c]	mg/kg dw	-	-	1,400	880	950	670	560	600	732	670	173	560	950
Thallium	mg/kg dw	-	-	0.187	0.0940	0.0950	0.0840	0.115	0.112	0.100	0.0950	0.0131	0.0840	0.115
Tin	mg/kg dw	-	-	0.510	***1.56***	***1.65***	***1.64***	***1.45***	***1.56***	***1.57***	***1.56***	0.0804	***1.45***	***1.65***
Titanium	mg/kg dw	-	-	1,190	***1,760***	***1,720***	***1,950***	***1,790***	***1,640***	***1,772***	***1,760***	114	***1,640***	***1,950***
Uranium	mg/kg dw	-	-	1.60	***1.63***	***1.73***	1.52	***1.84***	***1.80***	***1.70***	***1.73***	0.130	1.52	***1.84***
Vanadium	mg/kg dw	-	-	73.0	***129***	***125***	***143***	***120***	***116***	***127***	***125***	10.4	***116***	***143***
Zinc	mg/kg dw	123	315	85.1	***102***	***112***	***95.8***	***102***	***107***	***104***	***102***	6.08	***95.8***	***112***
Zirconium	mg/kg dw	-	-	4.80	***5.40***	4.40	***6.70***	***5.80***	4.50	***5.36***	***5.40***	0.956	4.40	***6.70***

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th percentile values see Appendix Table C.2.6.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.8: **Sediment Quality Data for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed) Deep Monitoring Areas, 2024**

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	QUL-PFF1									
		Lower	Upper	QUL-PREF1 (2014 to 2024)	QUL-PFF1-1	QUL-PFF1-2	QUL-PFF1-3	QUL-PFF1-4	QUL-PFF1-5	Mean	Median	Standard Deviation	Minimum	Maximum
					21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24					
Physical Tests														
Moisture	%	-	-	62.2	59.4	54.8	59.7	59.0	53.8	57.3	59.0	2.81	53.8	59.7
pH (1:2 soil:water)	pH	-	-	6.35	7.99	8.15	8.09	8.10	8.33	8.13	8.10	0.125	7.99	8.33
Particle Size														
% Gravel (>2 mm)	%	-	-	<0.1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
% Sand (2.0 mm - 0.063 mm)	%	-	-	30.6	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
% Silt (0.063 mm - 4 µm)	%	-	-	79.4	55.3	57.6	48.4	42.4	46.4	50.0	48.4	6.31	42.4	57.6
% Clay (<4 µm)	%	-	-	12.1	***44.5***	***42.0***	***51.2***	***57.2***	***53.6***	***49.7***	***51.2***	6.33	***42.0***	***57.2***
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	2.22	0.697	0.340	0.529	0.406	0.151	0.425	0.406	0.205	0.151	0.697
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.182	0.0910	0.0490	0.0690	0.0560	0.0580	0.0646	0.0580	0.0164	0.0490	0.0910
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	19,000	***28,100***	***25,600***	***27,300***	***29,700***	***28,000***	***27,740***	***28,000***	1,484	***25,600***	***29,700***
Antimony	mg/kg dw	-	-	0.470	***0.570***	***0.510***	***0.550***	***0.570***	***0.550***	***0.550***	***0.550***	0.0245	***0.510***	***0.570***
Arsenic	mg/kg dw	5.9	17	9.89	***15.4***	***13.5***	***14.6***	***18.1***	***14.3***	***15.2***	***14.6***	1.77	***13.5***	***18.1***
Barium	mg/kg dw	-	-	172	***281***	***262***	***288***	***316***	***299***	***289***	***288***	20.1	***262***	***316***
Beryllium	mg/kg dw	-	-	0.540	***1.00***	***0.870***	***0.970***	***1.05***	***1.02***	***0.982***	***1.00***	0.0691	***0.870***	***1.05***
Bismuth	mg/kg dw	-	-	0.170	0.160	0.120	0.170	0.170	0.140	0.152	0.160	0.0217	0.120	0.170
Boron	mg/kg dw	-	-	<5	11.6	10.4	10.4	11.6	12.4	11.3	11.6	0.867	10.4	12.4
Cadmium	mg/kg dw	0.6	3.5	0.475	0.238	0.179	0.219	0.216	0.167	0.204	0.216	0.0297	0.167	0.238
Calcium	mg/kg dw	-	-	9,480	***25,800***	***22,300***	***24,500***	***21,600***	***23,600***	***23,560***	***23,600***	1,683	***21,600***	***25,800***
Chromium	mg/kg dw	37.3	90	61.9	25.7	19.8	24.1	24.4	18.4	22.5	24.1	3.18	18.4	25.7
Cobalt	mg/kg dw	-	-	15.2	***20.9***	***17.5***	***20.6***	***20.5***	***18.0***	***19.5***	***20.5***	1.61	***17.5***	***20.9***
Copper	mg/kg dw	35.7	197	59.4	***682***	***586***	***706***	***747***	***709***	***686***	***706***	60.6	***586***	***747***
Iron	mg/kg dw	21,200	43,766	34,100	32,100	26,000	31,400	31,900	26,100	29,500	31,400	3,160	26,000	32,100
Lead	mg/kg dw	35	91.3	8.06	***11.4***	***8.94***	***11.8***	***12.2***	***10.3***	***10.9***	***11.4***	1.32	***8.94***	***12.2***
Lithium	mg/kg dw	-	-	16.1	***27.0***	***22.6***	***26.0***	***26.4***	***23.3***	***25.1***	***26.0***	1.97	***22.6***	***27.0***
Magnesium	mg/kg dw	-	-	9,030	***14,400***	***12,300***	***14,200***	***14,200***	***13,400***	***13,700***	***14,200***	872	***12,300***	***14,400***
Manganese	mg/kg dw	460	1,100	572	***1,230***	***893***	***1,200***	***1,530***	***1,010***	***1,173***	***1,200***	243	***893***	***1,530***
Mercury	mg/kg dw	0.17	0.486	0.0627	***0.0951***	***0.0730***	***0.0928***	***0.0876***	***0.0748***	***0.0847***	***0.0876***	0.0102	***0.0730***	***0.0951***
Molybdenum	mg/kg dw	25	23,000	1.11	***3.06***	***2.62***	***3.06***	***2.81***	***2.52***	***2.81***	***2.81***	0.248	***2.52***	***3.06***
Nickel	mg/kg dw	16	75	42.0	24.0	19.0	23.3	23.3	17.4	21.4	23.3	2.99	17.4	24.0
Phosphorus	mg/kg dw	-	-	1,400	1,270	1,160	1,170	987	1,170	1,151	1,170	102	987	1,270
Potassium	mg/kg dw	-	-	1,710	***2,720***	***2,490***	***2,630***	***3,060***	***2,990***	***2,778***	***2,720***	241	***2,490***	***3,060***
Selenium	mg/kg dw	2	-	1.34	1.20	0.750	1.01	0.880	0.600	0.888	0.880	0.231	0.600	1.20
Silver	mg/kg dw	0.5	-	0.238	***0.339***	***0.253***	***0.319***	***0.292***	***0.272***	***0.295***	***0.292***	0.0347	***0.253***	***0.339***
Sodium	mg/kg dw	-	-	541	***1,190***	***1,280***	***1,260***	***1,450***	***1,520***	***1,340***	***1,280***	139	***1,190***	***1,520***
Strontium	mg/kg dw	-	-	90.0	***243***	***251***	***252***	***268***	***265***	***256***	***252***	10.4	***243***	***268***
Sulphur[c]	mg/kg dw	-	-	1,400	960	650	750	<500	<500	672	650	147	<500	960
Thallium	mg/kg dw	-	-	0.187	0.0890	0.0700	0.0790	0.0890	0.0640	0.0782	0.0790	0.0112	0.0640	0.0890
Tin	mg/kg dw	-	-	0.510	***1.80***	***1.63***	***1.62***	***1.69***	***1.92***	***1.73***	***1.69***	0.127	***1.62***	***1.92***
Titanium	mg/kg dw	-	-	1,190	***1,920***	***1,790***	***1,790***	***1,750***	***2,040***	***1,858***	***1,790***	120	***1,750***	***2,040***
Uranium	mg/kg dw	-	-	1.60	***1.70***	1.45	***1.65***	1.45	1.45	1.54	1.45	0.124	1.45	***1.70***
Vanadium	mg/kg dw	-	-	73.0	***100***	***88.0***	***96.4***	***90.9***	***92.7***	***93.6***	***92.7***	4.70	***88.0***	***100***
Zinc	mg/kg dw	123	315	85.1	84.4	71.0	83.4	83.0	72.4	78.8	83.0	6.56	71.0	84.4
Zirconium	mg/kg dw	-	-	4.80	***6.60***	***7.00***	***6.90***	***5.20***	***7.00***	***6.54***	***6.90***	0.767	***5.20***	***7.00***

Value is > BC Lower Working Sediment Quality Guideline.
Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).
[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th percentile values see Appendix Table C.2.6.
[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.9: Pre-Breach Sediment Quality Data for the Quesnel Lake (QUL-LNF1; Exposed) Shallow Monitoring Area, 2007

Sample ID	Units	BC Working Sediment Quality Guidelines[a]		QUL-LNF1[b]					95th Percentile[c]
				QUL-LNF1-1	QUL-LNF1-2	QUL-LNF1-3	QUL-LNF1-4	QUL-LNF1-5	
		Lower	Upper	2007					
Physical Tests									
Moisture	%	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-
Particle Size									
% Gravel (>2 mm)	%	-	-	7.00	2.00	1.00	2.00	5.00	7.00
% Sand (2.0 mm - 0.063 mm)	%	-	-	36.0	56.0	39.0	58.0	33.0	58.0
% Silt (0.063 mm - 4 µm)	%	-	-	48.0	37.0	50.0	35.0	53.0	53.0
% Clay (<4 µm)	%	-	-	8.00	5.00	9.00	5.00	9.00	9.00
Organic / Inorganic Carbon									
Total Organic Carbon	%	-	-	1.92	1.72	2.45	1.28	2.07	2.45
Nutrients (Bulk sediment)									
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals (<63 µm)									
Aluminum	mg/kg dw	-	-	11,300	8,820	12,500	10,100	11,000	12,500
Antimony	mg/kg dw	-	-	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Arsenic	mg/kg dw	5.9	17	5.90	<5.0	7.50	6.60	<5.0	7.50
Barium	mg/kg dw	-	-	82.4	65.1	91.4	73.7	82.6	91.4
Beryllium	mg/kg dw	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bismuth	mg/kg dw	-	-	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
Boron	mg/kg dw	-	-	-	-	-	-	-	-
Cadmium	mg/kg dw	0.6	3.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Calcium	mg/kg dw	-	-	5,320	4,680	5,660	4,810	5,080	5,660
Chromium	mg/kg dw	37.3	90	30.1	23.0	32.3	25.8	27.4	32.3
Cobalt	mg/kg dw	-	-	8.40	6.50	9.60	7.80	7.80	9.60
Copper	mg/kg dw	35.7	197	23.7	19.4	29.6	20.7	21.8	29.6
Iron	mg/kg dw	21,200	43,766	21,100	15,400	23,100	19,700	18,600	23,100
Lead	mg/kg dw	35.0	91.3	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0
Lithium	mg/kg dw	-	-	12.3	8.80	13.2	10.6	11.8	13.2
Magnesium	mg/kg dw	-	-	5,300	3,730	5,770	5,130	4,850	5,770
Manganese	mg/kg dw	460	1,100	337	265	514	334	345	514
Mercury	mg/kg dw	0.17	0.486	0.0529	0.0465	0.0729	0.0442	0.0420	0.0729
Molybdenum	mg/kg dw	25	23,000	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	mg/kg dw	16	75	18.8	14.2	21.1	16.3	17.3	21.1
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-
Potassium	mg/kg dw	-	-	810	550	890	670	760	890
Selenium	mg/kg dw	2	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	mg/kg dw	0.5	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Sodium	mg/kg dw	-	-	200	<200	210	240	<200	240
Strontium	mg/kg dw	-	-	55.3	45.7	58.5	54.4	52.1	58.5
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	mg/kg dw	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	mg/kg dw	-	-	561	512	607	546	561	607
Uranium	mg/kg dw	-	-	-	-	-	-	-	-
Vanadium	mg/kg dw	-	-	49.8	44.8	54.9	52.2	45.7	54.9
Zinc	mg/kg dw	123	315	44.2	28.3	46.7	38.7	38.1	46.7

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. "-" indicates no data. Sediment metal concentrations are based on bulk (<2 mm fraction) sediment samples.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] Pre-breach values that were reported as < the laboratory reporting limit were not used for screening.

[c] 5th percentile value for pH.

Table C.2.10: **Sediment Quality Data for the Quesnel Lake (QUL-LREF1; Reference) Shallow Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024**

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2014					2015			2016				
		Lower	Upper	1	2	3	4	5	1	3	4	1	2	3	4	5
				26-Aug-14	24-Aug-14	25-Aug-14	25-Aug-14	26-Aug-14	24-Aug-15	25-Aug-15	25-Aug-15	14-Aug-16	14-Aug-16	14-Aug-16	14-Aug-16	14-Aug-16
Physical Tests																
Moisture	%	-	-	44.1	36.9	39.6	42.3	40.4	43.5	42.4	36.5	39.7	30.6	33.7	32.5	30.7
pH (1:2 soil:water)	pH	-	-	6.73	6.36	6.60	6.68	6.43	7.02	7.17	6.71	6.16	5.98	6.46	6.42	***5.69***
Particle Size																
% Gravel (>2 mm)	%	-	-	2.01	0.240	1.10	0.740	1.02	1.78	0.600	2.08	0.730	0.990	3.59	1.16	2.57
% Sand (2.0 mm - 0.063 mm)	%	-	-	61.1	53.6	52.4	66.0	65.2	57.8	56.8	65.3	33.9	73.1	69.7	76.8	66.5
% Silt (0.063 mm - 4 µm)	%	-	-	31.9	42.1	42.2	29.1	30.4	35.8	36.3	29.6	***59.5***	24.1	22.7	18.9	28.9
% Clay (<4 µm)	%	-	-	4.99	4.04	4.29	4.20	3.34	4.62	***6.30***	2.99	***5.85***	1.84	3.99	3.14	2.12
Organic / Inorganic Carbon (<63 µm)																
Total Organic Carbon	%	-	-	1.23	0.910	1.04	1.38	1.03	1.64	1.23	1.54	1.07	1.12	1.31	1.36	1.08
Nutrients (Bulk sediment)																
Total Nitrogen	%	-	-	0.0710	0.0610	0.0680	0.0690	0.0600	***0.115***	0.101	0.0970	0.0730	0.0450	0.0530	0.0460	0.0500
Metals, Metalloids, and Non-Metals (<63 µm)																
Aluminum	mg/kg dw	-	-	14,600	12,300	12,900	14,800	11,700	13,600	12,300	13,500	10,700	9,570	10,500	14,100	11,600
Antimony	mg/kg dw	-	-	***0.370***	0.260	0.260	0.330	0.260	0.330	0.300	0.300	0.250	0.230	0.260	0.290	0.250
Arsenic	mg/kg dw	5.9	17	4.90	3.30	3.56	4.92	3.71	5.37	3.82	4.43	3.47	3.47	4.13	4.99	3.67
Barium	mg/kg dw	-	-	126	135	114	124	120	117	107	122	100	104	104	111	124
Beryllium	mg/kg dw	-	-	0.370	0.340	0.330	0.400	0.310	0.400	0.330	0.370	0.300	0.300	0.330	0.380	0.310
Bismuth	mg/kg dw	-	-	***0.140***	<0.1	<0.1	0.120	<0.1	0.120	<0.1	0.110	<0.1	<0.1	<0.1	0.100	<0.1
Boron	mg/kg dw	-	-	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cadmium	mg/kg dw	0.6	3.5	0.341	0.286	0.311	0.354	0.275	0.345	0.287	0.358	0.282	0.273	0.286	0.344	0.297
Calcium	mg/kg dw	-	-	7,760	6,690	6,970	7,640	6,620	8,170	7,040	7,240	6,780	5,770	6,490	7,100	5,960
Chromium	mg/kg dw	37.3	90	53.6	46.3	46.1	54.4	47.3	51.4	45.5	52.2	43.2	43.0	44.4	52.9	55.4
Cobalt	mg/kg dw	-	-	11.5	8.99	9.90	12.0	8.99	11.6	9.78	11.0	9.63	8.66	9.79	11.1	8.82
Copper	mg/kg dw	35.7	197	33.1	26.9	28.7	35.2	27.4	33.8	27.9	33.0	26.7	25.8	28.8	32.1	25.8
Iron	mg/kg dw	21,200	43,766	25,700	21,500	22,000	26,300	22,900	24,800	21,400	23,400	20,200	20,800	22,700	24,800	22,700
Lead	mg/kg dw	35	91.3	5.78	4.72	4.99	6.07	4.80	6.29	5.04	6.02	4.82	4.58	5.30	5.58	5.00
Lithium	mg/kg dw	-	-	12.4	10.5	11.1	13.4	9.90	11.8	10.1	11.0	10.2	9.80	10.8	13.6	10.9
Magnesium	mg/kg dw	-	-	6,790	5,980	6,170	6,990	5,870	6,800	5,860	6,600	5,600	5,300	5,790	6,980	5,790
Manganese	mg/kg dw	460	1,100	364	254	298	365	264	370	299	298	252	233	263	287	234
Mercury	mg/kg dw	0.17	0.486	0.0403	0.0316	0.0354	0.0470	0.0340	***0.0481***	0.0362	0.0471	0.0319	0.0363	0.0383	0.0454	0.0268
Molybdenum	mg/kg dw	25	23,000	0.870	0.820	0.690	0.830	0.700	0.990	0.690	0.820	0.650	0.690	0.830	0.880	0.930
Nickel	mg/kg dw	16	75	32.6	26.3	28.1	33.2	26.2	32.2	27.5	32.3	26.5	25.1	28.1	31.8	29.7
Phosphorus	mg/kg dw	-	-	1,230	1,040	1,080	1,100	1,230	1,110	1,130	1,190	1,100	955	1,090	1,050	1,080
Potassium	mg/kg dw	-	-	1,280	950	1,060	1,320	990	1,300	1,070	1,270	990	900	1,000	1,160	910
Selenium	mg/kg dw	2	-	0.700	0.480	0.520	0.700	0.520	0.710	0.530	0.670	0.510	0.520	0.610	0.620	0.550
Silver	mg/kg dw	0.5	-	0.152	0.130	0.151	0.169	0.120	0.158	0.135	0.152	0.134	0.138	0.144	0.151	0.125
Sodium	mg/kg dw	-	-	410	390	370	390	370	480	440	460	350	320	350	380	340
Strontium	mg/kg dw	-	-	70.6	58.4	62.2	69.5	55.8	76.0	63.9	66.9	57.8	50.9	56.8	64.1	49.1
Sulphur[c]	mg/kg dw	-	-	-	-	-	-	-	<500	<500	<500	***1,000***	700	600	<500	600
Thallium	mg/kg dw	-	-	***0.153***	0.119	0.110	0.130	0.102	0.135	0.106	0.118	0.100	0.0950	0.103	0.118	0.101
Tin	mg/kg dw	-	-	0.400	0.370	0.340	0.380	0.280	0.380	0.370	0.390	0.300	0.270	0.320	0.550	0.320
Titanium	mg/kg dw	-	-	1,090	962	961	1,060	876	945	897	965	862	743	770	1,020	927
Uranium	mg/kg dw	-	-	1.13	0.855	0.935	1.15	0.869	1.25	0.985	1.18	0.981	0.996	1.08	1.15	0.971
Vanadium	mg/kg dw	-	-	61.6	53.8	53.3	61.1	54.8	59.0	52.7	59.4	50.6	48.1	51.6	61.8	54.7
Zinc	mg/kg dw	123	315	66.8	55.5	58.7	68.5	54.6	64.3	57.2	65.3	51.4	50.1	54.8	62.3	52.9
Zirconium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates exposed value > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. QUL-LREF1 was not sampled in 2017 or 2018.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.10: **Sediment Quality Data for the Quesnel Lake (QUL-LREF1; Reference) Shallow Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024**

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2019					2020					2021				
		Lower	Upper	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
				27-Aug-19	27-Aug-19	27-Aug-19	27-Aug-19	27-Aug-19	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	26-Aug-20	29-Aug-21	29-Aug-21	29-Aug-21	29-Aug-21	29-Aug-21
Physical Tests																		
Moisture	%	-	-	***46.3***	***44.9***	44.4	43.1	37.5	40.3	41.1	42.1	40.4	43.2	37.1	43.8	32.3	37.6	30.6
pH (1:2 soil:water)	pH	-	-	6.71	6.96	6.48	6.44	5.92	6.52	6.20	6.62	6.56	6.23	6.73	6.16	6.40	6.28	5.92
Particle Size																		
% Gravel (>2 mm)	%	-	-	<1.0	<1.0	3.50	5.40	<1.0	1.80	<1.0	<1.0	<1.0	***22.2***	4.20	<1.0	4.10	1.80	<1.0
% Sand (2.0 mm - 0.063 mm)	%	-	-	52.3	57.2	57.0	60.6	37.0	71.6	58.8	74.9	74.3	52.1	63.9	56.8	58.8	60.9	60.0
% Silt (0.063 mm - 4 µm)	%	-	-	43.5	41.2	36.9	31.0	***58.1***	23.9	38.4	22.4	22.7	23.5	28.6	40.0	33.5	33.2	37.2
% Clay (<4 µm)	%	-	-	3.60	1.60	2.70	3.00	4.60	2.70	2.80	2.10	2.50	2.20	3.30	3.20	3.60	4.10	2.80
Organic / Inorganic Carbon (<63 µm)																		
Total Organic Carbon	%	-	-	1.48	0.860	1.26	1.69	1.05	1.60	1.12	1.51	***1.98***	1.37	1.86	0.998	1.42	1.82	1.06
Nutrients (Bulk sediment)																		
Total Nitrogen	%	-	-	0.0880	0.0590	0.0750	0.0830	0.0910	0.0790	0.0760	0.0720	0.0750	0.0810	0.0620	0.0480	0.0570	0.0740	0.0440
Metals, Metalloids, and Non-Metals (<63 µm)																		
Aluminum	mg/kg dw	-	-	13,700	10,800	12,800	12,400	12,500	14,200	12,800	16,000	14,600	13,200	17,100	12,000	14,500	14,300	11,300
Antimony	mg/kg dw	-	-	0.280	0.220	0.290	0.260	0.270	0.310	0.270	0.350	0.310	0.280	0.340	0.250	0.310	0.310	0.250
Arsenic	mg/kg dw	5.9	17	4.12	3.16	3.55	3.72	3.24	4.61	3.86	5.40	5.49	4.33	***6.01***	3.56	4.68	5.08	3.45
Barium	mg/kg dw	-	-	114	85.5	111	107	***151***	113	118	***149***	129	136	144	115	130	128	124
Beryllium	mg/kg dw	-	-	0.340	0.300	0.300	0.320	0.360	0.380	0.340	0.450	0.410	0.350	0.410	0.300	0.370	0.360	0.300
Bismuth	mg/kg dw	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	0.110	<0.1	***0.140***	0.130	0.100	0.120	<0.1	<0.1	0.110	<0.1
Boron	mg/kg dw	-	-	<10	<10	<10	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	mg/kg dw	0.6	3.5	0.309	0.237	0.270	0.295	0.283	0.310	0.276	***0.408***	0.368	0.281	0.357	0.245	0.308	0.352	0.273
Calcium	mg/kg dw	-	-	6,940	6,990	6,810	6,500	6,490	7,510	7,110	8,150	7,660	6,800	***9,400***	7,380	8,660	7,100	6,820
Chromium	mg/kg dw	37.3	90	49.0	52.8	48.6	46.7	48.3	52.9	51.7	***60.5***	57.2	51.3	60.3	50.8	56.9	54.3	49.1
Cobalt	mg/kg dw	-	-	10.8	8.68	10.4	9.77	9.58	11.2	9.76	***13.3***	11.8	10.1	***13.3***	9.29	12.0	12.5	8.52
Copper	mg/kg dw	35.7	197	28.5	20.7	26.5	27.2	29.9	30.9	30.7	35.2	35.8	34.0	35.0	25.1	31.0	34.5	25.3
Iron	mg/kg dw	21,200	43,766	22,800	22,500	22,100	21,400	21,500	23,000	23,400	27,100	25,800	24,300	***28,200***	22,200	25,900	24,800	20,900
Lead	mg/kg dw	35	91.3	5.03	3.77	4.45	4.60	4.82	5.75	4.86	***6.72***	6.02	5.37	6.08	4.25	5.38	5.58	4.54
Lithium	mg/kg dw	-	-	11.1	8.00	10.1	10.6	11.0	12.1	10.4	***13.8***	12.8	11.5	12.7	8.70	11.4	11.7	9.10
Magnesium	mg/kg dw	-	-	6,520	5,440	6,070	5,950	6,630	6,830	6,490	7,590	7,410	6,700	***8,360***	6,500	7,700	7,940	6,420
Manganese	mg/kg dw	460	1,100	310	260	333	262	241	330	292	***443***	409	290	***498***	277	366	354	241
Mercury	mg/kg dw	0.17	0.486	0.0323	0.0254	0.0277	0.0308	0.0285	0.0337	0.0288	0.0364	0.0361	0.0322	0.0342	0.0253	0.0302	0.0397	0.0255
Molybdenum	mg/kg dw	25	23,000	0.810	0.550	0.820	0.800	0.760	0.940	0.750	0.980	***1.13***	0.950	***1.10***	0.600	0.830	0.920	0.740
Nickel	mg/kg dw	16	75	29.0	23.1	26.6	26.7	28.3	30.6	27.7	***34.6***	33.4	29.1	33.6	25.3	30.5	32.3	24.5
Phosphorus	mg/kg dw	-	-	1,070	***1,290***	1,160	1,020	1,110	1,090	1,240	1,210	1,200	1,180	1,220	1,000	1,200	1,130	1,190
Potassium	mg/kg dw	-	-	1,110	910	1,060	1,050	1,000	1,160	1,020	1,330	1,220	1,100	1,470	1,100	1,280	1,290	940
Selenium	mg/kg dw	2	-	0.570	0.310	0.500	0.630	0.520	0.700	0.710	***0.930***	***0.970***	0.820	0.880	0.510	0.660	0.770	0.500
Silver	mg/kg dw	0.5	-	0.139	0.0910	0.122	0.136	0.147	0.150	0.129	***0.174***	0.167	0.139	0.165	0.104	***0.197***	0.164	0.118
Sodium	mg/kg dw	-	-	402	364	395	355	386	403	393	445	414	408	514	462	468	406	380
Strontium	mg/kg dw	-	-	67.3	58.2	67.3	62.0	57.8	73.1	64.8	78.6	74.7	68.0	***86.6***	64.5	78.1	68.8	57.9
Sulphur[c]	mg/kg dw	-	-	600	500	<500	<500	700	720	610	540	500	600	<500	<500	<500	<500	<500
Thallium	mg/kg dw	-	-	0.106	0.0830	0.0950	0.100	0.106	0.119	0.102	0.138	0.123	0.100	0.131	0.0920	0.111	0.116	0.0890
Tin	mg/kg dw	-	-	0.360	0.320	0.390	0.340	0.340	0.360	0.330	0.480	0.410	0.340	***0.570***	0.390	0.510	0.480	0.370
Titanium	mg/kg dw	-	-	1,020	975	1,010	890	930	1,070	1,060	1,180	1,050	966	1,210	1,070	1,160	981	934
Uranium	mg/kg dw	-	-	1.03	0.925	1.01	0.963	0.862	1.32	1.06	1.41	1.34	1.14	1.30	0.936	1.18	1.07	0.852
Vanadium	mg/kg dw	-	-	56.6	57.8	56.6	51.1	55.2	59.9	59.6	68.7	62.8	58.3	***70.1***	58.8	65.3	60.8	55.8
Zinc	mg/kg dw	123	315	61.5	48.2	57.7	58.0	61.3	58.9	55.1	70.4	64.7	58.1	***71.2***	54.2	65.8	68.7	53.2
Zirconium	mg/kg dw	-	-	-	-	-	-	-	3.80	4.20	4.10	3.50	3.50	4.10	4.00	4.30	4.20	4.00

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates exposed value > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. QUL-LREF1 was not sampled in 2017 or 2018.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.10: **Sediment Quality Data for the Quesnel Lake (QUL-LREF1; Reference) Shallow Monitoring Area for Calculation of Reference 95th Percentile, 2014 to 2024**

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2022					2023					2024					95th Percentile (2014 to 2024)[b]
		Lower	Upper	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
				23-Aug-22	23-Aug-22	23-Aug-22	23-Aug-22	23-Aug-22	26-Aug-23	26-Aug-23	26-Aug-23	26-Aug-23	26-Aug-23	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	
Physical Tests																			
Moisture	%	-	-	30.6	26.6	30.6	34.9	29.6	38.6	31.8	44.8	41.4	38.1	28.4	33.4	31.1	31.0	29.6	44.8
pH (1:2 soil:water)	pH	-	-	6.19	5.97	6.07	6.38	6.01	6.29	6.31	6.19	6.52	6.44	6.47	5.89	6.00	6.71	***5.60***	5.89
Particle Size																			
% Gravel (>2 mm)	%	-	-	2.00	4.00	3.40	<1.0	2.10	5.20	<1.0	1.70	3.00	4.50	5.00	<1.0	***10.6***	4.00	4.70	5.40
% Sand (2.0 mm - 0.063 mm)	%	-	-	60.3	64.4	60.4	73.3	48.6	74.9	***84.2***	53.1	72.0	58.6	76.0	55.3	69.8	***78.6***	74.8	76.8
% Silt (0.063 mm - 4 µm)	%	-	-	33.6	29.0	32.3	22.5	44.9	17.1	14.0	40.9	22.0	33.8	16.6	41.8	17.6	15.4	18.9	44.9
% Clay (<4 µm)	%	-	-	4.10	2.60	3.90	3.60	4.40	2.80	1.50	4.30	3.00	3.10	2.40	2.90	2.00	2.00	1.60	4.99
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon	%	-	-	1.55	0.984	1.48	***1.87***	1.12	1.56	1.14	1.46	1.54	0.884	1.32	0.599	1.45	1.39	0.981	1.86
Nutrients (Bulk sediment)																			
Total Nitrogen	%	-	-	0.0780	0.0580	0.0930	0.0740	0.0870	0.0700	0.0700	***0.123***	0.0910	0.0810	0.0620	0.0560	0.0640	0.0600	0.0690	0.101
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	15,600	14,200	16,300	***17,800***	15,100	15,900	13,800	15,700	16,400	13,800	***17,500***	12,900	16,600	16,200	12,700	17,100
Antimony	mg/kg dw	-	-	0.290	0.250	0.340	0.300	0.260	0.300	0.250	0.280	0.300	0.220	0.350	0.220	0.300	0.290	0.220	0.350
Arsenic	mg/kg dw	5.9	17	4.68	4.14	5.08	5.71	3.97	5.65	4.74	4.34	5.52	3.31	***6.02***	2.92	4.64	5.49	3.27	5.71
Barium	mg/kg dw	-	-	128	108	130	138	124	136	141	132	140	134	135	105	128	119	113	144
Beryllium	mg/kg dw	-	-	0.430	0.380	0.410	0.450	0.390	0.370	0.320	0.340	0.370	0.290	0.450	0.320	0.410	0.400	0.320	0.450
Bismuth	mg/kg dw	-	-	0.110	<0.1	0.100	0.130	<0.1	0.110	<0.1	0.100	0.100	<0.1	0.120	<0.1	0.120	0.110	<0.1	0.130
Boron	mg/kg dw	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cadmium	mg/kg dw	0.6	3.5	0.358	0.268	0.328	***0.388***	0.289	0.362	0.280	0.337	0.354	0.260	0.345	0.232	0.346	0.340	0.272	0.368
Calcium	mg/kg dw	-	-	7,790	7,970	8,230	8,680	7,680	7,770	7,530	7,540	7,860	7,100	***8,840***	7,780	8,740	8,700	7,420	8,740
Chromium	mg/kg dw	37.3	90	53.9	58.0	55.6	59.0	52.6	54.7	57.7	52.2	56.5	49.9	58.5	53.8	59.4	***61.5***	53.6	60.3
Cobalt	mg/kg dw	-	-	11.8	10.1	12.2	12.9	10.5	12.7	8.83	11.0	12.2	8.34	12.6	9.05	11.1	12.3	8.54	12.9
Copper	mg/kg dw	35.7	197	34.1	26.9	33.0	***36.6***	29.7	35.6	29.2	29.6	31.5	24.9	***39.8***	23.8	33.2	31.9	25.8	35.8
Iron	mg/kg dw	21,200	43,766	25,300	25,000	27,200	***28,500***	24,200	27,100	26,800	24,700	26,800	21,100	28,000	21,100	26,200	26,900	21,000	28,000
Lead	mg/kg dw	35	91.3	5.96	4.88	5.69	6.47	5.14	5.96	4.74	5.29	5.45	4.32	***6.68***	4.28	6.14	5.87	4.61	6.47
Lithium	mg/kg dw	-	-	12.6	10.0	12.1	13.7	10.9	12.9	10.3	11.8	12.8	9.70	***14.5***	9.00	13.2	13.2	9.80	13.7
Magnesium	mg/kg dw	-	-	7,570	6,770	7,670	***8,320***	7,350	8,310	7,200	7,740	8,220	6,970	7,750	5,940	7,570	7,600	6,050	8,310
Manganese	mg/kg dw	460	1,100	353	306	430	407	320	418	268	377	433	234	332	262	326	402	246	433
Mercury	mg/kg dw	0.17	0.486	0.0370	0.0292	0.0357	0.0439	0.0310	0.0363	0.0258	0.0304	0.0345	0.0245	***0.0483***	0.0240	0.0369	0.0367	0.0271	0.0471
Molybdenum	mg/kg dw	25	23,000	0.860	0.610	0.850	0.940	0.620	0.840	0.770	0.670	0.860	0.560	1.02	0.490	0.870	0.910	0.660	1.02
Nickel	mg/kg dw	16	75	32.7	28.2	32.3	***34.8***	29.6	32.1	25.9	29.6	31.8	24.5	34.4	25.2	32.9	33.4	25.5	34.4
Phosphorus	mg/kg dw	-	-	1,090	1,160	1,210	1,110	1,120	1,170	***1,290***	1,130	1,090	1,150	1,200	1,190	1,280	1,240	1,280	1,280
Potassium	mg/kg dw	-	-	1,360	1,150	***1,510***	***1,630***	1,300	1,180	960	1,210	1,280	920	1,420	950	1,430	1,330	960	1,470
Selenium	mg/kg dw	2	-	0.710	0.520	0.700	0.880	0.580	0.770	0.560	0.690	0.750	0.420	0.810	0.360	0.790	0.720	0.460	0.880
Silver	mg/kg dw	0.5	-	0.159	0.127	0.140	0.167	0.128	0.151	0.115	0.136	0.146	0.172	0.168	0.0950	0.152	0.147	0.105	0.172
Sodium	mg/kg dw	-	-	463	496	***546***	***560***	515	413	399	436	444	383	473	427	538	476	415	538
Strontium	mg/kg dw	-	-	74.3	70.2	77.2	***83.7***	72.0	72.0	67.5	73.3	75.8	65.1	82.0	65.2	77.5	76.0	61.1	82.0
Sulphur[c]	mg/kg dw	-	-	530	<500	<500	<500	510	660	560	600	<500	510	<500	<500	<500	<500	<500	720
Thallium	mg/kg dw	-	-	0.130	0.105	0.129	***0.147***	0.112	0.120	0.0910	0.109	0.117	0.0920	0.136	0.100	0.122	0.118	0.0960	0.138
Tin	mg/kg dw	-	-	0.490	0.510	0.490	***0.570***	0.450	0.470	0.390	0.380	0.410	0.340	0.340	0.230	0.380	0.390	0.240	0.550
Titanium	mg/kg dw	-	-	991	1,090	1,140	1,080	1,080	1,050	1,080	1,090	1,120	1,050	***1,260***	1,160	***1,340***	1,220	1,010	1,220
Uranium	mg/kg dw	-	-	1.20	1.19	1.30	1.39	1.06	1.18	1.02	1.11	1.14	0.942	***1.48***	1.12	***1.44***	1.39	1.09	1.41
Vanadium	mg/kg dw	-	-	61.6	65.5	65.1	67.8	61.8	64.7	64.4	61.0	63.7	57.3	69.9	61.5	***70.0***	69.8	58.6	69.9
Zinc	mg/kg dw	123	315	66.4	56.2	65.0	70.3	61.2	68.2	55.8	62.5	65.8	53.4	***70.6***	51.8	68.2	69.4	54.0	70.4
Zirconium	mg/kg dw	-	-	3.20	3.60	3.40	3.00	3.50	4.20	4.10	3.70	3.10	3.60	4.90	***5.20***	4.00	3.90	3.70	4.90

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates exposed value > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" indicates no guideline available or no data. All summary statistics were calculated to 3 significant figures. QUL-LREF1 was not sampled in 2017 or 2018.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.11: Sediment Quality Data for the Quesnel Lake (QUL-LREF1; Reference) Shallow Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]	QUL-LREF1									
		Lower	Upper	QUL-LREF1 (2014 to 2024)	QUL-LREF1-1	QUL-LREF1-2	QUL-LREF1-3	QUL-LREF1-4	QUL-LREF1-5	Mean	Median	Standard Deviation	Minimum	Maximum
					21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24					
Physical Tests														
Moisture	%	-	-	44.8	28.4	33.4	31.1	31.0	29.6	30.7	31.0	1.87	28.4	33.4
pH (1:2 soil:water)	pH	-	-	5.89	6.47	5.89	6.00	6.71	***5.60***	6.13	6.00	0.449	***5.60***	6.71
Particle Size														
% Gravel (>2 mm)	%	-	-	5.40	5.00	<1	***10.6***	4.00	4.70	5.06	4.70	2.89	<1	***10.6***
% Sand (2.0 mm - 0.063 mm)	%	-	-	76.8	76.0	55.3	69.8	***78.6***	74.8	70.9	74.8	9.29	55.3	***78.6***
% Silt (0.063 mm - 4 µm)	%	-	-	44.9	16.6	41.8	17.6	15.4	18.9	22.1	17.6	11.1	15.4	41.8
% Clay (<4 µm)	%	-	-	4.99	2.40	2.90	2.00	2.00	1.60	2.18	2.00	0.492	1.60	2.90
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	1.86	1.32	0.599	1.45	1.39	0.981	1.15	1.32	0.357	0.599	1.45
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.101	0.0620	0.0560	0.0640	0.0600	0.0690	0.0622	0.0620	0.00482	0.0560	0.0690
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	17,100	***17,500***	12,900	16,600	16,200	12,700	15,180	16,200	2,224	12,700	***17,500***
Antimony	mg/kg dw	-	-	0.350	0.350	0.220	0.300	0.290	0.220	0.276	0.290	0.0559	0.220	0.350
Arsenic	mg/kg dw	5.9	17	5.71	***6.02***	2.92	4.64	5.49	3.27	4.47	4.64	1.35	2.92	***6.02***
Barium	mg/kg dw	-	-	144	135	105	128	119	113	120	119	11.9	105	135
Beryllium	mg/kg dw	-	-	0.450	0.450	0.320	0.410	0.400	0.320	0.380	0.400	0.0579	0.320	0.450
Bismuth	mg/kg dw	-	-	0.130	0.120	<0.1	0.120	0.110	<0.1	0.110	0.110	0.00600	<0.1	0.120
Boron	mg/kg dw	-	-	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
Cadmium	mg/kg dw	0.6	3.5	0.368	0.345	0.232	0.346	0.340	0.272	0.307	0.340	0.0522	0.232	0.346
Calcium	mg/kg dw	-	-	8,740	***8,840***	7,780	8,740	8,700	7,420	8,296	8,700	650	7,420	***8,840***
Chromium	mg/kg dw	37.3	90	60.3	58.5	53.8	59.4	***61.5***	53.6	57.4	58.5	3.51	53.6	***61.5***
Cobalt	mg/kg dw	-	-	12.9	12.6	9.05	11.1	12.3	8.54	10.7	11.1	1.85	8.54	12.6
Copper	mg/kg dw	35.7	197	35.8	***39.8***	23.8	33.2	31.9	25.8	30.9	31.9	6.36	23.8	***39.8***
Iron	mg/kg dw	21,200	43,766	28,000	28,000	21,100	26,200	26,900	21,000	24,640	26,200	3,340	21,000	28,000
Lead	mg/kg dw	35	91.3	6.47	***6.68***	4.28	6.14	5.87	4.61	5.52	5.87	1.03	4.28	***6.68***
Lithium	mg/kg dw	-	-	13.7	***14.5***	9.00	13.2	13.2	9.80	11.9	13.2	2.40	9.00	***14.5***
Magnesium	mg/kg dw	-	-	8,310	7,750	5,940	7,570	7,600	6,050	6,982	7,570	904	5,940	7,750
Manganese	mg/kg dw	460	1,100	433	332	262	326	402	246	314	326	62.3	246	402
Mercury	mg/kg dw	0.17	0.486	0.0471	***0.0483***	0.0240	0.0369	0.0367	0.0271	0.0346	0.0367	0.00957	0.0240	***0.0483***
Molybdenum	mg/kg dw	25	23,000	1.02	1.02	0.490	0.870	0.910	0.660	0.790	0.870	0.212	0.490	1.02
Nickel	mg/kg dw	16	75	34.4	34.4	25.2	32.9	33.4	25.5	30.3	32.9	4.53	25.2	34.4
Phosphorus	mg/kg dw	-	-	1,280	1,200	1,190	1,280	1,240	1,280	1,238	1,240	42.7	1,190	1,280
Potassium	mg/kg dw	-	-	1,470	1,420	950	1,430	1,330	960	1,218	1,330	243	950	1,430
Selenium	mg/kg dw	2	-	0.880	0.810	0.360	0.790	0.720	0.460	0.628	0.720	0.205	0.360	0.810
Silver	mg/kg dw	0.5	-	0.172	0.168	0.0950	0.152	0.147	0.105	0.133	0.147	0.0317	0.0950	0.168
Sodium	mg/kg dw	-	-	538	473	427	538	476	415	466	473	48.6	415	538
Strontium	mg/kg dw	-	-	82.0	82.0	65.2	77.5	76.0	61.1	72.4	76.0	8.81	61.1	82.0
Sulphur[c]	mg/kg dw	-	-	720	<500	<500	<500	<500	<500	<500	<500	-	<500	<500
Thallium	mg/kg dw	-	-	0.138	0.136	0.100	0.122	0.118	0.0960	0.114	0.118	0.0165	0.0960	0.136
Tin	mg/kg dw	-	-	0.550	0.340	0.230	0.380	0.390	0.240	0.316	0.340	0.0764	0.230	0.390
Titanium	mg/kg dw	-	-	1,220	***1,260***	1,160	***1,340***	1,220	1,010	1,198	1,220	124	1,010	***1,340***
Uranium	mg/kg dw	-	-	1.41	***1.48***	1.12	***1.44***	1.39	1.09	1.30	1.39	0.185	1.09	***1.48***
Vanadium	mg/kg dw	-	-	69.9	69.9	61.5	***70.0***	69.8	58.6	66.0	69.8	5.49	58.6	***70.0***
Zinc	mg/kg dw	123	315	70.4	***70.6***	51.8	68.2	69.4	54.0	62.8	68.2	9.11	51.8	***70.6***
Zirconium	mg/kg dw	-	-	4.90	4.90	***5.20***	4.00	3.90	3.70	4.34	4.00	0.666	3.70	***5.20***

Value is > BC Lower Working Sediment Quality Guideline.
Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Reference 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference 95th percentile values see Appendix Table C.2.10.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table C.2.12: Sediment Quality Data for the Quesnel Lake (QUL-LNF1; Exposed) Shallow Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile[b]		QUL-LNF1									
		Lower	Upper	Pre-Breach (QUL-LNF1; 2007)	Reference (QUL-LREF1; 2014 to 2023)	QUL-LNF1-1	QUL-LNF1-2	QUL-LNF1-3	QUL-LNF1-4	QUL-LNF1-5	Mean	Median	Standard Deviation	Minimum	Maximum
						20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24					
Physical Tests															
Moisture	%	-	-	-	44.8	24.8	21.8	26.4	23.6	25.6	24.4	24.8	1.80	21.8	26.4
pH (1:2 soil:water)	pH	-	-	-	5.89	8.73	8.56	8.68	8.61	8.68	8.65	8.68	0.0669	8.56	8.73
Particle Size															
% Gravel (>2 mm)	%	-	-	7.00	5.40	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
% Sand (2.0 mm - 0.063 mm)	%	-	-	58.0	76.8	***94.7***	***97.1***	***97.3***	***97.0***	***97.7***	***96.8***	***97.1***	1.18	***94.7***	***97.7***
% Silt (0.063 mm - 4 µm)	%	-	-	53.0	44.9	5.30	2.90	2.70	2.90	2.20	3.20	2.90	1.21	2.20	5.30
% Clay (<4 µm)	%	-	-	9.00	4.99	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
Organic / Inorganic Carbon (<63 µm)[c]															
Total Organic Carbon	%	-	-	2.45	1.86	0.293	0.505	0.491	0.401	0.415	0.421	0.415	0.0848	0.293	0.505
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	-	0.101	<0.02	0.0280	<0.02	<0.02	0.0230	0.0222	<0.0215	0.00283	<0.02	0.0280
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg	-	-	12,500	17,100	13,700	***17,300***	***17,900***	16,500	***17,800***	16,640	***17,300***	1,734	13,700	***17,900***
Antimony	mg/kg	-	-	<10.0	0.350	***0.520***	***0.560***	***0.530***	***0.500***	***0.580***	***0.538***	***0.530***	0.0319	***0.500***	***0.580***
Arsenic	mg/kg	5.9	17	7.50	5.71	***17.5***	***18.4***	***16.6***	***17.8***	***19.9***	***18.0***	***17.8***	1.23	***16.6***	***19.9***
Barium	mg/kg	-	-	91.4	144	119	***157***	***187***	***160***	***156***	***156***	***157***	24.2	119	***187***
Beryllium	mg/kg	-	-	<0.50	0.450	***0.530***	***0.630***	***0.630***	***0.600***	***0.650***	***0.608***	***0.630***	0.0471	***0.530***	***0.650***
Bismuth	mg/kg	-	-	<20.0	0.130	***0.150***	***0.160***	0.130	***0.140***	***0.170***	***0.150***	***0.150***	0.0158	0.130	***0.170***
Boron	mg/kg	-	-	-	<5	7.50	8.80	8.50	8.90	9.80	8.70	8.80	0.828	7.50	9.80
Cadmium	mg/kg	0.6	3.5	<0.50	0.368	0.252	0.318	0.265	0.323	***0.369***	0.305	0.318	0.0474	0.252	***0.369***
Calcium	mg/kg	-	-	5,660	8,740	***26,900***	***24,200***	***27,100***	***23,900***	***30,200***	***26,460***	***26,900***	2,562	***23,900***	***30,200***
Chromium	mg/kg	37.3	90	32.3	60.3	***61.8***	42.3	31.8	42.7	38.7	43.5	42.3	11.1	31.8	***61.8***
Cobalt	mg/kg	-	-	9.60	12.9	***37.9***	***24.5***	***20.6***	***24.5***	***23.0***	***26.1***	***24.5***	6.79	***20.6***	***37.9***
Copper	mg/kg	35.7	197	29.6	35.8	***1,370***	***1,640***	***1,710***	***1,640***	***2,180***	***1,708***	***1,640***	294	***1,370***	***2,180***
Iron	mg/kg	21,200	43,766	23,100	28,000	***227,000***	***103,000***	***74,400***	***108,000***	***92,400***	***120,960***	***103,000***	60,660	***74,400***	***227,000***
Lead	mg/kg	35	91.3	<30.0	6.47	***7.93***	***9.08***	***7.76***	***8.64***	***9.20***	***8.52***	***8.64***	0.655	***7.76***	***9.20***
Lithium	mg/kg	-	-	13.2	13.7	***15.2***	***17.5***	***17.5***	***15.4***	***17.6***	***16.6***	***17.5***	1.23	***15.2***	***17.6***
Magnesium	mg/kg	-	-	5,770	8,310	***8,550***	***10,400***	***10,400***	***9,100***	***10,200***	***9,730***	***10,200***	853	***8,550***	***10,400***
Manganese	mg/kg	460	1,100	514	433	***968***	***1,080***	***862***	***1,120***	***1,060***	***1,018***	***1,060***	103	***862***	***1,120***
Mercury	mg/kg	0.17	0.486	0.0729	0.0471	***0.0928***	***0.130***	***0.110***	***0.138***	***0.144***	***0.123***	***0.130***	0.0212	***0.0928***	***0.144***
Molybdenum	mg/kg	25	23,000	<4.0	1.02	***6.61***	***5.31***	***5.62***	***4.55***	***6.22***	***5.66***	***5.62***	0.802	***4.55***	***6.61***
Nickel	mg/kg	16	75	21.1	34.4	24.4	24.4	20.8	22.7	22.7	23.0	22.7	1.49	20.8	24.4
Phosphorus	mg/kg	-	-	-	1,280	1,880	1,800	1,750	1,760	1,970	1,832	1,800	92.6	1,750	1,970
Potassium	mg/kg	-	-	890	1,470	810	1,140	1,210	1,080	1,190	1,086	1,140	162	810	1,210
Selenium	mg/kg	2	-	<2.0	0.880	***1.83***	***1.60***	***1.61***	***1.56***	***2.16***	***1.75***	***1.61***	0.251	***1.56***	***2.16***
Silver	mg/kg	0.5	-	<2.0	0.172	***0.672***	***0.763***	***0.689***	***0.799***	***0.977***	***0.780***	***0.763***	0.122	***0.672***	***0.977***
Sodium	mg/kg	-	-	240	538	412	***590***	***703***	***594***	***600***	***580***	***594***	105	412	***703***
Strontium	mg/kg	-	-	58.5	82.0	***97.1***	***126***	***150***	***130***	***140***	***129***	***130***	19.9	***97.1***	***150***
Sulphur[d]	mg/kg	-	-	-	720	1,070	770	920	940	920	924	920	106	770	1,070
Thallium	mg/kg	-	-	<1.0	0.138	<0.05	0.0560	<0.05	0.0540	0.0550	0.0530	0.0540	0	<0.05	0.0560
Tin	mg/kg	-	-	<5.0	0.550	***1.43***	***1.04***	***1.10***	***1.04***	***1.34***	***1.19***	***1.10***	0.182	***1.04***	***1.43***
Titanium	mg/kg	-	-	607	1,220	***1,630***	***1,500***	***1,520***	1,180	***1,560***	***1,478***	***1,520***	174	1,180	***1,630***
Uranium	mg/kg	-	-	-	1.41	1.34	1.28	1.09	1.24	1.30	1.25	1.28	0.0964	1.09	1.34
Vanadium	mg/kg	-	-	54.9	69.9	***912***	***400***	***286***	***422***	***363***	***477***	***400***	249	***286***	***912***
Zinc	mg/kg	123	315	46.7	70.4	***111***	***96.3***	***81.3***	***84.2***	***91.3***	***92.8***	***91.3***	11.7	***81.3***	***111***
Zirconium	mg/kg	-	-	-	4.90	5.50	6.60	7.30	4.40	6.90	6.14	6.60	1.18	4.40	7.30

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: ***Bold/ Italics*** indicates exposed value is > both reference and pre-breach (QUL-LNF; 2007) 95th percentile value (<5th percentile value for pH). Reference or pre-breach 95th percentiles that were reported as < the laboratory reporting limit were not used for screening. "-" = no current BC Working Sediment Quality Guidelines/ no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] The 5th percentile is reported and screened for the pH reference data. For calculation of reference and pre-breach 95th percentile values, see Appendix Tables C.2.10 and C.2.12, respectively.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table C.2.12).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

APPENDIX C.3
PLANKTON COMMUNITY AND PRODUCTIVITY

Table C.3.1: Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (cells/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Chlorophyll-a (µg/L)	Diatom (cells/L)	Chlorophyte (cells/L)	Chrysophyte (cells/L)	Cryptomonad (cells/L)	Cyanobacteria (cells/L)	Dinoflagellates (cells/L)
2019	BOL-B2	Reference	Jun 25	-	16,710,532	19	0.114	0.0594	2.03	80,380	168,799	417,979	257,218	15,778,118	8,038
			Jul 31	1	16,818,503	17	0.135	0.0680	2.58	48,228	116,552	522,473	156,742	15,974,508	0
			Jul 31	2	13,739,324	23	0.286	0.0609	2.49	63,156	688,976	1,016,239	206,693	11,758,519	5,741
			Jul 31	3	20,677,883	24	0.173	0.0504	2.71	16,076	152,723	614,911	257,218	19,636,956	0
			Jul 31	4	18,345,174	20	0.118	0.0567	2.91	20,095	337,598	534,530	188,894	17,264,057	0
			Jul 31	5	15,019,218	17	0.131	0.0677	3.10	10,717	401,902	324,201	88,419	14,193,978	0
			Sep 4	-	5,919,483	25	0.334	0.0601	0.0910	6,430	181,660	41,798	141,470	5,522,403	6,430
	POL-P2	Exposed	Jun 24	-	3,958,740	21	0.464	0.0889	1.40	18,755	100,476	95,117	99,136	3,642,576	0
			Jul 29	1	25,314,116	17	0.143	0.0686	2.18	114,829	172,244	895,668	126,312	23,999,321	5,741
			Jul 29	2	19,520,978	13	0.181	0.0939	2.69	45,932	482,283	1,194,225	114,829	17,677,968	0
			Jul 29	3	16,181,958	16	0.284	0.0873	2.26	63,156	235,400	1,010,498	149,278	14,723,626	0
			Jul 29	4	12,479,073	17	0.225	0.0759	2.60	64,304	281,332	795,767	92,438	11,241,213	4,019
			Jul 29	5	21,754,408	14	0.146	0.0836	2.58	40,190	206,693	970,307	132,054	20,405,164	0
			Aug 28	-	732,162	15	0.655	0.193	0.400	42,811	61,159	32,327	151,150	444,714	0
2020	BOL-B2	Reference	Jun 22	-	1,240,656	21	0.786	0.222	2.47	234,152	559,169	132,803	178,235	136,297	0
			Jul 29	1	15,951,510	25	0.120	0.0455	1.39	34,162	62,295	40,190	245,161	15,567,693	2,010
			Jul 29	2	16,813,067	20	0.129	0.0574	1.94	0	68,149	43,685	174,740	16,526,493	0
			Jul 29	3	14,903,672	20	0.191	0.0618	2.10	4,728	134,756	42,554	257,690	14,463,944	0
			Jul 29	4	15,433,056	19	0.230	0.0683	2.59	4,728	156,033	101,658	210,408	14,960,229	0
			Jul 29	5	15,745,121	16	0.160	0.0744	2.24	2,364	99,294	66,196	226,957	15,350,311	0
			Aug 30	-	13,795,274	16	0.566	0.144	2.38	0	287,515	58,740	191,677	13,257,343	0
	POL-P2	Exposed	Jun 22	-	696,631	21	0.775	0.212	1.20	135,307	77,701	8,038	187,554	282,671	5,359
			Jul 27	1	7,654,935	21	0.399	0.0792	1.57	12,366	420,452	491,558	247,325	6,480,143	3,092
			Jul 27	2	8,306,655	17	0.496	0.117	2.04	8,038	357,693	622,949	305,446	7,008,510	4,019
			Jul 27	3	5,379,539	17	0.332	0.0881	1.62	32,748	226,256	339,384	297,706	4,483,446	0
			Jul 27	4	11,202,774	18	0.181	0.0678	1.83	9,275	228,775	404,994	287,515	10,269,124	3,092
			Jul 27	5	9,006,513	16	0.196	0.0777	1.75	5,359	222,386	332,239	214,348	8,226,822	5,359
			Aug 30	-	7,656,332	17	0.673	0.180	2.68	10,717	345,636	219,707	251,859	6,825,733	2,679
2021	BOL-B2	Reference	Jun 22	-	2,824,035	23	0.773	0.192	20.2	58,946	428,696	916,338	187,554	1,232,501	0
			Jul 27	1	2,668,930	19	0.315	0.0768	1.50	4,466	56,564	50,610	324,499	2,228,326	2,977
			Jul 27	2	3,038,383	24	0.256	0.0560	1.65	16,076	53,051	32,152	323,130	2,604,328	3,215
			Jul 27	3	4,013,088	20	0.262	0.0678	1.72	12,179	36,537	30,447	213,130	3,717,141	3,654
			Jul 27	4	5,506,064	19	0.191	0.0651	1.55	13,397	28,011	32,883	226,527	5,200,375	1,218
			Jul 27	5	3,461,184	20	0.245	0.0662	1.96	38,583	56,266	20,899	326,345	3,019,092	0
			Aug 30	-	5,314,570	27	0.501	0.0742	2.30	23,641	267,147	104,022	276,603	4,631,335	9,457
	POL-P2	Exposed	Jun 22	-	3,443,995	17	0.493	0.116	1.69	43,282	86,564	680,143	219,501	2,411,415	0
			Jul 26	1	7,608,014	19	0.134	0.0608	0.947	26,124	108,514	215,018	176,837	7,081,522	0
			Jul 26	2	5,924,516	15	0.212	0.0846	1.30	2,364	122,935	368,805	182,038	5,248,374	0
			Jul 26	3	5,961,554	13	0.189	0.0948	1.09	11,164	93,777	189,787	305,892	5,360,933	0
			Jul 26	4	4,784,649	13	0.218	0.0984	1.39	0	142,675	172,818	249,180	4,219,976	0
			Jul 26	5	6,664,489	13	0.198	0.0959	1.42	2,364	170,218	196,223	338,071	5,957,614	0
			Aug 30	-	1,697,368	21	0.492	0.0938	1.02	12,057	103,155	14,736	258,557	1,303,504	5,359

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.1: Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (cells/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Chlorophyll-a (µg/L)	Diatom (cells/L)	Chlorophyte (cells/L)	Chrysophyte (cells/L)	Cryptomonad (cells/L)	Cyanobacteria (cells/L)	Dinoflagellates (cells/L)
2022	BOL-B2	Reference	Jun 21	-	2,081,855	28	0.704	0.121	6.28	211,669	80,381	318,843	227,745	1,232,501	10,717
			Jul 26	1	1,921,549	29	0.734	0.130	1.82	69,764	66,731	160,761	142,562	1,480,215	1,517
			Jul 26	2	4,093,135	30	0.684	0.106	2.07	68,409	172,733	198,386	123,136	3,527,051	3,420
			Jul 26	3	2,531,093	26	0.730	0.142	1.94	71,449	64,304	225,065	153,616	2,014,871	1,786
			Jul 26	4	1,928,735	29	0.599	0.0859	2.50	53,587	125,036	207,203	151,830	1,385,720	5,359
			Jul 26	5	3,809,516	30	0.552	0.0744	2.09	19,716	131,945	107,680	151,661	3,398,514	0
			Aug 28	-	1,388,071	31	0.622	0.0852	2.18	35,166	129,614	36,171	45,214	1,137,886	2,010
	POL-P2	Exposed	Jun 21	-	1,026,397	17	0.744	0.230	2.60	510,107	253,508	37,099	166,944	52,556	6,183
			Jul 25	1	4,035,101	15	0.784	0.309	2.57	257,218	375,109	803,805	251,859	2,347,111	0
			Jul 25	2	3,531,383	21	0.861	0.343	2.46	144,685	439,413	841,316	203,631	1,902,338	0
			Jul 25	3	3,933,286	20	0.831	0.295	2.55	198,272	471,566	707,348	246,500	2,309,600	0
			Jul 25	4	6,608,867	16	0.800	0.312	3.78	43,282	636,861	1,174,792	166,944	4,586,988	0
			Jul 25	5	5,177,576	17	0.744	0.230	2.73	128,609	348,315	787,729	289,370	3,618,194	5,359
			Aug 25	-	9,239,164	27	0.461	0.0688	3.47	53,587	251,859	192,913	155,402	8,582,724	2,679
2023	BOL-B2	Reference	Jun 21	-	11,144,520	19	0.339	0.0796	2.30	104,022	661,957	676,142	80,380	9,612,562	9,457
			Jul 27	1	10,457,097	27	0.745	0.145	2.53	58,946	273,294	34,832	243,821	9,822,091	13,397
			Jul 27	2	9,615,605	29	0.679	0.108	2.54	52,422	244,636	118,823	422,871	8,759,378	13,979
			Jul 27	3	11,445,075	29	0.548	0.0763	2.61	77,403	130,990	104,197	342,361	10,775,237	11,908
			Jul 27	4	14,545,958	30	0.479	0.0639	3.08	94,360	216,678	139,792	328,512	13,742,153	10,484
			Jul 27	5	10,606,587	30	0.544	0.0731	2.52	44,656	169,692	244,119	327,476	9,802,782	14,885
			Aug 28	-	11,225,839	17	0.700	0.196	2.62	26,794	68,472	128,013	291,751	10,701,877	8,931
	POL-P2	Exposed	Jun 20	-	1,333,721	22	0.892	0.421	2.64	166,715	270,912	279,843	205,417	410,834	0
			Jul 27	1	27,379,063	23	0.592	0.107	3.56	127,663	151,304	449,185	165,489	26,466,508	18,913
			Jul 27	2	12,573,396	18	0.729	0.205	3.47	30,916	290,606	1,044,946	179,310	11,027,617	0
			Jul 27	3	19,813,853	20	0.531	0.107	4.08	155,402	75,022	825,240	166,120	18,581,352	10,717
			Jul 27	4	16,924,461	19	0.599	0.131	3.89	91,098	101,815	760,935	112,533	15,852,721	5,359
			Jul 27	5	26,894,347	22	0.449	0.0826	3.79	24,732	160,761	1,230,440	111,296	25,342,385	24,732
			Aug 28	-	21,105,397	18	0.674	0.171	4.25	130,618	110,523	3,275,505	221,046	17,327,514	40,190
2024	BOL-B2	Reference	Jun 19	-	2,974,079	24	0.478	0.0798	1.67	94,995	470,104	99,867	82,816	2,214,117	4,872
			Jul 25	1	12,438,776	26	0.410	0.0652	2.25	73,363	239,228	360,436	344,488	11,405,313	3,190
			Jul 25	2	10,948,684	30	0.490	0.0654	1.93	41,707	155,453	246,450	443,609	10,050,090	3,792
			Jul 25	3	11,046,252	22	0.487	0.0886	2.27	15,166	193,368	436,026	360,196	10,011,164	3,792
			Jul 25	4	8,817,741	29	0.523	0.0723	2.41	140,666	277,313	241,142	474,245	7,656,243	4,019
			Jul 25	5	12,538,800	24	0.525	0.0878	2.15	62,518	388,506	392,971	459,955	11,225,918	8,931
			Aug 26	-	7,477,958	23	0.748	0.173	2.27	3,654	266,717	54,805	314,215	6,823,953	10,961
	POL-P2	Exposed	Jun 19	-	1,152,533	29	0.785	0.161	1.04	50,702	70,488	103,876	116,243	809,988	1,237
			Jul 23	1	7,944,467	13	0.694	0.252	0.940	3,495	164,256	887,680	0	6,889,036	0
			Jul 23	2	6,008,442	14	0.659	0.210	1.24	8,038	64,304	827,919	12,057	5,092,105	4,019
			Jul 23	3	7,909,688	15	0.646	0.188	1.34	24,464	52,422	716,435	6,990	7,109,378	0
			Jul 23	4	7,174,471	20	0.639	0.139	1.26	4,019	116,552	707,348	204,970	6,141,581	0
			Jul 23	5	7,472,098	15	0.645	0.188	1.80	8,038	221,046	916,338	0	6,326,676	0
			Aug 26	-	7,701,226	30	0.576	0.0787	1.19	38,181	132,628	235,113	164,780	7,128,515	2,010

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.1: Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Euglenophytes (cells/L)	Radiophytes (cells/L)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cryptomonads (%)	Cyanobacteria (%)	Dinoflagellates (%)	Euglenophytes (%)	Radiophytes (%)
2019	BOL-B2	Reference	Jun 25	-	0	0	0.481	1.01	2.50	1.54	94.4	0.0481	0	0
			Jul 31	1	0	0	0.287	0.693	3.11	0.932	95.0	0	0	0
			Jul 31	2	0	0	0.460	5.01	7.40	1.50	85.6	0.0418	0	0
			Jul 31	3	0	0	0.0777	0.739	2.97	1.24	95.0	0	0	0
			Jul 31	4	0	0	0.110	1.84	2.91	1.03	94.1	0	0	0
			Jul 31	5	0	0	0.0714	2.68	2.16	0.589	94.5	0	0	0
			Sep 4	-	19,291	0	0.109	3.07	0.706	2.39	93.3	0.109	0.326	0
	POL-P2	Exposed	Jun 24	-	2,679	0	0.474	2.54	2.40	2.50	92.0	0	0.0677	0
			Jul 29	1	0	0	0.454	0.680	3.54	0.499	94.8	0.0227	0	0
			Jul 29	2	5,741	0	0.235	2.47	6.12	0.588	90.6	0	0.0294	0
			Jul 29	3	0	0	0.390	1.45	6.24	0.922	91.0	0	0	0
			Jul 29	4	0	0	0.515	2.25	6.38	0.741	90.1	0.0322	0	0
			Jul 29	5	0	0	0.185	0.950	4.46	0.607	93.8	0	0	0
			Aug 28	-	0	0	5.85	8.35	4.42	20.6	60.7	0	0	0
2020	BOL-B2	Reference	Jun 22	-	0	0	18.9	45.1	10.7	14.4	11.0	0	0	0
			Jul 29	1	0	0	0.214	0.391	0.252	1.54	97.6	0.0126	0	0
			Jul 29	2	0	0	0	0.405	0.260	1.04	98.3	0	0	0
			Jul 29	3	0	0	0.0317	0.904	0.286	1.73	97.0	0	0	0
			Jul 29	4	0	0	0.0306	1.01	0.659	1.36	96.9	0	0	0
			Jul 29	5	0	0	0.0150	0.631	0.420	1.44	97.5	0	0	0
			Aug 30	-	0	0	0	2.08	0.426	1.39	96.1	0	0	0
	POL-P2	Exposed	Jun 22	-	0	0	19.4	11.2	1.15	26.9	40.6	0.769	0	0
			Jul 27	1	0	0	0.162	5.49	6.42	3.23	84.7	0.0404	0	0
			Jul 27	2	0	0	0.0968	4.31	7.50	3.68	84.4	0.0484	0	0
			Jul 27	3	0	0	0.609	4.21	6.31	5.53	83.3	0	0	0
			Jul 27	4	0	0	0.0828	2.04	3.62	2.57	91.7	0.0276	0	0
			Jul 27	5	0	0	0.0595	2.47	3.69	2.38	91.3	0.0595	0	0
			Aug 30	-	0	0	0.140	4.51	2.87	3.29	89.2	0.0350	0	0
2021	BOL-B2	Reference	Jun 22	-	0	0	2.09	15.2	32.5	6.64	43.6	0	0	0
			Jul 27	1	1,489	0	0.167	2.12	1.90	12.2	83.5	0.112	0.0558	0
			Jul 27	2	6,430	0	0.529	1.75	1.06	10.6	85.7	0.106	0.212	0
			Jul 27	3	0	0	0.303	0.910	0.759	5.31	92.6	0.0910	0	0
			Jul 27	4	3,654	0	0.243	0.509	0.597	4.11	94.5	0.0221	0.0664	0
			Jul 27	5	0	0	1.11	1.63	0.604	9.43	87.2	0	0	0
			Aug 30	-	2,364	0	0.445	5.03	1.96	5.20	87.1	0.178	0.0445	0
	POL-P2	Exposed	Jun 22	-	3,092	0	1.26	2.51	19.8	6.37	70.0	0	0.0898	0
			Jul 26	1	0	0	0.343	1.43	2.83	2.32	93.1	0	0	0
			Jul 26	2	0	0	0.0399	2.08	6.23	3.07	88.6	0	0	0
			Jul 26	3	0	0	0.187	1.57	3.18	5.13	89.9	0	0	0
			Jul 26	4	0	0	0	2.98	3.61	5.21	88.2	0	0	0
			Jul 26	5	0	0	0.0355	2.55	2.94	5.07	89.4	0	0	0
			Aug 30	-	0	0	0.710	6.08	0.868	15.2	76.8	0.316	0	0

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.1: Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Euglenophytes (cells/L)	Radiophytes (cells/L)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cryptomonads (%)	Cyanobacteria (%)	Dinoflagellates (%)	Euglenophytes (%)	Radiophytes (%)
2022	BOL-B2	Reference	Jun 21	-	0	0	10.2	3.86	15.3	10.9	59.2	0.515	0	0
			Jul 26	1	0	0	3.63	3.47	8.37	7.42	77.0	0.0789	0	0
			Jul 26	2	0	0	1.67	4.22	4.85	3.01	86.2	0.0836	0	0
			Jul 26	3	0	0	2.82	2.54	8.89	6.07	79.6	0.0706	0	0
			Jul 26	4	0	0	2.78	6.48	10.7	7.87	71.8	0.278	0	0
			Jul 26	5	0	0	0.518	3.46	2.83	3.98	89.2	0	0	0
			Aug 28	-	2,010	0	2.53	9.34	2.61	3.26	82.0	0.145	0.145	0
	POL-P2	Exposed	Jun 21	-	0	0	49.7	24.7	3.61	16.3	5.12	0.602	0	0
			Jul 25	1	0	0	6.37	9.30	19.9	6.24	58.2	0	0	0
			Jul 25	2	0	0	4.10	12.4	23.8	5.77	53.9	0	0	0
			Jul 25	3	0	0	5.04	12.0	18.0	6.27	58.7	0	0	0
			Jul 25	4	0	0	0.655	9.64	17.8	2.53	69.4	0	0	0
			Jul 25	5	0	0	2.48	6.73	15.2	5.59	69.9	0.103	0	0
			Aug 25	-	0	0	0.580	2.73	2.09	1.68	92.9	0.0290	0	0
2023	BOL-B2	Reference	Jun 21	-	0	0	0.933	5.94	6.07	0.721	86.2	0.0849	0	0
			Jul 27	1	10,717	0	0.564	2.61	0.333	2.33	93.9	0.128	0.102	0
			Jul 27	2	3,495	0	0.545	2.54	1.24	4.40	91.1	0.145	0.0363	0
			Jul 27	3	2,977	0	0.676	1.14	0.910	2.99	94.2	0.104	0.0260	0
			Jul 27	4	13,979	0	0.649	1.49	0.961	2.26	94.5	0.0721	0.0961	0
			Jul 27	5	2,977	0	0.421	1.60	2.30	3.09	92.4	0.140	0.0281	0
			Aug 28	-	0	0	0.239	0.610	1.14	2.60	95.3	0.0796	0	0
	POL-P2	Exposed	Jun 20	-	0	0	12.5	20.3	21.0	15.4	30.8	0	0	0
			Jul 27	1	0	0	0.466	0.553	1.64	0.604	96.7	0.0691	0	0
			Jul 27	2	0	0	0.246	2.31	8.31	1.43	87.7	0	0	0
			Jul 27	3	0	0	0.784	0.379	4.16	0.838	93.8	0.0541	0	0
			Jul 27	4	0	0	0.538	0.602	4.50	0.665	93.7	0.0317	0	0
			Jul 27	5	0	0	0.0920	0.598	4.58	0.414	94.2	0.0920	0	0
			Aug 28	-	0	0	0.619	0.524	15.5	1.05	82.1	0.190	0	0
2024	BOL-B2	Reference	Jun 19	-	7,307	0	3.19	15.8	3.36	2.78	74.5	0.164	0.246	0
			Jul 25	1	12,759	0	0.590	1.92	2.90	2.77	91.7	0.0256	0.103	0
			Jul 25	2	3,792	0	0.381	1.42	2.25	4.05	91.8	0.0346	0.0346	0
			Jul 25	3	26,541	0	0.137	1.75	3.95	3.26	90.6	0.0343	0.240	0
			Jul 25	4	20,095	4,019	1.60	3.14	2.73	5.38	86.8	0.0456	0.228	0.0456
			Jul 25	5	0	0	0.499	3.10	3.13	3.67	89.5	0.0712	0	0
			Aug 26	-	3,654	0	0.0489	3.57	0.733	4.20	91.2	0.147	0.0489	0
	POL-P2	Exposed	Jun 19	-	0	0	4.40	6.12	9.01	10.1	70.3	0.107	0	0
			Jul 23	1	0	0	0.0440	2.07	11.2	0	86.7	0	0	0
			Jul 23	2	0	0	0.134	1.07	13.8	0.201	84.8	0.0669	0	0
			Jul 23	3	0	0	0.309	0.663	9.06	0.0884	89.9	0	0	0
			Jul 23	4	0	0	0.0560	1.62	9.86	2.86	85.6	0	0	0
			Jul 23	5	0	0	0.108	2.96	12.3	0	84.7	0	0	0
			Aug 26	-	0	0	0.496	1.72	3.05	2.14	92.6	0.0261	0	0

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.2: Summary Statistics for Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (cells/L)	2019	BOL-B2	Reference	5	16,920,021	2,733,715	13,739,324	16,818,503	20,677,883
		POL-P2	Exposed	5	19,050,107	4,954,229	12,479,073	19,520,978	25,314,116
	2020	BOL-B2	Reference	5	15,769,285	704,558	14,903,672	15,745,121	16,813,067
		POL-P2	Exposed	5	8,310,083	2,113,646	5,379,539	8,306,655	11,202,774
	2021	BOL-B2	Reference	5	3,737,530	1,108,008	2,668,930	3,461,184	5,506,064
		POL-P2	Exposed	5	6,188,644	1,040,862	4,784,649	5,961,554	7,608,014
	2022	BOL-B2	Reference	5	2,856,805	1,034,200	1,921,549	2,531,093	4,093,135
		POL-P2	Exposed	5	4,657,243	1,250,831	3,531,383	4,035,101	6,608,867
	2023	BOL-B2	Reference	5	11,334,064	1,909,187	9,615,605	10,606,587	14,545,958
		POL-P2	Exposed	5	20,717,024	6,404,296	12,573,396	19,813,853	27,379,063
	2024	BOL-B2	Reference	5	11,158,051	1,506,661	8,817,741	11,046,252	12,538,800
		POL-P2	Exposed	5	7,301,833	790,654	6,008,442	7,472,098	7,944,467
Richness (# of Taxa)	2019	BOL-B2	Reference	5	20	3.27	17	20	24
		POL-P2	Exposed	5	15	1.82	13	16	17
	2020	BOL-B2	Reference	5	20	3.24	16	20	25
		POL-P2	Exposed	5	18	1.92	16	17	21
	2021	BOL-B2	Reference	5	20	2.07	19	20	24
		POL-P2	Exposed	5	15	2.61	13	13	19
	2022	BOL-B2	Reference	5	29	1.64	26	29	30
		POL-P2	Exposed	5	18	2.59	15	17	21
	2023	BOL-B2	Reference	5	29	1.22	27	29	30
		POL-P2	Exposed	5	20	2.07	18	20	23
	2024	BOL-B2	Reference	5	26	3.35	22	26	30
		POL-P2	Exposed	5	15	2.70	13	15	20
Simpson's Diversity	2019	BOL-B2	Reference	5	0.168	0.0686	0.118	0.135	0.286
		POL-P2	Exposed	5	0.196	0.0595	0.143	0.181	0.284
	2020	BOL-B2	Reference	5	0.166	0.0453	0.120	0.160	0.230
		POL-P2	Exposed	5	0.321	0.134	0.181	0.332	0.496
	2021	BOL-B2	Reference	5	0.254	0.0442	0.191	0.256	0.315
		POL-P2	Exposed	5	0.190	0.0333	0.134	0.198	0.218
	2022	BOL-B2	Reference	5	0.660	0.0813	0.552	0.684	0.734
		POL-P2	Exposed	5	0.804	0.0448	0.744	0.800	0.861
	2023	BOL-B2	Reference	5	0.599	0.109	0.479	0.548	0.745
		POL-P2	Exposed	5	0.580	0.103	0.449	0.592	0.729
	2024	BOL-B2	Reference	5	0.487	0.0466	0.410	0.490	0.525
		POL-P2	Exposed	5	0.657	0.0222	0.639	0.646	0.694
Simpson's Evenness	2019	BOL-B2	Reference	5	0.0607	0.00749	0.0504	0.0609	0.0680
		POL-P2	Exposed	5	0.0819	0.00985	0.0686	0.0836	0.0939
	2020	BOL-B2	Reference	5	0.0615	0.0110	0.0455	0.0618	0.0744
		POL-P2	Exposed	5	0.0859	0.0186	0.0678	0.0792	0.117
	2021	BOL-B2	Reference	5	0.0664	0.00743	0.0560	0.0662	0.0768
		POL-P2	Exposed	5	0.0869	0.0155	0.0608	0.0948	0.0984
	2022	BOL-B2	Reference	5	0.108	0.0287	0.0744	0.106	0.142
		POL-P2	Exposed	5	0.298	0.0420	0.230	0.309	0.343
	2023	BOL-B2	Reference	5	0.0932	0.0333	0.0639	0.0763	0.145
		POL-P2	Exposed	5	0.126	0.0473	0.0826	0.107	0.205
	2024	BOL-B2	Reference	5	0.0758	0.0116	0.0652	0.0723	0.0886
		POL-P2	Exposed	5	0.195	0.0409	0.139	0.188	0.252
Chlorophyll-a (µg/L)	2019	BOL-B2	Reference	5	2.76	0.248	2.49	2.71	3.10
		POL-P2	Exposed	5	2.46	0.227	2.18	2.58	2.69
	2020	BOL-B2	Reference	5	2.05	0.441	1.39	2.10	2.59
		POL-P2	Exposed	5	1.76	0.186	1.57	1.75	2.04
	2021	BOL-B2	Reference	5	1.68	0.180	1.50	1.65	1.96
		POL-P2	Exposed	5	1.23	0.204	0.947	1.30	1.42
	2022	BOL-B2	Reference	5	2.08	0.257	1.82	2.07	2.50
		POL-P2	Exposed	5	2.82	0.547	2.46	2.57	3.78
	2023	BOL-B2	Reference	5	2.66	0.240	2.52	2.54	3.08
		POL-P2	Exposed	5	3.76	0.247	3.47	3.79	4.08
	2024	BOL-B2	Reference	5	2.20	0.178	1.93	2.25	2.41
		POL-P2	Exposed	5	1.32	0.310	0.940	1.26	1.80
Diatoms (cells/L)	2019	BOL-B2	Reference	5	31,655	22,813	10,717	20,095	63,156
		POL-P2	Exposed	5	65,682	29,426	40,190	63,156	114,829
	2020	BOL-B2	Reference	5	9,196	14,093	0	4,728	34,162
		POL-P2	Exposed	5	13,557	11,019	5,359	9,275	32,748
	2021	BOL-B2	Reference	5	16,940	12,845	4,466	13,397	38,583
		POL-P2	Exposed	5	8,403	10,784	0	2,364	26,124
	2022	BOL-B2	Reference	5	56,585	21,810	19,716	68,409	71,449
		POL-P2	Exposed	5	154,413	80,005	43,282	144,685	257,218
	2023	BOL-B2	Reference	5	65,557	20,143	44,656	58,946	94,360
		POL-P2	Exposed	5	85,962	57,807	24,732	91,098	155,402
	2024	BOL-B2	Reference	5	66,684	46,939	15,166	62,518	140,666
		POL-P2	Exposed	5	9,611	8,577	3,495	8,038	24,464
Chlorophyte (cells/L)	2019	BOL-B2	Reference	5	339,550	229,468	116,552	337,598	688,976
		POL-P2	Exposed	5	275,590	122,268	172,244	235,400	482,283
	2020	BOL-B2	Reference	5	104,105	40,927	62,295	99,294	156,033
		POL-P2	Exposed	5	291,113	92,165	222,386	228,775	420,452
	2021	BOL-B2	Reference	5	46,086	13,037	28,011	53,051	56,564
		POL-P2	Exposed	5	127,624	29,890	93,777	122,935	170,218
	2022	BOL-B2	Reference	5	112,150	46,315	64,304	125,036	172,733
		POL-P2	Exposed	5	454,253	113,305	348,315	439,413	636,861
	2023	BOL-B2	Reference	5	207,058	57,171	130,990	216,678	273,294
		POL-P2	Exposed	5	155,902	83,152	75,022	151,304	290,606
	2024	BOL-B2	Reference	5	250,773	89,707	155,453	239,228	388,506
		POL-P2	Exposed	5	123,716	70,322	52,422	116,552	221,046
Chrysophyte (cells/L)	2019	BOL-B2	Reference	5	602,471	254,857	324,201	534,530	1,016,239
		POL-P2	Exposed	5	973,293	148,109	795,767	970,307	1,194,225
	2020	BOL-B2	Reference	5	58,857	26,125	40,190	43,685	101,658
		POL-P2	Exposed	5	438,225	121,526	332,239	404,994	622,949
	2021	BOL-B2	Reference	5	33,398	10,759	20,899	32,152	50,610
		POL-P2	Exposed	5	228,530	79,856	172,818	196,223	368,805
	2022	BOL-B2	Reference	5	179,819	46,661	107,680	198,386	225,065
		POL-P2	Exposed	5	862,998	181,026	707,348	803,805	1,174,792
	2023	BOL-B2	Reference	5	128,353	75,751	34,832	118,823	244,119
		POL-P2	Exposed	5	862,149	296,310	449,185	825,240	1,230,440
	2024	BOL-B2	Reference	5	335,405	87,840	241,142	360,436	436,026
		POL-P2	Exposed	5	811,144	96,110	707,348	827,919	916,338

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.1.

Table C.3.2: Summary Statistics for Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Cryptomonad (cells/L)	2019	BOL-B2	Reference	5	179,593	62,613	88,419	188,894	257,218
		POL-P2	Exposed	5	122,982	21,120	92,438	126,312	149,278
	2020	BOL-B2	Reference	5	222,991	32,395	174,740	226,957	257,690
		POL-P2	Exposed	5	270,468	38,539	214,348	287,515	305,446
	2021	BOL-B2	Reference	5	282,726	57,624	213,130	323,130	326,345
		POL-P2	Exposed	5	250,404	72,201	176,837	249,180	338,071
	2022	BOL-B2	Reference	5	144,561	12,731	123,136	151,661	153,616
		POL-P2	Exposed	5	231,661	47,256	166,944	246,500	289,370
	2023	BOL-B2	Reference	5	333,008	63,577	243,821	328,512	422,871
		POL-P2	Exposed	5	146,950	32,458	111,296	165,489	179,310
	2024	BOL-B2	Reference	5	416,499	59,820	344,488	443,609	474,245
		POL-P2	Exposed	5	44,803	89,680	0	6,990	204,970
Cyanobacteria (cells/L)	2019	BOL-B2	Reference	5	15,765,604	2,991,785	11,758,519	15,974,508	19,636,956
		POL-P2	Exposed	5	17,609,458	4,937,955	11,241,213	17,677,968	23,999,321
	2020	BOL-B2	Reference	5	15,373,734	769,046	14,463,944	15,350,311	16,526,493
		POL-P2	Exposed	5	7,293,609	2,142,697	4,483,446	7,008,510	10,269,124
	2021	BOL-B2	Reference	5	3,353,852	1,170,714	2,228,326	3,019,092	5,200,375
		POL-P2	Exposed	5	5,573,684	1,049,356	4,219,976	5,360,933	7,081,522
	2022	BOL-B2	Reference	5	2,361,274	1,034,754	1,385,720	2,014,871	3,527,051
		POL-P2	Exposed	5	2,952,846	1,117,738	1,902,338	2,347,111	4,586,988
	2023	BOL-B2	Reference	5	10,580,328	1,905,944	8,759,378	9,822,091	13,742,153
		POL-P2	Exposed	5	19,454,117	6,491,976	11,027,617	18,581,352	26,466,508
	2024	BOL-B2	Reference	5	10,069,746	1,495,768	7,656,243	10,050,090	11,405,313
		POL-P2	Exposed	5	6,311,755	788,382	5,092,105	6,326,676	7,109,378
Dinoflagellates (cells/L)	2019	BOL-B2	Reference	5	1,148	2,568	0	0	5,741
		POL-P2	Exposed	5	1,952	2,742	0	0	5,741
	2020	BOL-B2	Reference	5	402	899	0	0	2,010
		POL-P2	Exposed	5	3,112	1,972	0	3,092	5,359
	2021	BOL-B2	Reference	5	2,213	1,545	0	2,977	3,654
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	2,416	2,044	0	1,786	5,359
		POL-P2	Exposed	5	1,072	2,396	0	0	5,359
	2023	BOL-B2	Reference	5	12,931	1,744	10,484	13,397	14,885
		POL-P2	Exposed	5	11,944	9,996	0	10,717	24,732
	2024	BOL-B2	Reference	5	4,745	2,361	3,190	3,792	8,931
		POL-P2	Exposed	5	804	1,797	0	0	4,019
Euglenophytes (cells/L)	2019	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	1,148	2,568	0	0	5,741
	2020	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2021	BOL-B2	Reference	5	2,315	2,745	0	1,489	6,430
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2023	BOL-B2	Reference	5	6,829	5,173	2,977	3,495	13,979
		POL-P2	Exposed	5	0	0	0	0	0
	2024	BOL-B2	Reference	5	12,637	11,033	0	12,759	26,541
		POL-P2	Exposed	5	0	0	0	0	0
Radiophytes (cells/L)	2019	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2020	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2021	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2023	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2024	BOL-B2	Reference	5	804	1,797	0	0	4,019
		POL-P2	Exposed	5	0	0	0	0	0
Diatoms (%)	2019	BOL-B2	Reference	5	0.201	0.169	0.0714	0.110	0.460
		POL-P2	Exposed	5	0.356	0.141	0.185	0.390	0.515
	2020	BOL-B2	Reference	5	0.0583	0.0881	0	0.0306	0.214
		POL-P2	Exposed	5	0.202	0.231	0.0595	0.0968	0.609
	2021	BOL-B2	Reference	5	0.472	0.384	0.167	0.303	1.11
		POL-P2	Exposed	5	0.121	0.144	0	0.0399	0.343
	2022	BOL-B2	Reference	5	2.28	1.21	0.518	2.78	3.63
		POL-P2	Exposed	5	3.73	2.23	0.655	4.10	6.37
	2023	BOL-B2	Reference	5	0.571	0.100	0.421	0.564	0.676
		POL-P2	Exposed	5	0.425	0.268	0.0920	0.466	0.784
	2024	BOL-B2	Reference	5	0.640	0.560	0.137	0.499	1.60
		POL-P2	Exposed	5	0.130	0.107	0.0440	0.108	0.309
Chlorophytes (%)	2019	BOL-B2	Reference	5	2.19	1.78	0.693	1.84	5.01
		POL-P2	Exposed	5	1.56	0.786	0.680	1.45	2.47
	2020	BOL-B2	Reference	5	0.668	0.283	0.391	0.631	1.01
		POL-P2	Exposed	5	3.70	1.42	2.04	4.21	5.49
	2021	BOL-B2	Reference	5	1.38	0.656	0.509	1.63	2.12
		POL-P2	Exposed	5	2.12	0.655	1.43	2.08	2.98
	2022	BOL-B2	Reference	5	4.04	1.49	2.54	3.47	6.48
		POL-P2	Exposed	5	10.0	2.31	6.73	9.64	12.4
	2023	BOL-B2	Reference	5	1.88	0.662	1.14	1.60	2.61
		POL-P2	Exposed	5	0.888	0.801	0.379	0.598	2.31
	2024	BOL-B2	Reference	5	2.27	0.801	1.42	1.92	3.14
		POL-P2	Exposed	5	1.68	0.894	0.663	1.62	2.96
Chrysophytes (%)	2019	BOL-B2	Reference	5	3.71	2.09	2.16	2.97	7.40
		POL-P2	Exposed	5	5.35	1.28	3.54	6.12	6.38
	2020	BOL-B2	Reference	5	0.375	0.172	0.252	0.286	0.659
		POL-P2	Exposed	5	5.51	1.76	3.62	6.31	7.50
	2021	BOL-B2	Reference	5	0.983	0.544	0.597	0.759	1.90
		POL-P2	Exposed	5	3.76	1.41	2.83	3.18	6.23
	2022	BOL-B2	Reference	5	7.13	3.22	2.83	8.37	10.7
		POL-P2	Exposed	5	18.9	3.20	15.2	18.0	23.8
	2023	BOL-B2	Reference	5	1.15	0.724	0.333	0.961	2.30
		POL-P2	Exposed	5	4.64	2.38	1.64	4.50	8.31
	2024	BOL-B2	Reference	5	2.99	0.624	2.25	2.90	3.95
		POL-P2	Exposed	5	11.2	1.88	9.06	11.2	13.8

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.1.

Table C.3.2: Summary Statistics for Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Cryptomonads (%)	2019	BOL-B2	Reference	5	1.06	0.343	0.589	1.03	1.50
		POL-P2	Exposed	5	0.671	0.165	0.499	0.607	0.922
	2020	BOL-B2	Reference	5	1.42	0.254	1.04	1.44	1.73
		POL-P2	Exposed	5	3.48	1.26	2.38	3.23	5.53
	2021	BOL-B2	Reference	5	8.33	3.47	4.11	9.43	12.2
		POL-P2	Exposed	5	4.16	1.36	2.32	5.07	5.21
	2022	BOL-B2	Reference	5	5.67	2.12	3.01	6.07	7.87
		POL-P2	Exposed	5	5.28	1.57	2.53	5.77	6.27
	2023	BOL-B2	Reference	5	3.01	0.860	2.26	2.99	4.40
		POL-P2	Exposed	5	0.790	0.387	0.414	0.665	1.43
	2024	BOL-B2	Reference	5	3.83	0.990	2.77	3.67	5.38
		POL-P2	Exposed	5	0.629	1.25	0	0.0884	2.86
Cyanobacteria (%)	2019	BOL-B2	Reference	5	92.8	4.07	85.6	94.5	95.0
		POL-P2	Exposed	5	92.0	2.11	90.1	91.0	94.8
	2020	BOL-B2	Reference	5	97.5	0.538	96.9	97.5	98.3
		POL-P2	Exposed	5	87.1	4.07	83.3	84.7	91.7
	2021	BOL-B2	Reference	5	88.7	4.65	83.5	87.2	94.5
		POL-P2	Exposed	5	89.8	1.93	88.2	89.4	93.1
	2022	BOL-B2	Reference	5	80.8	6.99	71.8	79.6	89.2
		POL-P2	Exposed	5	62.0	7.22	53.9	58.7	69.9
	2023	BOL-B2	Reference	5	93.2	1.42	91.1	93.9	94.5
		POL-P2	Exposed	5	93.2	3.31	87.7	93.8	96.7
	2024	BOL-B2	Reference	5	90.1	2.04	86.8	90.6	91.8
		POL-P2	Exposed	5	86.3	2.15	84.7	85.6	89.9
Dinoflagellates (%)	2019	BOL-B2	Reference	5	0.00836	0.0187	0	0	0.0418
		POL-P2	Exposed	5	0.0110	0.0154	0	0	0.0322
	2020	BOL-B2	Reference	5	0.00252	0.00563	0	0	0.0126
		POL-P2	Exposed	5	0.0352	0.0228	0	0.0404	0.0595
	2021	BOL-B2	Reference	5	0.0661	0.0514	0	0.0910	0.112
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	0.102	0.104	0	0.0789	0.278
		POL-P2	Exposed	5	0.0207	0.0463	0	0	0.103
	2023	BOL-B2	Reference	5	0.118	0.0302	0.0721	0.128	0.145
		POL-P2	Exposed	5	0.0494	0.0353	0	0.0541	0.0920
	2024	BOL-B2	Reference	5	0.0423	0.0177	0.0256	0.0346	0.0712
		POL-P2	Exposed	5	0.0134	0.0299	0	0	0.0669
Euglenophytes (%)	2019	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0.00588	0.0132	0	0	0.0294
	2020	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2021	BOL-B2	Reference	5	0.0668	0.0866	0	0.0558	0.212
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2023	BOL-B2	Reference	5	0.0578	0.0381	0.0260	0.0363	0.102
		POL-P2	Exposed	5	0	0	0	0	0
	2024	BOL-B2	Reference	5	0.121	0.110	0	0.103	0.240
		POL-P2	Exposed	5	0	0	0	0	0
Radiophytes (%)	2019	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2020	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2021	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2022	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2023	BOL-B2	Reference	5	0	0	0	0	0
		POL-P2	Exposed	5	0	0	0	0	0
	2024	BOL-B2	Reference	5	0.00912	0.0204	0	0	0.0456
		POL-P2	Exposed	5	0	0	0	0	0

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.1.

Table C.3.3: Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (organisms/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Wet Weight Biomass (mg/L)	Dry Weight Biomass (mg/L)	Calanoida (organisms/L)	Cladocera (organisms/L)
2019	BOL-B2	Reference	Jun 25	-	36.1	11	0.351	0.140	0.161	0.0319	2.32	1.05
			Jul 31	1	6.31	10	0.653	0.288	0.0162	0.00311	0.101	0.204
			Jul 31	2	3.13	8	0.756	0.511	0.0196	0.00387	0.0725	0.367
			Jul 31	3	4.33	7	0.719	0.508	0.0342	0.00675	0.242	0.395
			Jul 31	4	4.88	9	0.725	0.404	0.0308	0.00608	0.186	0.296
			Jul 31	5	6.42	8	0.732	0.467	0.0377	0.00737	0.134	0.561
			Sep 4	-	1.92	10	0.841	0.629	0.0169	0.00334	0.0216	0.296
	POL-P2	Exposed	Jun 24	-	20.9	8	0.689	0.402	0.204	0.0408	0.0262	2.04
			Jul 29	1	17.4	8	0.473	0.237	0.122	0.0243	0.210	0.252
			Jul 29	2	18.2	10	0.599	0.250	0.163	0.0325	0.183	0.262
			Jul 29	3	5.99	10	0.694	0.327	0.0581	0.0116	0.0905	0.249
			Jul 29	4	4.67	8	0.711	0.433	0.0445	0.00889	0.118	0.219
			Jul 29	5	5.57	10	0.705	0.339	0.0544	0.0109	0.125	0.125
			Aug 28	-	38.4	7	0.646	0.404	0.375	0.0749	0.588	0.849
2020	BOL-B2	Reference	Jun 22	-	68.8	12	0.759	0.346	0.292	0.0575	1.02	4.70
			Jul 29	1	22.8	12	0.762	0.351	0.0729	0.0142	0.523	1.27
			Jul 29	2	27.6	12	0.724	0.302	0.0992	0.0193	0.364	0.909
			Jul 29	3	24.5	10	0.777	0.449	0.0979	0.0191	0.444	1.25
			Jul 29	4	36.7	10	0.729	0.369	0.0901	0.0172	0.525	0.891
			Jul 29	5	24.5	12	0.798	0.412	0.0598	0.0116	0.327	1.07
			Aug 30	-	7.32	7	0.701	0.478	0.0934	0.0185	0.296	1.86
	POL-P2	Exposed	Jun 22	-	44.2	11	0.623	0.241	0.0941	0.0187	0.113	1.58
			Jul 27	1	30.5	8	0.566	0.288	0.125	0.0249	0.340	0.905
			Jul 27	2	20.1	10	0.547	0.221	0.0849	0.0170	0.186	0.584
			Jul 27	3	26.3	7	0.495	0.283	0.118	0.0236	0.218	0.618
			Jul 27	4	33.2	8	0.494	0.247	0.118	0.0235	0.728	1.27
			Jul 27	5	35.1	12	0.513	0.171	0.127	0.0253	0.340	1.40
			Aug 30	-	13.1	8	0.587	0.302	0.0525	0.0105	0.196	0.712
2021	BOL-B2	Reference	Jun 22	-	70.3	10	0.553	0.224	0.106	0.0202	0.764	0.873
			Jul 27	1	14.8	9	0.694	0.363	0.0327	0.00624	0.400	0.280
			Jul 27	2	8.11	10	0.689	0.322	0.0236	0.00446	0.373	0.286
			Jul 27	3	18.4	11	0.671	0.276	0.0339	0.00626	0.301	0.443
			Jul 27	4	30.6	9	0.689	0.358	0.0543	0.00974	0.819	0.568
			Jul 27	5	21.7	10	0.643	0.280	0.0263	0.00487	0.190	0.475
			Aug 30	-	12.2	10	0.782	0.459	0.0174	0.00275	0.153	0.382
	POL-P2	Exposed	Jun 22	-	35.8	11	0.734	0.342	0.119	0.0235	0.431	1.38
			Jul 26	1	19.1	9	0.481	0.214	0.0362	0.00720	0.380	1.26
			Jul 26	2	8.13	10	0.668	0.301	0.0354	0.00706	0.0784	0.556
			Jul 26	3	9.70	10	0.607	0.255	0.0332	0.00663	0.0646	0.736
			Jul 26	4	13.6	10	0.686	0.318	0.0480	0.00956	0.373	1.31
			Jul 26	5	8.98	10	0.687	0.319	0.0384	0.00766	0.216	0.597
			Aug 30	-	9.94	10	0.645	0.282	0.0601	0.0120	0.154	0.308

Notes: "-" = only one sample (replicate) collected. organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

Table C.3.3: Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (organisms/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Wet Weight Biomass (mg/L)	Dry Weight Biomass (mg/L)	Calanoida (organisms/L)	Cladocera (organisms/L)
2022	BOL-B2	Reference	Jun 21	-	40.6	10	0.539	0.217	0.175	0.0347	0.475	2.04
			Jul 26	1	19.6	11	0.576	0.215	0.101	0.0198	0.129	0.272
			Jul 26	2	33.8	12	0.601	0.209	0.158	0.0308	0.309	0.509
			Jul 26	3	37.0	9	0.395	0.184	0.0849	0.0160	0.509	0.365
			Jul 26	4	27.8	10	0.566	0.230	0.0774	0.0149	0.306	0.418
			Jul 26	5	33.2	10	0.513	0.205	0.107	0.0204	0.357	0.959
			Aug 28	-	8.61	12	0.794	0.405	0.0611	0.0120	0.314	0.704
	POL-P2	Exposed	Jun 21	-	13.8	9	0.591	0.272	0.129	0.0258	0.0646	0.366
			Jul 25	1	20.4	10	0.732	0.372	0.161	0.0321	0.496	1.49
			Jul 25	2	22.1	11	0.547	0.201	0.0705	0.0140	0.354	0.639
			Jul 25	3	32.9	10	0.450	0.182	0.0939	0.0186	0.375	0.732
			Jul 25	4	23.0	11	0.609	0.233	0.0955	0.0189	0.586	0.860
			Jul 25	5	29.6	12	0.623	0.221	0.109	0.0215	0.699	1.14
			Aug 25	-	4.52	9	0.695	0.365	0.0810	0.0161	0.167	0.402
2023	BOL-B2	Reference	Jun 21	-	101	10	0.642	0.279	0.388	0.0770	1.82	2.35
			Jul 27	1	29.5	11	0.629	0.245	0.0430	0.00834	0.122	0.217
			Jul 27	2	29.0	10	0.659	0.294	0.0474	0.00923	0.119	0.503
			Jul 27	3	30.8	11	0.767	0.391	0.0983	0.0193	0.282	2.10
			Jul 27	4	44.9	9	0.696	0.366	0.0729	0.0142	0.255	1.02
			Jul 27	5	30.0	11	0.645	0.256	0.0379	0.00726	0.0842	0.236
			Aug 28	-	15.5	11	0.811	0.480	0.0415	0.00791	0.0416	0.374
	POL-P2	Exposed	Jun 20	-	32.4	12	0.721	0.299	0.0542	0.0106	0.118	2.38
			Jul 27	1	8.81	13	0.749	0.307	0.0259	0.00511	0.170	0.165
			Jul 27	2	13.3	13	0.747	0.304	0.0343	0.00674	0.220	0.167
			Jul 27	3	10.8	14	0.774	0.316	0.0339	0.00670	0.144	0.153
			Jul 27	4	21.1	12	0.695	0.273	0.0450	0.00884	0.198	0.248
			Jul 27	5	8.33	12	0.763	0.351	0.0395	0.00783	0.120	0.184
			Aug 28	-	7.82	12	0.810	0.438	0.0312	0.00611	0.176	0.426
2024	BOL-B2	Reference	Jun 19	-	19.7	10	0.672	0.305	0.0463	0.00915	0.306	0.655
			Jul 25	1	7.54	8	0.768	0.539	0.0194	0.00366	0.124	0.640
			Jul 25	2	10.7	11	0.728	0.334	0.0140	0.00253	0.0693	0.298
			Jul 25	3	12.0	13	0.745	0.302	0.0239	0.00433	0.170	0.340
			Jul 25	4	9.52	11	0.770	0.396	0.0218	0.00403	0.156	0.423
			Jul 25	5	4.65	12	0.788	0.394	0.0111	0.00210	0.0259	0.463
			Aug 26	-	4.22	13	0.795	0.375	0.00827	0.00160	0.187	0.811
	POL-P2	Exposed	Jun 19	-	7.28	12	0.732	0.310	0.0213	0.00419	0.0453	0.277
			Jul 23	1	4.87	9	0.518	0.231	0.0843	0.0169	0.0522	0.222
			Jul 23	2	3.64	10	0.621	0.264	0.0468	0.00934	0.127	0.244
			Jul 23	3	2.89	10	0.684	0.316	0.0308	0.00614	0.0489	0.183
			Jul 23	4	6.22	11	0.577	0.215	0.0140	0.00276	0.189	0.236
			Jul 23	5	3.67	11	0.686	0.289	0.0595	0.0119	0.0940	0.157
			Aug 26	-	3.12	14	0.720	0.256	0.0342	0.00681	0.102	0.321

Notes: "-" = only one sample (replicate) collected. organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

Table C.3.3: Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Copepod Nauplii (organisms/L)	Cyclopoida (organisms/L)	Rotifera (organisms/L)	Calanoida (%)	Cladocera (%)	Copepod Nauplii (%)	Cyclopoida (%)	Rotifera (%)
2019	BOL-B2	Reference	Jun 25	1	0.202	2.22	30.3	6.44	2.91	0.560	6.16	83.9
			Jul 31	1	0.896	0.437	4.67	1.60	3.24	14.2	6.93	74.0
			Jul 31	2	0.472	0.403	1.81	2.32	11.7	15.1	12.9	58.0
			Jul 31	3	0.157	0.784	2.75	5.58	9.12	3.63	18.1	63.5
			Jul 31	4	0.514	0.797	3.09	3.82	6.06	10.5	16.3	63.2
			Jul 31	5	0.326	1.00	4.39	2.09	8.74	5.09	15.7	68.4
			Sep 04	1	0.346	0.310	0.943	1.12	15.5	18.0	16.2	49.2
	POL-P2	Exposed	Jun 24	1	9.33	5.79	3.67	0.126	9.80	44.7	27.8	17.6
			Jul 29	1	12.3	4.07	0.629	1.20	1.44	70.4	23.4	3.61
			Jul 29	2	10.1	5.87	1.78	1.01	1.44	55.4	32.3	9.81
			Jul 29	3	2.52	1.95	1.19	1.51	4.15	42.0	32.5	19.8
			Jul 29	4	2.06	1.32	0.943	2.53	4.69	44.2	28.3	20.2
			Jul 29	5	2.16	1.85	1.31	2.25	2.25	38.7	33.2	23.6
			Aug 28	1	21.0	12.5	3.53	1.53	2.21	54.6	32.5	9.18
2020	BOL-B2	Reference	Jun 22	-	17.0	9.39	36.7	1.48	6.83	24.7	13.7	53.3
			Jul 29	1	2.73	3.02	15.3	2.29	5.58	11.9	13.2	66.9
			Jul 29	2	3.82	3.25	19.3	1.32	3.29	13.8	11.8	69.8
			Jul 29	3	4.88	2.24	15.7	1.81	5.11	19.9	9.13	64.0
			Jul 29	4	13.5	2.21	19.6	1.43	2.43	36.7	6.02	53.4
			Jul 29	5	6.00	2.76	14.4	1.33	4.37	24.5	11.3	58.6
			Aug 30	-	0.382	0.439	4.34	4.04	25.4	5.22	6.00	59.3
	POL-P2	Exposed	Jun 22	-	25.8	5.53	11.1	0.256	3.59	58.5	12.5	25.2
			Jul 27	1	19.1	6.60	3.58	1.11	2.97	62.5	21.7	11.8
			Jul 27	2	12.7	4.75	1.80	0.926	2.91	63.5	23.7	8.99
			Jul 27	3	17.6	6.58	1.27	0.829	2.35	67.0	25.0	4.83
			Jul 27	4	23.0	5.28	2.88	2.19	3.81	69.4	15.9	8.67
			Jul 27	5	23.6	6.79	2.97	0.969	4.00	67.2	19.4	8.47
			Aug 30	-	8.19	3.08	0.890	1.50	5.45	62.7	23.6	6.81
2021	BOL-B2	Reference	Jun 22	-	12.7	6.44	49.5	1.09	1.24	18.1	9.16	70.4
			Jul 27	1	2.60	1.44	10.1	2.70	1.89	17.5	9.72	68.2
			Jul 27	2	0.407	0.862	6.18	4.61	3.52	5.02	10.6	76.2
			Jul 27	3	1.86	1.76	14.0	1.64	2.41	10.1	9.60	76.2
			Jul 27	4	4.56	1.47	23.2	2.68	1.86	14.9	4.79	75.8
			Jul 27	5	4.14	1.33	15.5	0.877	2.19	19.1	6.14	71.7
			Aug 30	-	1.42	0.628	9.60	1.25	3.13	11.6	5.15	78.8
	POL-P2	Exposed	Jun 22	-	11.0	9.09	13.9	1.20	3.85	30.7	25.4	38.9
			Jul 26	1	13.9	1.48	2.04	1.99	6.61	73.0	7.74	10.7
			Jul 26	2	3.81	2.75	0.927	0.965	6.84	46.9	33.9	11.4
			Jul 26	3	5.54	2.51	0.853	0.666	7.59	57.1	25.8	8.79
			Jul 26	4	6.71	2.92	2.29	2.75	9.62	49.3	21.5	16.9
			Jul 26	5	4.10	2.65	1.41	2.40	6.65	45.7	29.6	15.7
			Aug 30	-	3.17	5.02	1.29	1.55	3.10	31.9	50.5	13.0

Notes: "-" = only one sample (replicate) collected. organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

Table C.3.3: Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Copepod Nauplii (organisms/L)	Cyclopoida (organisms/L)	Rotifera (organisms/L)	Calanoida (%)	Cladocera (%)	Copepod Nauplii (%)	Cyclopoida (%)	Rotifera (%)
2022	BOL-B2	Reference	Jun 21	-	5.98	4.38	27.8	1.17	5.01	14.7	10.8	68.3
			Jul 26	1	2.64	2.86	13.8	0.656	1.38	13.4	14.6	70.0
			Jul 26	2	5.18	4.24	23.6	0.915	1.51	15.3	12.5	69.7
			Jul 26	3	3.01	1.88	31.2	1.38	0.989	8.15	5.09	84.4
			Jul 26	4	5.81	1.58	19.7	1.10	1.50	20.9	5.69	70.8
			Jul 26	5	3.82	1.88	26.1	1.07	2.89	11.5	5.68	78.8
			Aug 28	-	1.30	0.858	5.44	3.64	8.18	15.1	9.96	63.2
	POL-P2	Exposed	Jun 21	-	0.776	4.74	7.89	0.467	2.65	5.61	34.3	57.0
			Jul 25	1	7.66	3.24	7.52	2.43	7.29	37.5	15.9	36.9
			Jul 25	2	14.3	1.03	5.78	1.60	2.89	64.7	4.65	26.2
			Jul 25	3	23.8	1.51	6.45	1.14	2.23	72.4	4.59	19.6
			Jul 25	4	13.3	1.46	6.83	2.55	3.74	57.7	6.34	29.7
			Jul 25	5	16.8	1.23	9.71	2.36	3.86	56.8	4.17	32.9
			Aug 25	-	1.45	1.95	0.548	3.69	8.89	32.1	43.2	12.2
2023	BOL-B2	Reference	Jun 21	-	23.4	16.0	57.6	1.80	2.32	23.2	15.8	56.9
			Jul 27	1	9.68	1.66	17.8	0.414	0.737	32.8	5.62	60.4
			Jul 27	2	8.33	2.10	18.0	0.410	1.73	28.7	7.25	61.9
			Jul 27	3	5.91	4.39	18.1	0.916	6.82	19.2	14.2	58.9
			Jul 27	4	17.3	2.89	23.4	0.567	2.27	38.6	6.43	52.2
			Jul 27	5	7.22	1.54	20.9	0.281	0.785	24.1	5.13	69.7
			Aug 28	-	2.62	1.84	10.6	0.268	2.41	16.9	11.9	68.5
	POL-P2	Exposed	Jun 20	-	5.85	2.69	21.3	0.364	7.36	18.1	8.31	65.9
			Jul 27	1	3.47	0.952	4.05	1.93	1.87	39.4	10.8	46.0
			Jul 27	2	4.88	1.25	6.79	1.65	1.25	36.7	9.40	51.0
			Jul 27	3	4.33	1.39	4.79	1.34	1.41	40.1	12.9	44.3
			Jul 27	4	9.34	1.71	9.62	0.938	1.17	44.2	8.11	45.6
			Jul 27	5	2.46	1.71	3.87	1.44	2.21	29.5	20.5	46.4
			Aug 28	-	1.70	1.28	4.23	2.26	5.45	21.8	16.4	54.1
2024	BOL-B2	Reference	Jun 19	-	6.52	2.12	10.1	1.55	3.33	33.1	10.8	51.2
			Jul 25	1	1.38	0.815	4.58	1.64	8.49	18.2	10.8	60.8
			Jul 25	2	4.03	0.505	5.81	0.647	2.78	37.7	4.72	54.2
			Jul 25	3	2.51	0.781	8.22	1.41	2.82	20.9	6.50	68.4
			Jul 25	4	2.33	0.722	5.89	1.63	4.44	24.5	7.58	61.8
			Jul 25	5	1.25	0.382	2.53	0.558	9.96	26.9	8.21	54.4
			Aug 26	-	0.0873	0.362	2.77	4.43	19.2	2.07	8.57	65.7
	POL-P2	Exposed	Jun 19	-	0.717	0.956	5.28	0.622	3.81	9.85	13.1	72.6
			Jul 23	1	0.836	3.24	0.522	1.07	4.56	17.2	66.5	10.7
			Jul 23	2	0.531	2.11	0.626	3.50	6.71	14.6	58.0	17.2
			Jul 23	3	1.13	1.14	0.387	1.69	6.35	39.2	39.4	13.4
			Jul 23	4	3.96	0.589	1.24	3.03	3.79	63.7	9.48	20.0
			Jul 23	5	0.846	1.81	0.764	2.56	4.27	23.1	49.3	20.8
			Aug 26	-	0.740	1.42	0.541	3.26	10.3	23.7	45.4	17.3

Notes: "-" = only one sample (replicate) collected. organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

Table C.3.4: Summary Statistics for Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (organisms/L)	2019	BOL-B2	Reference	5	5.01	1.39	3.13	4.88	6.42
		POL-P2	Exposed	5	10.4	6.80	4.67	5.99	18.2
	2020	BOL-B2	Reference	5	27.2	5.58	22.8	24.5	36.7
		POL-P2	Exposed	5	29.0	5.99	20.1	30.5	35.1
	2021	BOL-B2	Reference	5	18.7	8.33	8.11	18.4	30.6
		POL-P2	Exposed	5	11.9	4.54	8.13	9.70	19.1
	2022	BOL-B2	Reference	5	30.3	6.79	19.6	33.2	37.0
		POL-P2	Exposed	5	25.6	5.36	20.4	23.0	32.9
	2023	BOL-B2	Reference	5	32.9	6.77	29.0	30.0	44.9
		POL-P2	Exposed	5	12.5	5.21	8.33	10.8	21.1
	2024	BOL-B2	Reference	5	8.89	2.89	4.65	9.52	12.0
		POL-P2	Exposed	5	4.26	1.31	2.89	3.67	6.22
Richness (# of Taxa)	2019	BOL-B2	Reference	5	8	1.14	7	8	10
		POL-P2	Exposed	5	9	1.10	8	10	10
	2020	BOL-B2	Reference	5	11	1.10	10	12	12
		POL-P2	Exposed	5	9	2.00	7	8	12
	2021	BOL-B2	Reference	5	10	0.84	9	10	11
		POL-P2	Exposed	5	10	0.45	9	10	10
	2022	BOL-B2	Reference	5	10	1.14	9	10	12
		POL-P2	Exposed	5	11	0.84	10	11	12
	2023	BOL-B2	Reference	5	10	0.89	9	11	11
		POL-P2	Exposed	5	13	0.84	12	13	14
	2024	BOL-B2	Reference	5	11	1.87	8	11	13
		POL-P2	Exposed	5	10	0.84	9	10	11
Simpson's Diversity	2019	BOL-B2	Reference	5	0.717	0.0385	0.653	0.725	0.756
		POL-P2	Exposed	5	0.637	0.102	0.473	0.694	0.711
	2020	BOL-B2	Reference	5	0.758	0.0314	0.724	0.762	0.798
		POL-P2	Exposed	5	0.523	0.0321	0.494	0.513	0.566
	2021	BOL-B2	Reference	5	0.677	0.0210	0.643	0.689	0.694
		POL-P2	Exposed	5	0.626	0.0872	0.481	0.668	0.687
	2022	BOL-B2	Reference	5	0.530	0.0821	0.395	0.566	0.601
		POL-P2	Exposed	5	0.592	0.103	0.450	0.609	0.732
	2023	BOL-B2	Reference	5	0.679	0.0551	0.629	0.659	0.767
		POL-P2	Exposed	5	0.746	0.0302	0.695	0.749	0.774
	2024	BOL-B2	Reference	5	0.760	0.0235	0.728	0.768	0.788
		POL-P2	Exposed	5	0.617	0.0717	0.518	0.621	0.686
Simpson's Evenness	2019	BOL-B2	Reference	5	0.436	0.0932	0.288	0.467	0.511
		POL-P2	Exposed	5	0.317	0.0789	0.237	0.327	0.433
	2020	BOL-B2	Reference	5	0.377	0.0565	0.302	0.369	0.449
		POL-P2	Exposed	5	0.242	0.0482	0.171	0.247	0.288
	2021	BOL-B2	Reference	5	0.320	0.0411	0.276	0.322	0.363
		POL-P2	Exposed	5	0.282	0.0460	0.214	0.301	0.319
	2022	BOL-B2	Reference	5	0.208	0.0169	0.184	0.209	0.230
		POL-P2	Exposed	5	0.242	0.0756	0.182	0.221	0.372
	2023	BOL-B2	Reference	5	0.310	0.0654	0.245	0.294	0.391
		POL-P2	Exposed	5	0.310	0.0279	0.273	0.307	0.351
	2024	BOL-B2	Reference	5	0.393	0.0907	0.302	0.394	0.539
		POL-P2	Exposed	5	0.263	0.0415	0.215	0.264	0.316
Wet Weight Biomass (mg/L)	2019	BOL-B2	Reference	5	0.0277	0.00936	0.0162	0.0308	0.0377
		POL-P2	Exposed	5	0.0883	0.0515	0.0445	0.0581	0.163
	2020	BOL-B2	Reference	5	0.0840	0.0171	0.0598	0.0901	0.0992
		POL-P2	Exposed	5	0.114	0.0170	0.0849	0.118	0.127
	2021	BOL-B2	Reference	5	0.0342	0.0120	0.0236	0.0327	0.0543
		POL-P2	Exposed	5	0.0383	0.00576	0.0332	0.0362	0.0480
	2022	BOL-B2	Reference	5	0.106	0.0315	0.0774	0.101	0.158
		POL-P2	Exposed	5	0.106	0.0338	0.0705	0.0955	0.161
	2023	BOL-B2	Reference	5	0.0599	0.0253	0.0379	0.0474	0.0983
		POL-P2	Exposed	5	0.0357	0.00709	0.0259	0.0343	0.0450
	2024	BOL-B2	Reference	5	0.0180	0.00532	0.0111	0.0194	0.0239
		POL-P2	Exposed	5	0.0471	0.0269	0.0140	0.0468	0.0843
Dry Weight Biomass (mg/L)	2019	BOL-B2	Reference	5	0.00544	0.00185	0.00311	0.00608	0.00737
		POL-P2	Exposed	5	0.0176	0.0103	0.00889	0.0116	0.0325
	2020	BOL-B2	Reference	5	0.0163	0.00334	0.0116	0.0172	0.0193
		POL-P2	Exposed	5	0.0229	0.00340	0.0170	0.0236	0.0253
	2021	BOL-B2	Reference	5	0.00631	0.00208	0.00446	0.00624	0.00974
		POL-P2	Exposed	5	0.00762	0.00114	0.00663	0.00720	0.00956
	2022	BOL-B2	Reference	5	0.0204	0.00627	0.0149	0.0198	0.0308
		POL-P2	Exposed	5	0.0210	0.00676	0.0140	0.0189	0.0321
	2023	BOL-B2	Reference	5	0.0117	0.00502	0.00726	0.00923	0.0193
		POL-P2	Exposed	5	0.00704	0.00140	0.00511	0.00674	0.00884
	2024	BOL-B2	Reference	5	0.00333	0.000967	0.00210	0.00366	0.00433
		POL-P2	Exposed	5	0.00940	0.00540	0.00276	0.00934	0.0169
Calanoida (organisms/L)	2019	BOL-B2	Reference	5	0.147	0.0678	0.0725	0.134	0.242
		POL-P2	Exposed	5	0.145	0.0493	0.0905	0.125	0.210
	2020	BOL-B2	Reference	5	0.437	0.0903	0.327	0.444	0.525
		POL-P2	Exposed	5	0.362	0.216	0.186	0.340	0.728
	2021	BOL-B2	Reference	5	0.417	0.239	0.190	0.373	0.819
		POL-P2	Exposed	5	0.222	0.153	0.0646	0.216	0.380
	2022	BOL-B2	Reference	5	0.322	0.136	0.129	0.309	0.509
		POL-P2	Exposed	5	0.502	0.145	0.354	0.496	0.699
	2023	BOL-B2	Reference	5	0.172	0.0894	0.0842	0.122	0.282
		POL-P2	Exposed	5	0.170	0.0401	0.120	0.170	0.220
	2024	BOL-B2	Reference	5	0.109	0.0603	0.0259	0.124	0.170
		POL-P2	Exposed	5	0.102	0.0581	0.0489	0.0940	0.189
Cladocera (organisms/L)	2019	BOL-B2	Reference	5	0.365	0.132	0.204	0.367	0.561
		POL-P2	Exposed	5	0.221	0.0561	0.125	0.249	0.262
	2020	BOL-B2	Reference	5	1.08	0.182	0.891	1.07	1.27
		POL-P2	Exposed	5	0.955	0.370	0.584	0.905	1.40
	2021	BOL-B2	Reference	5	0.410	0.125	0.280	0.443	0.568
		POL-P2	Exposed	5	0.892	0.366	0.556	0.736	1.31
	2022	BOL-B2	Reference	5	0.505	0.268	0.272	0.418	0.959
		POL-P2	Exposed	5	0.972	0.345	0.639	0.860	1.49
	2023	BOL-B2	Reference	5	0.815	0.788	0.217	0.503	2.10
		POL-P2	Exposed	5	0.183	0.0377	0.153	0.167	0.248
	2024	BOL-B2	Reference	5	0.433	0.133	0.298	0.423	0.640
		POL-P2	Exposed	5	0.208	0.0370	0.157	0.222	0.244

Notes: organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.3.

Table C.3.4: Summary Statistics for Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Copepod Nauplii (organisms/L)	2019	BOL-B2	Reference	5	0.473	0.275	0.157	0.472	0.896
		POL-P2	Exposed	5	5.81	4.95	2.06	2.52	12.3
	2020	BOL-B2	Reference	5	6.19	4.26	2.73	4.88	13.5
		POL-P2	Exposed	5	19.2	4.41	12.7	19.1	23.6
	2021	BOL-B2	Reference	5	2.71	1.69	0.407	2.60	4.56
		POL-P2	Exposed	5	6.82	4.15	3.81	5.54	13.9
	2022	BOL-B2	Reference	5	4.09	1.37	2.64	3.82	5.81
		POL-P2	Exposed	5	15.2	5.88	7.66	14.3	23.8
	2023	BOL-B2	Reference	5	9.69	4.48	5.91	8.33	17.3
		POL-P2	Exposed	5	4.89	2.65	2.46	4.33	9.34
	2024	BOL-B2	Reference	5	2.30	1.12	1.25	2.33	4.03
		POL-P2	Exposed	5	1.46	1.41	0.531	0.846	3.96
Cyclopoida (organisms/L)	2019	BOL-B2	Reference	5	0.685	0.258	0.403	0.784	1.00
		POL-P2	Exposed	5	3.01	1.91	1.32	1.95	5.87
	2020	BOL-B2	Reference	5	2.70	0.465	2.21	2.76	3.25
		POL-P2	Exposed	5	6.00	0.923	4.75	6.58	6.79
	2021	BOL-B2	Reference	5	1.37	0.327	0.862	1.44	1.76
		POL-P2	Exposed	5	2.46	0.569	1.48	2.65	2.92
	2022	BOL-B2	Reference	5	2.49	1.09	1.58	1.88	4.24
		POL-P2	Exposed	5	1.69	0.888	1.03	1.46	3.24
	2023	BOL-B2	Reference	5	2.51	1.17	1.54	2.10	4.39
		POL-P2	Exposed	5	1.40	0.322	0.952	1.39	1.71
	2024	BOL-B2	Reference	5	0.641	0.189	0.382	0.722	0.815
		POL-P2	Exposed	5	1.78	1.01	0.589	1.81	3.24
Rotifera (organisms/L)	2019	BOL-B2	Reference	5	3.34	1.18	1.81	3.09	4.67
		POL-P2	Exposed	5	1.17	0.430	0.629	1.19	1.78
	2020	BOL-B2	Reference	5	16.9	2.42	14.4	15.7	19.6
		POL-P2	Exposed	5	2.50	0.939	1.27	2.88	3.58
	2021	BOL-B2	Reference	5	13.8	6.38	6.18	14.0	23.2
		POL-P2	Exposed	5	1.50	0.646	0.853	1.41	2.29
	2022	BOL-B2	Reference	5	22.9	6.59	13.8	23.6	31.2
		POL-P2	Exposed	5	7.26	1.51	5.78	6.83	9.71
	2023	BOL-B2	Reference	5	19.7	2.47	17.8	18.1	23.4
		POL-P2	Exposed	5	5.82	2.42	3.87	4.79	9.62
	2024	BOL-B2	Reference	5	5.40	2.08	2.53	5.81	8.22
		POL-P2	Exposed	5	0.709	0.330	0.387	0.626	1.24
Calanoida (%)	2019	BOL-B2	Reference	5	3.08	1.63	1.60	2.32	5.58
		POL-P2	Exposed	5	1.70	0.660	1.01	1.51	2.53
	2020	BOL-B2	Reference	5	1.64	0.417	1.32	1.43	2.29
		POL-P2	Exposed	5	1.21	0.561	0.829	0.969	2.19
	2021	BOL-B2	Reference	5	2.50	1.40	0.877	2.68	4.61
		POL-P2	Exposed	5	1.75	0.904	0.666	1.99	2.75
	2022	BOL-B2	Reference	5	1.02	0.265	0.656	1.07	1.38
		POL-P2	Exposed	5	2.02	0.615	1.14	2.36	2.55
	2023	BOL-B2	Reference	5	0.518	0.245	0.281	0.414	0.916
		POL-P2	Exposed	5	1.46	0.371	0.938	1.44	1.93
	2024	BOL-B2	Reference	5	1.18	0.535	0.558	1.41	1.64
		POL-P2	Exposed	5	2.37	0.986	1.07	2.56	3.50
Cladocera (%)	2019	BOL-B2	Reference	5	7.78	3.24	3.24	8.74	11.7
		POL-P2	Exposed	5	2.80	1.53	1.44	2.25	4.69
	2020	BOL-B2	Reference	5	4.16	1.30	2.43	4.37	5.58
		POL-P2	Exposed	5	3.21	0.684	2.35	2.97	4.00
	2021	BOL-B2	Reference	5	2.37	0.680	1.86	2.19	3.52
		POL-P2	Exposed	5	7.46	1.27	6.61	6.84	9.62
	2022	BOL-B2	Reference	5	1.66	0.723	0.989	1.50	2.89
		POL-P2	Exposed	5	4.00	1.95	2.23	3.74	7.29
	2023	BOL-B2	Reference	5	2.47	2.52	0.737	1.73	6.82
		POL-P2	Exposed	5	1.58	0.443	1.17	1.41	2.21
	2024	BOL-B2	Reference	5	5.70	3.33	2.78	4.44	9.96
		POL-P2	Exposed	5	5.14	1.31	3.79	4.56	6.71
Copepod Nauplii (%)	2019	BOL-B2	Reference	5	9.71	5.20	3.63	10.5	15.1
		POL-P2	Exposed	5	50.1	12.9	38.7	44.2	70.4
	2020	BOL-B2	Reference	5	21.4	9.92	11.9	19.9	36.7
		POL-P2	Exposed	5	65.9	2.85	62.5	67.0	69.4
	2021	BOL-B2	Reference	5	13.3	5.75	5.02	14.9	19.1
		POL-P2	Exposed	5	54.4	11.3	45.7	49.3	73.0
	2022	BOL-B2	Reference	5	13.9	4.75	8.15	13.4	20.9
		POL-P2	Exposed	5	57.8	13.0	37.5	57.7	72.4
	2023	BOL-B2	Reference	5	28.7	7.52	19.2	28.7	38.6
		POL-P2	Exposed	5	38.0	5.46	29.5	39.4	44.2
	2024	BOL-B2	Reference	5	25.6	7.49	18.2	24.5	37.7
		POL-P2	Exposed	5	31.5	20.4	14.6	23.1	63.7
Cyclopoida (%)	2019	BOL-B2	Reference	5	14.0	4.37	6.93	15.7	18.1
		POL-P2	Exposed	5	29.9	4.15	23.4	32.3	33.2
	2020	BOL-B2	Reference	5	10.3	2.80	6.02	11.3	13.2
		POL-P2	Exposed	5	21.1	3.61	15.9	21.7	25.0
	2021	BOL-B2	Reference	5	8.18	2.55	4.79	9.60	10.6
		POL-P2	Exposed	5	23.7	10.0	7.74	25.8	33.9
	2022	BOL-B2	Reference	5	8.72	4.49	5.09	5.69	14.6
		POL-P2	Exposed	5	7.13	4.97	4.17	4.65	15.9
	2023	BOL-B2	Reference	5	7.73	3.73	5.13	6.43	14.2
		POL-P2	Exposed	5	12.3	4.88	8.11	10.8	20.5
	2024	BOL-B2	Reference	5	7.56	2.25	4.72	7.58	10.8
		POL-P2	Exposed	5	44.5	22.0	9.48	49.3	66.5
Rotifera (%)	2019	BOL-B2	Reference	5	65.5	6.05	58.0	63.5	74.0
		POL-P2	Exposed	5	15.4	8.37	3.61	19.8	23.6
	2020	BOL-B2	Reference	5	62.5	6.59	53.4	64.0	69.8
		POL-P2	Exposed	5	8.55	2.47	4.83	8.67	11.8
	2021	BOL-B2	Reference	5	73.6	3.59	68.2	75.8	76.2
		POL-P2	Exposed	5	12.7	3.44	8.79	11.4	16.9
	2022	BOL-B2	Reference	5	74.7	6.59	69.7	70.8	84.4
		POL-P2	Exposed	5	29.1	6.58	19.6	29.7	36.9
	2023	BOL-B2	Reference	5	60.6	6.31	52.2	60.4	69.7
		POL-P2	Exposed	5	46.7	2.56	44.3	46.0	51.0
	2024	BOL-B2	Reference	5	59.9	5.90	54.2	60.8	68.4
		POL-P2	Exposed	5	16.4	4.31	10.7	17.2	20.8

Notes: organisms/L = organisms per litre. mg/L = milligrams per litre. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date, differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.3.

Table C.3.5: **Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024**

Year	Area	Type	Date	Replicate	Density (cells/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Chlorophyll-a (µg/L)	Diatom (cells/L)	Chlorophyte (cells/L)	Chrysophyte (cells/L)	Cryptomonad (cells/L)
2019	QUL-ZOO-7	Reference	Jun 25	-	608,882	17	0.757	0.242	1.25	309,465	84,400	58,276	156,742
			Jul 30	1	697,301	20	0.854	0.343	2.08	269,275	76,361	227,075	116,552
			Jul 30	2	803,805	24	0.903	0.427	1.78	279,322	114,542	208,989	102,485
			Jul 30	3	580,138	20	0.869	0.380	2.06	206,193	52,422	131,055	136,297
			Jul 30	4	606,873	19	0.876	0.425	0.974	241,142	32,152	202,961	112,533
			Jul 30	5	567,906	22	0.910	0.505	1.97	178,235	80,380	167,751	117,076
			Aug 29	-	1,181,593	20	0.781	0.229	0.571	380,468	75,022	484,962	109,853
	QUL-ZOO-1	Exposed	Jun 25	-	653,092	21	0.712	0.165	1.39	365,731	72,342	48,228	152,723
			Jul 30	1	711,367	19	0.853	0.359	2.21	287,360	60,285	190,904	118,561
			Jul 30	2	737,609	25	0.872	0.313	1.99	234,049	134,756	260,055	92,201
			Jul 30	3	770,707	20	0.854	0.342	1.92	212,772	47,283	319,158	122,935
			Jul 30	4	683,234	26	0.882	0.327	2.17	190,904	60,285	253,199	118,561
			Jul 30	5	787,256	20	0.863	0.364	1.90	255,326	85,109	276,603	156,033
			Aug 29	-	852,033	17	0.633	0.160	0.442	166,120	26,793	554,625	80,380
2020	QUL-ZOO-7	Reference	Jun 23	-	793,321	24	0.880	0.347	1.22	71,643	52,422	269,100	186,972
			Jul 28	1	836,903	24	0.824	0.237	1.28	134,756	108,750	198,587	340,435
			Jul 28	2	924,376	25	0.837	0.245	1.48	78,016	115,842	222,228	345,163
			Jul 28	3	801,795	20	0.797	0.246	1.63	86,409	70,333	128,609	343,627
			Jul 28	4	886,865	18	0.816	0.301	1.61	142,006	115,212	257,218	359,033
			Jul 28	5	998,573	23	0.890	0.395	1.53	120,571	170,036	389,536	247,325
			Aug 27	-	1,029,489	16	0.643	0.175	1.93	95,838	61,831	775,981	95,838
	QUL-ZOO-1	Exposed	Jun 23	-	622,075	24	0.879	0.345	1.15	92,612	43,685	260,363	145,034
			Jul 28	1	637,802	25	0.907	0.430	1.64	188,719	101,349	197,456	50,675
			Jul 28	2	998,573	23	0.890	0.395	1.47	120,571	170,036	389,536	247,325
			Jul 28	3	820,354	25	0.902	0.406	1.46	172,582	127,663	269,511	179,674
			Jul 28	4	1,619,976	21	0.857	0.334	1.64	238,050	151,486	439,001	244,233
			Jul 28	5	1,256,615	20	0.872	0.392	1.75	139,326	104,495	364,392	267,935
			Aug 27	-	1,425,208	19	0.833	0.315	1.47	207,134	132,937	544,114	108,205
2021	QUL-ZOO-7	Reference	Jun 23	-	757,184	24	0.874	0.331	1.07	91,634	62,697	181,660	73,950
			Jul 28	1	499,967	19	0.846	0.341	1.06	274,901	59,482	136,647	25,722
			Jul 28	2	699,310	25	0.907	0.431	1.11	331,570	52,247	116,552	124,590
			Jul 28	3	485,260	22	0.894	0.429	1.12	171,181	41,679	189,043	56,564
			Jul 28	4	605,150	19	0.881	0.442	1.29	186,023	37,894	126,312	25,262
			Jul 28	5	462,188	24	0.900	0.416	1.04	166,944	60,285	106,659	120,571
			Aug 29	-	629,647	28	0.905	0.377	1.34	204,970	48,228	29,473	85,739
	QUL-ZOO-1	Exposed	Jun 23	-	620,537	22	0.901	0.458	1.15	67,520	67,520	147,900	104,495
			Jul 28	1	555,674	23	0.909	0.476	0.969	225,415	85,623	192,214	41,938
			Jul 28	2	520,927	26	0.919	0.472	1.06	211,772	43,282	165,398	88,109
			Jul 28	3	527,715	23	0.922	0.555	1.10	185,225	57,664	195,709	76,886
			Jul 28	4	514,744	23	0.910	0.481	0.991	247,325	26,278	148,395	71,106
			Jul 28	5	683,234	28	0.857	0.250	1.14	95,308	47,080	143,537	41,339
			Aug 29	-	415,299	22	0.878	0.371	1.22	168,799	49,568	96,457	99,136

Notes: "-" = only one sample (replicate) collected. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.5: **Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024**

Year	Area	Type	Date	Replicate	Density (cells/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Chlorophyll-a (µg/L)	Diatom (cells/L)	Chlorophyte (cells/L)	Chrysophyte (cells/L)	Cryptomonad (cells/L)
2022	QUL-ZOO-7	Reference	Jun 22	-	709,645	26	0.855	0.266	2.02	87,270	41,339	319,225	197,506
			Jul 27	1	1,511,153	20	0.480	0.0962	3.97	88,419	76,361	1,173,555	140,666
			Jul 27	2	1,107,853	25	0.702	0.134	2.26	139,792	41,938	698,961	213,183
			Jul 27	3	1,225,803	22	0.670	0.138	2.48	148,704	68,323	775,672	229,084
			Jul 27	4	1,278,050	21	0.746	0.188	4.24	192,913	100,476	703,329	265,256
			Jul 27	5	1,079,895	24	0.759	0.173	3.15	157,266	90,865	615,086	195,709
			Aug 28	-	436,734	29	0.897	0.335	1.09	230,424	40,190	41,530	96,457
	QUL-ZOO-1	Exposed	Jun 22	-	471,863	21	0.863	0.348	1.58	114,617	56,564	128,013	128,013
			Jul 27	1	2,065,161	18	0.585	0.134	2.76	216,409	61,831	1,415,933	296,790
			Jul 27	2	1,498,860	17	0.572	0.137	2.50	226,957	42,554	1,040,218	189,131
			Jul 28	3	1,947,681	13	0.319	0.113	3.13	117,479	68,014	1,687,990	74,197
			Jul 28	4	2,250,654	18	0.385	0.0904	5.48	123,662	49,465	1,929,132	123,662
			Jul 28	5	1,607,610	17	0.576	0.139	2.59	166,120	16,076	1,205,707	208,989
			Aug 28	-	632,996	22	0.866	0.339	1.04	383,817	78,371	72,342	58,276
2023	QUL-ZOO-7	Reference	Jun 21	-	953,849	16	0.808	0.325	1.48	404,582	21,435	251,859	128,609
			Jul 26	1	5,085,612	10	0.100	0.111	0.924	4,853,746	15,458	77,289	77,289
			Jul 26	2	7,113,674	8	0.0880	0.137	1.35	6,872,533	0	100,476	80,380
			Jul 26	3	7,595,957	12	0.357	0.130	1.28	6,048,633	60,285	160,761	80,380
			Jul 26	4	5,348,395	10	0.317	0.146	0.812	4,451,843	61,831	92,747	77,289
			Jul 26	5	7,274,435	10	0.142	0.117	1.06	6,751,962	100,476	80,380	301,427
			Aug 27	-	9,585,375	8	0.0738	0.135	2.09	9,344,233	40,190	180,856	0
	QUL-ZOO-1	Exposed	Jun 21	-	404,582	22	0.851	0.304	1.60	116,552	17,416	159,421	91,098
			Jul 26	1	4,791,914	9	0.112	0.125	1.41	4,529,132	30,916	77,289	154,578
			Jul 26	2	4,869,203	8	0.128	0.143	1.48	4,560,048	0	185,493	77,289
			Jul 26	3	4,977,408	8	0.114	0.141	1.34	4,776,457	15,458	61,831	92,747
			Jul 26	4	5,317,479	11	0.139	0.106	1.07	5,054,697	30,916	123,662	92,747
			Jul 26	5	6,651,486	6	0.0994	0.185	1.42	6,410,345	0	120,571	120,571
			Aug 27	-	10,348,989	10	0.0865	0.109	2.34	10,188,228	60,285	40,190	20,095
2024	QUL-ZOO-7	Reference	Jun 20	-	2,620,404	19	0.629	0.142	0.848	1,720,143	16,076	787,729	88,419
			Jul 24	1	2,491,795	15	0.571	0.155	0.876	1,752,295	48,228	578,740	96,457
			Jul 24	2	2,507,872	16	0.536	0.135	0.748	1,864,828	72,342	514,435	40,190
			Jul 24	3	2,628,442	18	0.535	0.119	1.03	1,880,904	88,419	506,397	80,380
			Jul 24	4	3,102,687	21	0.626	0.127	1.13	2,001,474	144,685	506,397	96,457
			Jul 24	5	2,089,893	13	0.395	0.127	1.15	1,721,482	46,889	321,522	0
			Aug 25	-	448,121	28	0.573	0.0836	0.652	63,802	12,559	45,716	36,674
	QUL-ZOO-1	Exposed	Jun 20	-	3,688,046	17	0.686	0.188	0.796	2,127,719	35,462	1,276,631	165,489
			Jul 24	1	2,891,951	11	0.305	0.131	1.12	2,524,996	113,581	244,636	0
			Jul 24	2	2,848,266	17	0.518	0.122	1.09	2,053,198	131,055	559,169	52,422
			Jul 24	3	2,507,872	16	0.485	0.121	1.01	1,824,637	40,190	490,321	120,571
			Jul 24	4	2,588,252	18	0.517	0.115	1.00	1,880,904	72,342	538,549	56,266
			Jul 24	5	3,175,030	17	0.443	0.106	1.13	2,441,558	100,476	432,045	110,523
			Aug 25	-	237,792	25	0.871	0.310	0.768	77,701	18,086	63,635	44,209

Notes: "-" = only one sample (replicate) collected. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.5: **Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024**

Year	Area	Type	Date	Replicate	Cyanobacteria (cells/L)	Dinoflagellates (cells/L)	Euglenophytes (cells/L)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cryptomonads (%)	Cyanobacteria (%)	Dinoflagellates (%)	Euglenophytes (%)
2019	QUL-ZOO-7	Reference	Jun 25	-	0	0	0	50.8	13.9	9.57	25.7	0	0	0
			Jul 30	1	0	8,038	0	38.6	10.9	32.6	16.7	0	1.15	0
			Jul 30	2	96,457	2,010	0	34.8	14.2	26.0	12.8	12.0	0.250	0
			Jul 30	3	48,927	5,242	0	35.5	9.04	22.6	23.5	8.43	0.904	0
			Jul 30	4	0	18,086	0	39.7	5.30	33.4	18.5	0	2.98	0
			Jul 30	5	13,979	10,484	0	31.4	14.2	29.5	20.6	2.46	1.85	0
			Aug 29	-	128,609	2,679	0	32.2	6.35	41.0	9.30	10.9	0.227	0
	QUL-ZOO-1	Exposed	Jun 25	-	12,057	2,010	0	56.0	11.1	7.38	23.4	1.85	0.308	0
			Jul 30	1	42,200	12,057	0	40.4	8.47	26.8	16.7	5.93	1.69	0
			Jul 30	2	0	16,549	0	31.7	18.3	35.3	12.5	0	2.24	0
			Jul 30	3	42,554	26,005	0	27.6	6.13	41.4	15.9	5.52	3.37	0
			Jul 30	4	44,209	16,076	0	27.9	8.82	37.1	17.4	6.47	2.35	0
			Jul 30	5	7,092	7,092	0	32.4	10.8	35.1	19.8	0.901	0.901	0
			Aug 29	-	18,755	5,359	0	19.5	3.14	65.1	9.43	2.20	0.629	0
2020	QUL-ZOO-7	Reference	Jun 23	-	190,467	22,716	0	9.03	6.61	33.9	23.6	24.0	2.86	0
			Jul 28	1	54,375	0	0	16.1	13.0	23.7	40.7	6.50	0	0
			Jul 28	2	160,761	2,364	0	8.44	12.5	24.0	37.3	17.4	0.256	0
			Jul 28	3	164,780	8,038	0	10.8	8.77	16.0	42.9	20.6	1.00	0
			Jul 28	4	10,717	2,679	0	16.0	13.0	29.0	40.5	1.21	0.302	0
			Jul 28	5	58,740	12,366	0	12.1	17.0	39.0	24.8	5.88	1.24	0
			Aug 27	-	0	0	0	9.31	6.01	75.4	9.31	0	0	0
	QUL-ZOO-1	Exposed	Jun 23	-	64,654	15,727	0	14.9	7.02	41.9	23.3	10.4	2.53	0
			Jul 28	1	92,612	6,990	0	29.6	15.9	31.0	7.95	14.5	1.10	0
			Jul 28	2	58,740	12,366	0	12.1	17.0	39.0	24.8	5.88	1.24	0
			Jul 28	3	66,196	4,728	0	21.0	15.6	32.9	21.9	8.07	0.576	0
			Jul 28	4	531,748	15,458	0	14.7	9.35	27.1	15.1	32.8	0.954	0
			Jul 28	5	359,033	21,435	0	11.1	8.32	29.0	21.3	28.6	1.71	0
			Aug 27	-	432,818	0	0	14.5	9.33	38.2	7.59	30.4	0	0
2021	QUL-ZOO-7	Reference	Jun 23	-	345,636	1,608	0	12.1	8.28	24.0	9.77	45.6	0.212	0
			Jul 28	1	0	3,215	0	55.0	11.9	27.3	5.14	0	0.643	0
			Jul 28	2	72,342	2,010	0	47.4	7.47	16.7	17.8	10.3	0.287	0
			Jul 28	3	26,794	0	0	35.3	8.59	39.0	11.7	5.52	0	0
			Jul 28	4	229,659	0	0	30.7	6.26	20.9	4.17	38.0	0	0
			Jul 28	5	0	7,729	0	36.1	13.0	23.1	26.1	0	1.67	0
			Aug 29	-	255,878	5,359	0	32.5	7.66	4.68	13.6	40.6	0.851	0
	QUL-ZOO-1	Exposed	Jun 23	-	233,103	0	0	10.9	10.9	23.8	16.8	37.6	0	0
			Jul 28	1	0	10,484	0	40.6	15.4	34.6	7.55	0	1.89	0
			Jul 28	2	6,183	6,183	0	40.6	8.31	31.8	16.9	1.19	1.19	0
			Jul 28	3	0	12,232	0	35.1	10.9	37.1	14.6	0	2.32	0
			Jul 28	4	18,549	3,092	0	48.0	5.11	28.8	13.8	3.60	0.601	0
			Jul 28	5	347,933	8,038	0	13.9	6.89	21.0	6.05	50.9	1.18	0
			Aug 29	-	0	1,340	0	40.6	11.9	23.2	23.9	0	0.323	0

Notes: "-" = only one sample (replicate) collected. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.5: **Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024**

Year	Area	Type	Date	Replicate	Cyanobacteria (cells/L)	Dinoflagellates (cells/L)	Euglenophytes (cells/L)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cryptomonads (%)	Cyanobacteria (%)	Dinoflagellates (%)	Euglenophytes (%)
2022	QUL-ZOO-7	Reference	Jun 22	-	29,856	34,449	0	12.3	5.83	45.0	27.8	4.21	4.85	0
			Jul 27	1	32,152	0	0	5.85	5.05	77.7	9.31	2.13	0	0
			Jul 27	2	3,495	10,484	0	12.6	3.79	63.1	19.2	0.315	0.946	0
			Jul 27	3	4,019	0	0	12.1	5.57	63.3	18.7	0.328	0	0
			Jul 27	4	16,076	0	0	15.1	7.86	55.0	20.8	1.26	0	0
			Jul 27	5	13,979	6,990	0	14.6	8.41	57.0	18.1	1.29	0.647	0
			Aug 28	-	25,454	2,679	0	52.8	9.20	9.51	22.1	5.83	0.613	0
	QUL-ZOO-1	Exposed	Jun 22	-	43,167	1,489	0	24.3	12.0	27.1	27.1	9.15	0.315	0
			Jul 27	1	68,014	6,183	0	10.5	2.99	68.6	14.4	3.29	0.299	0
			Jul 27	2	0	0	0	15.1	2.84	69.4	12.6	0	0	0
			Jul 28	3	0	0	0	6.03	3.49	86.7	3.81	0	0	0
			Jul 28	4	18,549	6,183	0	5.49	2.20	85.7	5.49	0.824	0.275	0
			Jul 28	5	0	10,717	0	10.3	1.00	75.0	13.0	0	0.667	0
			Aug 28	-	32,152	8,038	0	60.6	12.4	11.4	9.21	5.08	1.27	0
2023	QUL-ZOO-7	Reference	Jun 21	-	147,364	0	0	42.4	2.25	26.4	13.5	15.4	0	0
			Jul 26	1	0	61,831	0	95.4	0.304	1.52	1.52	0	1.22	0
			Jul 26	2	0	60,285	0	96.6	0	1.41	1.13	0	0.847	0
			Jul 26	3	1,205,707	40,190	0	79.6	0.794	2.12	1.06	15.9	0.529	0
			Jul 26	4	618,312	46,373	0	83.2	1.16	1.73	1.45	11.6	0.867	0
			Jul 26	5	0	40,190	0	92.8	1.38	1.10	4.14	0	0.552	0
			Aug 27	-	0	20,095	0	97.5	0.419	1.89	0	0	0.210	0
	QUL-ZOO-1	Exposed	Jun 21	-	16,076	2,679	1,340	28.8	4.30	39.4	22.5	3.97	0.662	0.331
			Jul 26	1	0	0	0	94.5	0.645	1.61	3.23	0	0	0
			Jul 26	2	15,458	30,916	0	93.7	0	3.81	1.59	0.317	0.635	0
			Jul 26	3	0	30,916	0	96.0	0.311	1.24	1.86	0	0.621	0
			Jul 26	4	0	15,458	0	95.1	0.581	2.33	1.74	0	0.291	0
			Jul 26	5	0	0	0	96.4	0	1.81	1.81	0	0	0
			Aug 27	-	0	40,190	0	98.5	0.583	0.388	0.194	0	0.388	0
2024	QUL-ZOO-7	Reference	Jun 20	-	8,038	0	0	65.6	0.613	30.1	3.37	0.307	0	0
			Jul 24	1	0	16,076	0	70.3	1.94	23.2	3.87	0	0.645	0
			Jul 24	2	0	16,076	0	74.4	2.88	20.5	1.60	0	0.641	0
			Jul 24	3	64,304	8,038	0	71.6	3.36	19.3	3.06	2.45	0.306	0
			Jul 24	4	337,598	16,076	0	64.5	4.66	16.3	3.11	10.9	0.518	0
			Jul 24	5	0	0	0	82.4	2.24	15.4	0	0	0	0
			Aug 25	-	286,356	3,014	0	14.2	2.80	10.2	8.18	63.9	0.673	0
	QUL-ZOO-1	Exposed	Jun 20	-	70,924	11,821	0	57.7	0.962	34.6	4.49	1.92	0.321	0
			Jul 24	1	0	8,737	0	87.3	3.93	8.46	0	0	0.302	0
			Jul 24	2	8,737	43,685	0	72.1	4.60	19.6	1.84	0.307	1.53	0
			Jul 24	3	8,038	24,114	0	72.8	1.60	19.6	4.81	0.321	0.962	0
			Jul 24	4	16,076	24,114	0	72.7	2.80	20.8	2.17	0.621	0.932	0
			Jul 24	5	50,238	40,190	0	76.9	3.16	13.6	3.48	1.58	1.27	0
			Aug 25	-	28,133	6,029	0	32.7	7.61	26.8	18.6	11.8	2.54	0

Notes: "-" = only one sample (replicate) collected. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

Table C.3.6: Summary Statistics for Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (cells/L)	2019	QUL-ZOO-7	Reference	5	651,204	99,205	567,906	606,873	803,805
		QUL-ZOO-1	Exposed	5	738,035	42,440	683,234	737,609	787,256
	2020	QUL-ZOO-7	Reference	5	889,702	76,777	801,795	886,865	998,573
		QUL-ZOO-1	Exposed	5	1,066,664	384,533	637,802	998,573	1,619,976
	2021	QUL-ZOO-7	Reference	5	550,375	99,674	462,188	499,967	699,310
		QUL-ZOO-1	Exposed	5	560,459	70,394	514,744	527,715	683,234
	2022	QUL-ZOO-7	Reference	5	1,240,551	171,951	1,079,895	1,225,803	1,511,153
		QUL-ZOO-1	Exposed	5	1,873,993	314,457	1,498,860	1,947,681	2,250,654
	2023	QUL-ZOO-7	Reference	5	6,483,615	1,172,904	5,085,612	7,113,674	7,595,957
		QUL-ZOO-1	Exposed	5	5,321,498	770,116	4,791,914	4,977,408	6,651,486
	2024	QUL-ZOO-7	Reference	5	2,564,138	363,138	2,089,893	2,507,872	3,102,687
		QUL-ZOO-1	Exposed	5	2,802,274	265,322	2,507,872	2,848,266	3,175,030
Richness (# of Taxa)	2019	QUL-ZOO-7	Reference	5	21	2.00	19	20	24
		QUL-ZOO-1	Exposed	5	22	3.24	19	20	26
	2020	QUL-ZOO-7	Reference	5	22	2.92	18	23	25
		QUL-ZOO-1	Exposed	5	23	2.28	20	23	25
	2021	QUL-ZOO-7	Reference	5	22	2.77	19	22	25
		QUL-ZOO-1	Exposed	5	25	2.30	23	23	28
	2022	QUL-ZOO-7	Reference	5	22	2.07	20	22	25
		QUL-ZOO-1	Exposed	5	17	2.07	13	17	18
	2023	QUL-ZOO-7	Reference	5	10	1.41	8	10	12
		QUL-ZOO-1	Exposed	5	8	1.82	6	8	11
	2024	QUL-ZOO-7	Reference	5	17	3.05	13	16	21
		QUL-ZOO-1	Exposed	5	16	2.77	11	17	18
Simpson's Diversity	2019	QUL-ZOO-7	Reference	5	0.882	0.0233	0.854	0.876	0.910
		QUL-ZOO-1	Exposed	5	0.865	0.0124	0.853	0.863	0.882
	2020	QUL-ZOO-7	Reference	5	0.833	0.0352	0.797	0.824	0.890
		QUL-ZOO-1	Exposed	5	0.886	0.0207	0.857	0.890	0.907
	2021	QUL-ZOO-7	Reference	5	0.886	0.0242	0.846	0.894	0.907
		QUL-ZOO-1	Exposed	5	0.903	0.0263	0.857	0.910	0.922
	2022	QUL-ZOO-7	Reference	5	0.672	0.113	0.480	0.702	0.759
		QUL-ZOO-1	Exposed	5	0.487	0.126	0.319	0.572	0.585
	2023	QUL-ZOO-7	Reference	5	0.201	0.127	0.0880	0.142	0.357
		QUL-ZOO-1	Exposed	5	0.118	0.0154	0.0994	0.114	0.139
	2024	QUL-ZOO-7	Reference	5	0.533	0.0852	0.395	0.536	0.626
		QUL-ZOO-1	Exposed	5	0.454	0.0887	0.305	0.485	0.518
Simpson's Evenness	2019	QUL-ZOO-7	Reference	5	0.416	0.0605	0.343	0.425	0.505
		QUL-ZOO-1	Exposed	5	0.341	0.0214	0.313	0.342	0.364
	2020	QUL-ZOO-7	Reference	5	0.285	0.0667	0.237	0.246	0.395
		QUL-ZOO-1	Exposed	5	0.391	0.0356	0.334	0.395	0.430
	2021	QUL-ZOO-7	Reference	5	0.412	0.0406	0.341	0.429	0.442
		QUL-ZOO-1	Exposed	5	0.447	0.115	0.250	0.476	0.555
	2022	QUL-ZOO-7	Reference	5	0.146	0.0359	0.0962	0.138	0.188
		QUL-ZOO-1	Exposed	5	0.123	0.0208	0.0904	0.134	0.139
	2023	QUL-ZOO-7	Reference	5	0.128	0.0145	0.111	0.130	0.146
		QUL-ZOO-1	Exposed	5	0.140	0.0294	0.106	0.141	0.185
	2024	QUL-ZOO-7	Reference	5	0.133	0.0137	0.119	0.127	0.155
		QUL-ZOO-1	Exposed	5	0.119	0.00934	0.106	0.121	0.131
Chlorophyll-a (µg/L)	2019	QUL-ZOO-7	Reference	5	1.77	0.462	0.974	1.97	2.08
		QUL-ZOO-1	Exposed	5	2.04	0.143	1.90	1.99	2.21
	2020	QUL-ZOO-7	Reference	5	1.51	0.140	1.28	1.53	1.63
		QUL-ZOO-1	Exposed	5	1.59	0.124	1.46	1.64	1.75
	2021	QUL-ZOO-7	Reference	5	1.12	0.0986	1.04	1.11	1.29
		QUL-ZOO-1	Exposed	5	1.05	0.0720	0.969	1.06	1.14
	2022	QUL-ZOO-7	Reference	5	3.22	0.877	2.26	3.15	4.24
		QUL-ZOO-1	Exposed	5	3.29	1.25	2.50	2.76	5.48
	2023	QUL-ZOO-7	Reference	5	1.09	0.229	0.812	1.06	1.35
		QUL-ZOO-1	Exposed	5	1.34	0.161	1.07	1.41	1.48
	2024	QUL-ZOO-7	Reference	5	0.987	0.172	0.748	1.03	1.15
		QUL-ZOO-1	Exposed	5	1.07	0.0612	1.00	1.09	1.13
Diatoms (cells/L)	2019	QUL-ZOO-7	Reference	5	234,833	42,511	178,235	241,142	279,322
		QUL-ZOO-1	Exposed	5	236,082	37,378	190,904	234,049	287,360
	2020	QUL-ZOO-7	Reference	5	112,351	28,726	78,016	120,571	142,006
		QUL-ZOO-1	Exposed	5	171,850	45,703	120,571	172,582	238,050
	2021	QUL-ZOO-7	Reference	5	226,124	73,531	166,944	186,023	331,570
		QUL-ZOO-1	Exposed	5	193,009	59,073	95,308	211,772	247,325
	2022	QUL-ZOO-7	Reference	5	145,419	37,708	88,419	148,704	192,913
		QUL-ZOO-1	Exposed	5	170,125	50,790	117,479	166,120	226,957
	2023	QUL-ZOO-7	Reference	5	5,795,743	1,099,001	4,451,843	6,048,633	6,872,533
		QUL-ZOO-1	Exposed	5	5,066,136	780,295	4,529,132	4,776,457	6,410,345
	2024	QUL-ZOO-7	Reference	5	1,844,197	111,819	1,721,482	1,864,828	2,001,474
		QUL-ZOO-1	Exposed	5	2,145,058	321,384	1,824,637	2,053,198	2,524,996
Chlorophyte (cells/L)	2019	QUL-ZOO-7	Reference	5	71,172	31,092	32,152	76,361	114,542
		QUL-ZOO-1	Exposed	5	77,544	34,792	47,283	60,285	134,756
	2020	QUL-ZOO-7	Reference	5	116,035	35,562	70,333	115,212	170,036
		QUL-ZOO-1	Exposed	5	131,006	29,733	101,349	127,663	170,036
	2021	QUL-ZOO-7	Reference	5	50,317	10,199	37,894	52,247	60,285
		QUL-ZOO-1	Exposed	5	51,985	21,934	26,278	47,080	85,623
	2022	QUL-ZOO-7	Reference	5	75,593	22,575	41,938	76,361	100,476
		QUL-ZOO-1	Exposed	5	47,588	20,261	16,076	49,465	68,014
	2023	QUL-ZOO-7	Reference	5	47,610	40,181	0	60,285	100,476
		QUL-ZOO-1	Exposed	5	15,458	15,458	0	15,458	30,916
	2024	QUL-ZOO-7	Reference	5	80,113	40,061	46,889	72,342	144,685
		QUL-ZOO-1	Exposed	5	91,529	35,821	40,190	100,476	131,055

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.5.

Table C.3.6: Summary Statistics for Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Chrysophyte (cells/L)	2019	QUL-ZOO-7	Reference	5	187,566	38,220	131,055	202,961	227,075
		QUL-ZOO-1	Exposed	5	259,984	46,357	190,904	260,055	319,158
	2020	QUL-ZOO-7	Reference	5	239,236	96,298	128,609	222,228	389,536
		QUL-ZOO-1	Exposed	5	331,979	97,231	197,456	364,392	439,001
	2021	QUL-ZOO-7	Reference	5	135,043	32,181	106,659	126,312	189,043
		QUL-ZOO-1	Exposed	5	169,051	24,177	143,537	165,398	195,709
	2022	QUL-ZOO-7	Reference	5	793,321	220,034	615,086	703,329	1,173,555
		QUL-ZOO-1	Exposed	5	1,455,796	358,748	1,040,218	1,415,933	1,929,132
	2023	QUL-ZOO-7	Reference	5	102,331	33,979	77,289	92,747	160,761
		QUL-ZOO-1	Exposed	5	113,769	48,262	61,831	120,571	185,493
	2024	QUL-ZOO-7	Reference	5	485,498	96,557	321,522	506,397	578,740
		QUL-ZOO-1	Exposed	5	452,944	126,331	244,636	490,321	559,169
Cryptomonad (cells/L)	2019	QUL-ZOO-7	Reference	5	116,989	12,280	102,485	116,552	136,297
		QUL-ZOO-1	Exposed	5	121,658	22,749	92,201	118,561	156,033
	2020	QUL-ZOO-7	Reference	5	327,117	45,169	247,325	343,627	359,033
		QUL-ZOO-1	Exposed	5	197,968	88,744	50,675	244,233	267,935
	2021	QUL-ZOO-7	Reference	5	70,542	49,190	25,262	56,564	124,590
		QUL-ZOO-1	Exposed	5	63,875	21,201	41,339	71,106	88,109
	2022	QUL-ZOO-7	Reference	5	208,780	45,912	140,666	213,183	265,256
		QUL-ZOO-1	Exposed	5	178,554	85,031	74,197	189,131	296,790
	2023	QUL-ZOO-7	Reference	5	123,353	99,558	77,289	80,380	301,427
		QUL-ZOO-1	Exposed	5	107,586	30,558	77,289	92,747	154,578
	2024	QUL-ZOO-7	Reference	5	62,697	41,921	0	80,380	96,457
		QUL-ZOO-1	Exposed	5	67,956	48,929	0	56,266	120,571
Cyanobacteria (cells/L)	2019	QUL-ZOO-7	Reference	5	31,873	41,273	0	13,979	96,457
		QUL-ZOO-1	Exposed	5	27,211	21,761	0	42,200	44,209
	2020	QUL-ZOO-7	Reference	5	89,875	69,158	10,717	58,740	164,780
		QUL-ZOO-1	Exposed	5	221,666	213,536	58,740	92,612	531,748
	2021	QUL-ZOO-7	Reference	5	65,759	96,272	0	26,794	229,659
		QUL-ZOO-1	Exposed	5	74,533	153,023	0	6,183	347,933
	2022	QUL-ZOO-7	Reference	5	13,944	11,660	3,495	13,979	32,152
		QUL-ZOO-1	Exposed	5	17,313	29,459	0	0	68,014
	2023	QUL-ZOO-7	Reference	5	364,804	540,978	0	0	1,205,707
		QUL-ZOO-1	Exposed	5	3,092	6,913	0	0	15,458
	2024	QUL-ZOO-7	Reference	5	80,380	146,460	0	0	337,598
		QUL-ZOO-1	Exposed	5	16,618	19,637	0	8,737	50,238
Dinoflagellates (cells/L)	2019	QUL-ZOO-7	Reference	5	8,772	6,091	2,010	8,038	18,086
		QUL-ZOO-1	Exposed	5	15,556	6,970	7,092	16,076	26,005
	2020	QUL-ZOO-7	Reference	5	5,090	5,020	0	2,679	12,366
		QUL-ZOO-1	Exposed	5	12,195	6,688	4,728	12,366	21,435
	2021	QUL-ZOO-7	Reference	5	2,591	3,184	0	2,010	7,729
		QUL-ZOO-1	Exposed	5	8,006	3,587	3,092	8,038	12,232
	2022	QUL-ZOO-7	Reference	5	3,495	4,942	0	0	10,484
		QUL-ZOO-1	Exposed	5	4,617	4,603	0	6,183	10,717
	2023	QUL-ZOO-7	Reference	5	49,774	10,620	40,190	46,373	61,831
		QUL-ZOO-1	Exposed	5	15,458	15,458	0	15,458	30,916
	2024	QUL-ZOO-7	Reference	5	11,253	7,189	0	16,076	16,076
		QUL-ZOO-1	Exposed	5	28,168	14,104	8,737	24,114	43,685
Diatoms (%)	2019	QUL-ZOO-7	Reference	5	36.0	3.31	31.4	35.5	39.7
		QUL-ZOO-1	Exposed	5	32.0	5.16	27.6	31.7	40.4
	2020	QUL-ZOO-7	Reference	5	12.7	3.35	8.44	12.1	16.1
		QUL-ZOO-1	Exposed	5	17.7	7.70	11.1	14.7	29.6
	2021	QUL-ZOO-7	Reference	5	40.9	9.98	30.7	36.1	55.0
		QUL-ZOO-1	Exposed	5	35.7	13.0	13.9	40.6	48.0
	2023	QUL-ZOO-7	Reference	5	89.5	7.64	79.6	92.8	96.6
		QUL-ZOO-1	Exposed	5	95.1	1.10	93.7	95.1	96.4
	2024	QUL-ZOO-7	Reference	5	72.6	6.53	64.5	71.6	82.4
		QUL-ZOO-1	Exposed	5	76.3	6.42	72.1	72.8	87.3
Chlorophytes (%)	2019	QUL-ZOO-7	Reference	5	10.7	3.76	5.30	10.9	14.2
		QUL-ZOO-1	Exposed	5	10.5	4.65	6.13	8.82	18.3
	2020	QUL-ZOO-7	Reference	5	12.9	2.93	8.77	13.0	17.0
		QUL-ZOO-1	Exposed	5	13.2	4.07	8.32	15.6	17.0
	2021	QUL-ZOO-7	Reference	5	9.45	2.90	6.26	8.59	13.0
		QUL-ZOO-1	Exposed	5	9.33	4.01	5.11	8.31	15.4
	2022	QUL-ZOO-7	Reference	5	6.14	1.95	3.79	5.57	8.41
		QUL-ZOO-1	Exposed	5	2.50	0.960	1.00	2.84	3.49
	2023	QUL-ZOO-7	Reference	5	0.727	0.575	0	0.794	1.38
		QUL-ZOO-1	Exposed	5	0.307	0.307	0	0.311	0.645
	2024	QUL-ZOO-7	Reference	5	3.02	1.07	1.94	2.88	4.66
		QUL-ZOO-1	Exposed	5	3.22	1.14	1.60	3.16	4.60
Chrysophytes (%)	2019	QUL-ZOO-7	Reference	5	28.8	4.55	22.6	29.5	33.4
		QUL-ZOO-1	Exposed	5	35.1	5.29	26.8	35.3	41.4
	2020	QUL-ZOO-7	Reference	5	26.4	8.45	16.0	24.0	39.0
		QUL-ZOO-1	Exposed	5	31.8	4.58	27.1	31.0	39.0
	2021	QUL-ZOO-7	Reference	5	25.4	8.51	16.7	23.1	39.0
		QUL-ZOO-1	Exposed	5	30.6	6.21	21.0	31.8	37.1
	2022	QUL-ZOO-7	Reference	5	63.2	8.87	55.0	63.1	77.7
		QUL-ZOO-1	Exposed	5	77.1	8.69	68.6	75.0	86.7
	2023	QUL-ZOO-7	Reference	5	1.58	0.377	1.10	1.52	2.12
		QUL-ZOO-1	Exposed	5	2.16	1.00	1.24	1.81	3.81
	2024	QUL-ZOO-7	Reference	5	18.9	3.18	15.4	19.3	23.2
		QUL-ZOO-1	Exposed	5	16.4	5.26	8.46	19.6	20.8

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.5.

Table C.3.6: Summary Statistics for Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Cryptomonads (%)	2019	QUL-ZOO-7	Reference	5	18.4	4.05	12.8	18.5	23.5
		QUL-ZOO-1	Exposed	5	16.5	2.65	12.5	16.7	19.8
	2020	QUL-ZOO-7	Reference	5	37.2	7.24	24.8	40.5	42.9
		QUL-ZOO-1	Exposed	5	18.2	6.74	7.95	21.3	24.8
	2021	QUL-ZOO-7	Reference	5	13.0	9.16	4.17	11.7	26.1
		QUL-ZOO-1	Exposed	5	11.8	4.72	6.05	13.8	16.9
	2022	QUL-ZOO-7	Reference	5	17.2	4.53	9.31	18.7	20.8
		QUL-ZOO-1	Exposed	5	9.86	4.83	3.81	12.6	14.4
	2023	QUL-ZOO-7	Reference	5	1.86	1.29	1.06	1.45	4.14
		QUL-ZOO-1	Exposed	5	2.05	0.667	1.59	1.81	3.23
	2024	QUL-ZOO-7	Reference	5	2.33	1.54	0	3.06	3.87
		QUL-ZOO-1	Exposed	5	2.46	1.81	0	2.17	4.81
Cyanobacteria (%)	2019	QUL-ZOO-7	Reference	5	4.58	5.39	0	2.46	12.0
		QUL-ZOO-1	Exposed	5	3.77	3.06	0	5.52	6.47
	2020	QUL-ZOO-7	Reference	5	10.3	8.25	1.21	6.50	20.6
		QUL-ZOO-1	Exposed	5	18.0	12.1	5.88	14.5	32.8
	2021	QUL-ZOO-7	Reference	5	10.8	15.8	0	5.52	38.0
		QUL-ZOO-1	Exposed	5	11.1	22.3	0	1.19	50.9
	2022	QUL-ZOO-7	Reference	5	1.06	0.762	0.315	1.26	2.13
		QUL-ZOO-1	Exposed	5	0.824	1.43	0	0	3.29
	2023	QUL-ZOO-7	Reference	5	5.49	7.67	0	0	15.9
		QUL-ZOO-1	Exposed	5	0.0635	0.142	0	0	0.317
	2024	QUL-ZOO-7	Reference	5	2.67	4.71	0	0	10.9
		QUL-ZOO-1	Exposed	5	0.566	0.609	0	0.321	1.58
Dinoflagellates (%)	2019	QUL-ZOO-7	Reference	5	1.43	1.04	0.250	1.15	2.98
		QUL-ZOO-1	Exposed	5	2.11	0.910	0.901	2.24	3.37
	2020	QUL-ZOO-7	Reference	5	0.560	0.531	0	0.302	1.24
		QUL-ZOO-1	Exposed	5	1.11	0.412	0.576	1.10	1.71
	2021	QUL-ZOO-7	Reference	5	0.521	0.696	0	0.287	1.67
		QUL-ZOO-1	Exposed	5	1.43	0.672	0.601	1.19	2.32
	2022	QUL-ZOO-7	Reference	5	0.319	0.449	0	0	0.946
		QUL-ZOO-1	Exposed	5	0.248	0.275	0	0.275	0.667
	2023	QUL-ZOO-7	Reference	5	0.802	0.280	0.529	0.847	1.22
		QUL-ZOO-1	Exposed	5	0.309	0.314	0	0.291	0.635
	2024	QUL-ZOO-7	Reference	5	0.422	0.273	0	0.518	0.645
		QUL-ZOO-1	Exposed	5	0.999	0.461	0.302	0.962	1.53

Notes: Cell/L = cells per litre. µg/L = micrograms per litre. Displayed data were collected using depth-integrated (DI) sampling methods. Sampling methods employed in 2019 included both surface (S) and DI methods. See Minnow (2019a, 2020a) for results of surface phytoplankton sampling completed in 2018 and 2019. See Minnow 2020a for a comparison of results from the S and DI sampling methodologies, and for rationale regarding the selection of DI methods for ongoing phytoplankton monitoring.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.5.

Table C.3.7: Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (organisms/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Wet Weight Biomass (mg/L)	Dry Weight Biomass (mg/L)	Calanoida (organisms/L)	Cladocera (organisms/L)
2019	QUL-ZOO-7	Reference	Jun 25	1	7.60	10	0.760	0.417	0.0767	0.0153	0.821	0.297
			Jul 30	1	3.47	10	0.802	0.504	0.0269	0.00532	0.274	0.205
			Jul 30	2	2.86	8	0.766	0.534	0.0214	0.00424	0.169	0.146
			Jul 30	3	3.65	9	0.743	0.432	0.0277	0.00548	0.292	0.178
			Jul 30	4	2.70	9	0.747	0.440	0.0195	0.00387	0.132	0.183
			Jul 30	5	3.35	10	0.738	0.382	0.0243	0.00481	0.224	0.187
			Aug 29	1	1.47	10	0.804	0.511	0.0110	0.00219	0.123	0.0844
	QUL-ZOO-1	Exposed	Jun 25	1	5.90	7	0.743	0.555	0.0520	0.0104	0.513	0.0799
			Jul 30	1	2.87	10	0.730	0.370	0.0154	0.00305	0.180	0.116
			Jul 30	2	3.08	10	0.717	0.353	0.0142	0.00277	0.155	0.116
			Jul 30	3	3.67	10	0.788	0.471	0.0253	0.00501	0.292	0.173
			Jul 30	4	4.17	11	0.751	0.365	0.0238	0.00470	0.292	0.164
			Jul 30	5	2.56	10	0.812	0.531	0.0200	0.00396	0.196	0.151
			Aug 29	1	1.26	9	0.811	0.589	0.00632	0.00125	0.0426	0.0700
2020	QUL-ZOO-7	Reference	Jun 23	-	8.72	8	0.761	0.524	0.107	0.0214	1.89	0.123
			Jul 28	1	9.87	11	0.730	0.337	0.0492	0.00955	0.616	0.189
			Jul 28	2	11.3	12	0.720	0.298	0.0268	0.00500	0.296	0.0641
			Jul 28	3	7.79	10	0.708	0.342	0.0301	0.00578	0.409	0.0986
			Jul 28	4	11.4	11	0.681	0.285	0.0368	0.00698	0.414	0.246
			Jul 28	5	25.0	9	0.578	0.264	0.0442	0.00784	0.419	0.279
			Aug 27	-	7.69	13	0.817	0.421	0.153	0.0306	1.43	2.91
	QUL-ZOO-1	Exposed	Jun 23	-	10.9	11	0.771	0.397	0.164	0.0327	3.48	0.0657
			Jul 28	1	13.2	11	0.811	0.480	0.0532	0.0104	0.634	0.176
			Jul 28	2	6.35	12	0.814	0.447	0.0317	0.00619	0.401	0.232
			Jul 28	3	11.8	12	0.758	0.344	0.0346	0.00655	0.511	0.166
			Jul 28	4	7.23	12	0.771	0.363	0.0313	0.00605	0.527	0.133
			Jul 28	5	16.1	11	0.760	0.378	0.0379	0.00705	0.468	0.242
			Aug 27	-	5.36	10	0.770	0.434	0.0284	0.00554	0.246	0.240
2021	QUL-ZOO-7	Reference	Jun 23	-	18.1	12	0.814	0.447	0.177	0.0352	4.23	0.534
			Jul 28	1	9.59	11	0.798	0.450	0.0324	0.00604	0.442	0.524
			Jul 28	2	8.28	13	0.735	0.290	0.0259	0.00479	0.370	0.518
			Jul 28	3	7.22	13	0.679	0.240	0.0187	0.00342	0.178	0.308
			Jul 28	4	9.36	14	0.704	0.241	0.0228	0.00406	0.288	0.364
			Jul 28	5	6.88	12	0.720	0.298	0.0133	0.00232	0.181	0.195
			Aug 29	-	3.23	16	0.804	0.319	0.00535	0.000975	0.109	0.198
	QUL-ZOO-1	Exposed	Jun 23	-	14.7	10	0.797	0.493	0.0658	0.0129	1.36	0.151
			Jul 28	1	11.2	14	0.726	0.261	0.0249	0.00458	0.271	0.592
			Jul 28	2	5.10	13	0.722	0.277	0.0117	0.00213	0.0904	0.152
			Jul 28	3	6.28	14	0.805	0.366	0.0145	0.00265	0.146	0.178
			Jul 28	4	10.1	11	0.796	0.446	0.0233	0.00421	0.263	0.435
			Jul 28	5	6.54	11	0.732	0.339	0.0152	0.00279	0.160	0.177
			Aug 29	-	4.43	12	0.781	0.381	0.00873	0.00162	0.108	0.210

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. mg/L = milligrams per litre.

Table C.3.7: Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Density (organisms/L)	Richness (# of Taxa)	Simpson's Diversity	Simpson's Evenness	Wet Weight Biomass (mg/L)	Dry Weight Biomass (mg/L)	Calanoida (organisms/L)	Cladocera (organisms/L)
2022	QUL-ZOO-7	Reference	Jun 22	1	5.46	9	0.817	0.607	0.0510	0.00992	0.772	0.0154
			Jul 27	1	5.29	11	0.797	0.449	0.0226	0.00418	0.154	0.0803
			Jul 27	2	11.9	11	0.479	0.175	0.0360	0.00503	0.0782	0.0761
			Jul 27	3	3.10	9	0.725	0.404	0.0135	0.00234	0.0759	0.0537
			Jul 27	4	4.03	9	0.817	0.608	0.0212	0.00403	0.163	0.163
			Jul 27	5	5.53	10	0.774	0.442	0.0203	0.00350	0.102	0.157
			Aug 28	1	2.31	11	0.793	0.439	0.0127	0.00246	0.0597	0.144
	QUL-ZOO-1	Exposed	Jun 22	-	2.88	10	0.828	0.581	0.0261	0.00508	0.384	0.0340
			Jul 27	1	6.77	9	0.811	0.587	0.0254	0.00458	0.133	0.136
			Jul 27	2	7.76	10	0.805	0.514	0.0287	0.00518	0.163	0.153
			Jul 28	3	11.7	12	0.774	0.368	0.0352	0.00585	0.139	0.139
			Jul 28	4	3.72	10	0.823	0.564	0.0196	0.00369	0.0988	0.121
			Jul 28	5	4.65	11	0.813	0.485	0.0191	0.00347	0.0926	0.0895
			Aug 28	-	3.65	12	0.799	0.415	0.0205	0.00401	0.0833	0.262
2023	QUL-ZOO-7	Reference	Jun 21	1	10.1	12	0.737	0.317	0.0953	0.0190	0.608	0.131
			Jul 26	1	17.3	12	0.793	0.403	0.0763	0.0148	0.920	0.690
			Jul 26	2	17.3	13	0.705	0.260	0.0408	0.00763	0.419	0.312
			Jul 26	3	5.77	15	0.704	0.225	0.0123	0.00230	0.149	0.0640
			Jul 26	4	17.7	12	0.745	0.327	0.0643	0.0124	0.881	0.565
			Jul 26	5	16.4	13	0.751	0.309	0.0454	0.00866	0.715	0.296
			Aug 27	1	6.32	10	0.820	0.555	0.0263	0.00512	0.345	0.164
	QUL-ZOO-1	Exposed	Jun 21	-	2.92	11	0.747	0.359	0.0253	0.00505	0.113	0.00939
			Jul 26	1	8.07	12	0.773	0.367	0.0342	0.00669	0.485	0.173
			Jul 26	2	15.0	14	0.747	0.282	0.0558	0.0108	0.701	0.383
			Jul 26	3	14.9	11	0.744	0.355	0.0569	0.0110	0.865	0.307
			Jul 26	4	29.7	13	0.736	0.292	0.0882	0.0168	1.36	0.657
			Jul 26	5	8.69	11	0.745	0.356	0.0339	0.00656	0.519	0.164
			Aug 27	-	14.1	11	0.737	0.346	0.0421	0.00800	0.633	0.394
2024	QUL-ZOO-7	Reference	Jun 20	1	0.839	12	0.831	0.492	0.00350	0.000676	0.0646	0.00767
			Jul 24	1	2.61	11	0.746	0.358	0.00578	0.00110	0.0815	0.239
			Jul 24	2	2.13	13	0.634	0.210	0.00510	0.000971	0.0302	0.0789
			Jul 24	3	3.12	13	0.686	0.245	0.00804	0.00154	0.0518	0.242
			Jul 24	4	2.23	12	0.616	0.217	0.00467	0.000881	0.0289	0.0841
			Jul 24	5	3.78	13	0.711	0.266	0.00711	0.00126	0.0695	0.139
			Aug 25	1	2.14	15	0.828	0.388	0.00593	0.00113	0.0828	0.237
	QUL-ZOO-1	Exposed	Jun 20	-	2.16	10	0.812	0.533	0.00779	0.00150	0.0966	0.00580
			Jul 24	1	1.61	12	0.755	0.340	0.00610	0.00119	0.0493	0.100
			Jul 24	2	1.75	11	0.653	0.262	0.00431	0.000821	0.0175	0.0821
			Jul 24	3	1.83	13	0.680	0.241	0.00506	0.000971	0.0350	0.0361
			Jul 24	4	1.63	10	0.700	0.333	0.00354	0.000664	0.0219	0.0473
			Jul 24	5	1.64	11	0.682	0.286	0.00467	0.000894	0.0289	0.0789
			Aug 25	-	2.26	15	0.836	0.407	0.00624	0.00118	0.0986	0.266

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. mg/L = milligrams per litre.

Table C.3.7: Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Copepod Nauplii (organisms/L)	Cyclopoida (organisms/L)	Rotifera (organisms/L)	Calanoida (%)	Cladocera (%)	Copepod Nauplii (%)	Cyclopoida (%)	Rotifera (%)
2019	QUL-ZOO-7	Reference	Jun 25	1	0.662	2.56	3.26	10.8	3.90	8.71	33.6	42.9
			Jul 30	1	0.205	0.712	2.08	7.88	5.91	5.91	20.5	59.8
			Jul 30	2	0.0913	0.689	1.76	5.90	5.11	3.19	24.1	61.7
			Jul 30	3	0.0913	0.808	2.28	8.00	4.88	2.50	22.1	62.5
			Jul 30	4	0.0913	0.589	1.70	4.90	6.76	3.38	21.8	63.1
			Jul 30	5	0.0685	0.698	2.17	6.68	5.59	2.05	20.9	64.8
			Aug 29	1	0.0761	0.317	0.867	8.39	5.75	5.18	21.6	59.1
	QUL-ZOO-1	Exposed	Jun 25	1	1.25	2.02	2.03	8.70	1.35	21.3	34.2	34.4
			Jul 30	1	0.297	0.383	1.89	6.26	4.03	10.3	13.4	66.0
			Jul 30	2	0.205	0.347	2.26	5.03	3.75	6.66	11.2	73.3
			Jul 30	3	0.434	0.648	2.12	7.96	4.73	11.8	17.7	57.8
			Jul 30	4	0.297	0.584	2.83	7.01	3.94	7.12	14.0	67.9
			Jul 30	5	0.319	0.539	1.35	7.67	5.89	12.5	21.1	52.9
			Aug 29	1	0.167	0.186	0.791	3.39	5.57	13.3	14.8	63.0
2020	QUL-ZOO-7	Reference	Jun 23	-	2.03	3.12	1.56	21.7	1.41	23.2	35.8	17.9
			Jul 28	1	1.28	1.47	6.31	6.24	1.92	13.0	14.9	64.0
			Jul 28	2	1.48	0.838	8.67	2.61	0.564	13.0	7.38	76.4
			Jul 28	3	0.789	0.877	5.62	5.25	1.27	10.1	11.3	72.1
			Jul 28	4	1.28	1.30	8.13	3.64	2.17	11.3	11.4	71.5
			Jul 28	5	1.15	1.15	22.0	1.67	1.12	4.60	4.60	88.0
			Aug 27	-	0.715	0.690	1.95	18.6	37.8	9.29	8.97	25.3
	QUL-ZOO-1	Exposed	Jun 23	-	0.712	3.15	3.45	32.1	0.605	6.55	29.0	31.8
			Jul 28	1	3.37	1.75	7.31	4.79	1.33	25.4	13.2	55.2
			Jul 28	2	0.986	0.838	3.89	6.32	3.66	15.5	13.2	61.3
			Jul 28	3	1.28	0.622	9.22	4.33	1.41	10.9	5.27	78.1
			Jul 28	4	0.542	0.606	5.42	7.29	1.84	7.50	8.38	75.0
			Jul 28	5	1.87	0.818	12.7	2.91	1.50	11.6	5.08	78.9
			Aug 27	-	0.912	0.758	3.20	4.60	4.48	17.0	14.1	59.8
2021	QUL-ZOO-7	Reference	Jun 23	-	6.00	3.90	3.45	23.4	2.95	33.1	21.5	19.1
			Jul 28	1	1.44	1.27	5.91	4.61	5.46	15.0	13.3	61.7
			Jul 28	2	0.575	0.986	5.83	4.47	6.25	6.94	11.9	70.4
			Jul 28	3	0.329	0.904	5.50	2.47	4.27	4.55	12.5	76.2
			Jul 28	4	0.780	0.786	7.15	3.07	3.88	8.33	8.40	76.3
			Jul 28	5	0.575	0.387	5.54	2.64	2.83	8.35	5.62	80.6
			Aug 29	-	0.460	0.391	2.07	3.38	6.13	14.2	12.1	64.1
	QUL-ZOO-1	Exposed	Jun 23	-	7.31	1.71	4.19	9.21	1.02	49.7	11.6	28.5
			Jul 28	1	1.38	1.09	7.82	2.43	5.30	12.4	9.79	70.1
			Jul 28	2	0.493	0.587	3.78	1.77	2.98	9.66	11.5	74.1
			Jul 28	3	0.986	0.662	4.31	2.32	2.83	15.7	10.5	68.6
			Jul 28	4	1.81	0.986	6.61	2.60	4.31	17.9	9.76	65.5
			Jul 28	5	0.945	0.698	4.56	2.45	2.70	14.4	10.7	69.7
			Aug 29	-	0.986	0.682	2.44	2.44	4.73	22.3	15.4	55.2

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. mg/L = milligrams per litre.

Table C.3.7: Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2019 to 2024

Year	Area	Type	Date	Replicate	Copepod Nauplii (organisms/L)	Cyclopoida (organisms/L)	Rotifera (organisms/L)	Calanoida (%)	Cladocera (%)	Copepod Nauplii (%)	Cyclopoida (%)	Rotifera (%)
2022	QUL-ZOO-7	Reference	Jun 22	1	1.34	1.31	2.02	14.1	0.282	24.6	24.0	37.0
			Jul 27	1	1.42	0.549	3.09	2.92	1.52	26.8	10.4	58.3
			Jul 27	2	0.648	0.434	10.7	0.654	0.637	5.43	3.63	89.7
			Jul 27	3	0.574	0.289	2.11	2.45	1.73	18.5	9.31	68.0
			Jul 27	4	0.722	0.496	2.48	4.05	4.05	17.9	12.3	61.6
			Jul 27	5	0.741	0.423	4.11	1.84	2.84	13.4	7.64	74.3
			Aug 28	1	0.545	0.296	1.27	2.58	6.24	23.6	12.8	54.8
	QUL-ZOO-1	Exposed	Jun 22	-	0.815	0.676	0.973	13.3	1.18	28.3	23.4	33.8
			Jul 27	1	1.39	0.602	4.51	1.96	2.01	20.5	8.90	66.6
			Jul 27	2	2.07	0.689	4.69	2.10	1.97	26.7	8.88	60.4
			Jul 28	3	1.54	0.692	9.18	1.19	1.19	13.2	5.92	78.5
			Jul 28	4	0.633	0.509	2.36	2.65	3.24	17.0	13.7	63.4
			Jul 28	5	0.895	0.460	3.12	1.99	1.92	19.2	9.88	67.0
			Aug 28	-	0.772	0.407	2.13	2.28	7.18	21.1	11.2	58.3
2023	QUL-ZOO-7	Reference	Jun 21	1	3.48	3.80	2.04	6.05	1.31	34.6	37.8	20.3
			Jul 26	1	1.38	2.12	12.2	5.31	3.98	7.96	12.2	70.5
			Jul 26	2	0.329	1.13	15.1	2.42	1.80	1.90	6.51	87.4
			Jul 26	3	0.230	0.299	5.03	2.58	1.11	3.99	5.19	87.1
			Jul 26	4	0.394	1.58	14.3	4.98	3.20	2.23	8.92	80.7
			Jul 26	5	0.789	0.912	13.7	4.36	1.81	4.81	5.57	83.5
			Aug 27	1	0.624	0.685	4.50	5.46	2.60	9.88	10.8	71.2
	QUL-ZOO-1	Exposed	Jun 21	-	0.969	1.07	0.756	3.86	0.322	33.2	36.7	25.9
			Jul 26	1	0.723	1.01	5.68	6.00	2.14	8.95	12.5	70.4
			Jul 26	2	0.854	1.48	11.6	4.68	2.56	5.70	9.87	77.2
			Jul 26	3	1.25	1.28	11.2	5.82	2.06	8.39	8.62	75.1
			Jul 26	4	1.71	1.82	24.1	4.60	2.21	5.76	6.15	81.3
			Jul 26	5	0.559	0.749	6.70	5.97	1.89	6.42	8.62	77.1
			Aug 27	-	0.526	0.879	11.7	4.48	2.79	3.72	6.22	82.8
2024	QUL-ZOO-7	Reference	Jun 20	1	0.197	0.153	0.416	7.70	0.914	23.5	18.3	49.6
			Jul 24	1	0.237	0.210	1.84	3.12	9.18	9.07	8.06	70.6
			Jul 24	2	0.131	0.198	1.70	1.42	3.69	6.16	9.30	79.4
			Jul 24	3	0.163	0.283	2.38	1.66	7.74	5.21	9.08	76.3
			Jul 24	4	0.105	0.162	1.85	1.29	3.77	4.71	7.26	83.0
			Jul 24	5	0.197	0.216	3.15	1.84	3.68	5.22	5.72	83.5
			Aug 25	1	0.256	0.205	1.36	3.87	11.1	12.0	9.57	63.5
	QUL-ZOO-1	Exposed	Jun 20	-	0.411	0.336	1.31	4.47	0.268	19.0	15.5	60.7
			Jul 24	1	0.164	0.242	1.06	3.05	6.21	10.2	14.9	65.6
			Jul 24	2	0.171	0.151	1.33	1.00	4.70	9.77	8.64	75.9
			Jul 24	3	0.197	0.182	1.38	1.92	1.97	10.8	9.93	75.4
			Jul 24	4	0.184	0.137	1.24	1.35	2.91	11.3	8.41	76.0
			Jul 24	5	0.105	0.176	1.25	1.77	4.82	6.42	10.8	76.2
			Aug 25	-	0.320	0.191	1.38	4.37	11.8	14.2	8.45	61.2

Notes: "-" = only one sample (replicate) collected. Cells/L = cells per litre. mg/L = milligrams per litre.

Table C.3.8: Summary Statistics for Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (organisms/L)	2019	QUL-ZOO-7	Reference	5	3.21	0.408	2.70	3.35	3.65
		QUL-ZOO-1	Exposed	5	3.27	0.645	2.56	3.08	4.17
	2020	QUL-ZOO-7	Reference	5	13.1	6.83	7.79	11.3	25.0
		QUL-ZOO-1	Exposed	5	10.9	4.11	6.35	11.8	16.1
	2021	QUL-ZOO-7	Reference	5	8.27	1.22	6.88	8.28	9.59
		QUL-ZOO-1	Exposed	5	7.84	2.63	5.10	6.54	11.2
	2022	QUL-ZOO-7	Reference	5	5.98	3.48	3.10	5.29	11.9
		QUL-ZOO-1	Exposed	5	6.92	3.12	3.72	6.77	11.7
	2023	QUL-ZOO-7	Reference	5	14.9	5.12	5.77	17.3	17.7
		QUL-ZOO-1	Exposed	5	15.3	8.70	8.07	14.9	29.7
	2024	QUL-ZOO-7	Reference	5	2.77	0.680	2.13	2.61	3.78
		QUL-ZOO-1	Exposed	5	1.69	0.0945	1.61	1.64	1.83
Richness (# of Taxa)	2019	QUL-ZOO-7	Reference	5	9	0.84	8	9	10
		QUL-ZOO-1	Exposed	5	10	0.45	10	10	11
	2020	QUL-ZOO-7	Reference	5	11	1.14	9	11	12
		QUL-ZOO-1	Exposed	5	12	0.55	11	12	12
	2021	QUL-ZOO-7	Reference	5	13	1.14	11	13	14
		QUL-ZOO-1	Exposed	5	13	1.52	11	13	14
	2022	QUL-ZOO-7	Reference	5	10	1.00	9	10	11
		QUL-ZOO-1	Exposed	5	10	1.14	9	10	12
	2023	QUL-ZOO-7	Reference	5	13	1.22	12	13	15
		QUL-ZOO-1	Exposed	5	12	1.30	11	12	14
	2024	QUL-ZOO-7	Reference	5	12	0.89	11	13	13
		QUL-ZOO-1	Exposed	5	11	1.14	10	11	13
Simpson's Diversity	2019	QUL-ZOO-7	Reference	5	0.759	0.0259	0.738	0.747	0.802
		QUL-ZOO-1	Exposed	5	0.759	0.0395	0.717	0.751	0.812
	2020	QUL-ZOO-7	Reference	5	0.684	0.0616	0.578	0.708	0.730
		QUL-ZOO-1	Exposed	5	0.782	0.0275	0.758	0.771	0.814
	2021	QUL-ZOO-7	Reference	5	0.727	0.0445	0.679	0.720	0.798
		QUL-ZOO-1	Exposed	5	0.756	0.0407	0.722	0.732	0.805
	2022	QUL-ZOO-7	Reference	5	0.719	0.138	0.479	0.774	0.817
		QUL-ZOO-1	Exposed	5	0.805	0.0186	0.774	0.811	0.823
	2023	QUL-ZOO-7	Reference	5	0.740	0.0372	0.704	0.745	0.793
		QUL-ZOO-1	Exposed	5	0.749	0.0139	0.736	0.745	0.773
	2024	QUL-ZOO-7	Reference	5	0.678	0.0539	0.616	0.686	0.746
		QUL-ZOO-1	Exposed	5	0.694	0.0378	0.653	0.682	0.755
Simpson's Evenness	2019	QUL-ZOO-7	Reference	5	0.459	0.0606	0.382	0.440	0.534
		QUL-ZOO-1	Exposed	5	0.418	0.0787	0.353	0.370	0.531
	2020	QUL-ZOO-7	Reference	5	0.305	0.0338	0.264	0.298	0.342
		QUL-ZOO-1	Exposed	5	0.403	0.0582	0.344	0.378	0.480
	2021	QUL-ZOO-7	Reference	5	0.304	0.0860	0.240	0.290	0.450
		QUL-ZOO-1	Exposed	5	0.338	0.0744	0.261	0.339	0.446
	2022	QUL-ZOO-7	Reference	5	0.416	0.156	0.175	0.442	0.608
		QUL-ZOO-1	Exposed	5	0.504	0.0857	0.368	0.514	0.587
	2023	QUL-ZOO-7	Reference	5	0.305	0.0680	0.225	0.309	0.403
		QUL-ZOO-1	Exposed	5	0.330	0.0401	0.282	0.355	0.367
	2024	QUL-ZOO-7	Reference	5	0.259	0.0595	0.210	0.245	0.358
		QUL-ZOO-1	Exposed	5	0.292	0.0434	0.241	0.286	0.340
Wet Weight Biomass (mg/L)	2019	QUL-ZOO-7	Reference	5	0.0240	0.00348	0.0195	0.0243	0.0277
		QUL-ZOO-1	Exposed	5	0.0197	0.00491	0.0142	0.0200	0.0253
	2020	QUL-ZOO-7	Reference	5	0.0374	0.00938	0.0268	0.0368	0.0492
		QUL-ZOO-1	Exposed	5	0.0377	0.00904	0.0313	0.0346	0.0532
	2021	QUL-ZOO-7	Reference	5	0.0226	0.00720	0.0133	0.0228	0.0324
		QUL-ZOO-1	Exposed	5	0.0180	0.00583	0.0117	0.0152	0.0249
	2022	QUL-ZOO-7	Reference	5	0.0227	0.00821	0.0135	0.0212	0.0360
		QUL-ZOO-1	Exposed	5	0.0256	0.00670	0.0191	0.0254	0.0352
	2023	QUL-ZOO-7	Reference	5	0.0478	0.0245	0.0123	0.0454	0.0763
		QUL-ZOO-1	Exposed	5	0.0538	0.0222	0.0339	0.0558	0.0882
	2024	QUL-ZOO-7	Reference	5	0.00614	0.00140	0.00467	0.00578	0.00804
		QUL-ZOO-1	Exposed	5	0.00473	0.000948	0.00354	0.00467	0.00610
Dry Weight Biomass (mg/L)	2019	QUL-ZOO-7	Reference	5	0.00474	0.000690	0.00387	0.00481	0.00548
		QUL-ZOO-1	Exposed	5	0.00390	0.000983	0.00277	0.00396	0.00501
	2020	QUL-ZOO-7	Reference	5	0.00703	0.00178	0.00500	0.00698	0.00955
		QUL-ZOO-1	Exposed	5	0.00724	0.00179	0.00605	0.00655	0.0104
	2021	QUL-ZOO-7	Reference	5	0.00412	0.00140	0.00232	0.00406	0.00604
		QUL-ZOO-1	Exposed	5	0.00327	0.00106	0.00213	0.00279	0.00458
	2022	QUL-ZOO-7	Reference	5	0.00382	0.000989	0.00234	0.00403	0.00503
		QUL-ZOO-1	Exposed	5	0.00455	0.00100	0.00347	0.00458	0.00585
	2023	QUL-ZOO-7	Reference	5	0.00916	0.00480	0.00230	0.00866	0.0148
		QUL-ZOO-1	Exposed	5	0.0104	0.00420	0.00656	0.0108	0.0168
	2024	QUL-ZOO-7	Reference	5	0.00115	0.000261	0.000881	0.00110	0.00154
		QUL-ZOO-1	Exposed	5	0.000908	0.000194	0.000664	0.000894	0.00119
Calanoida (organisms/L)	2019	QUL-ZOO-7	Reference	5	0.218	0.0678	0.132	0.224	0.292
		QUL-ZOO-1	Exposed	5	0.223	0.0647	0.155	0.196	0.292
	2020	QUL-ZOO-7	Reference	5	0.431	0.116	0.296	0.414	0.616
		QUL-ZOO-1	Exposed	5	0.508	0.0854	0.401	0.511	0.634
	2021	QUL-ZOO-7	Reference	5	0.292	0.116	0.178	0.288	0.442
		QUL-ZOO-1	Exposed	5	0.186	0.0784	0.0904	0.160	0.271
	2022	QUL-ZOO-7	Reference	5	0.115	0.0415	0.0759	0.102	0.163
		QUL-ZOO-1	Exposed	5	0.125	0.0293	0.0926	0.133	0.163
	2023	QUL-ZOO-7	Reference	5	0.617	0.328	0.149	0.715	0.920
		QUL-ZOO-1	Exposed	5	0.787	0.357	0.485	0.701	1.36
	2024	QUL-ZOO-7	Reference	5	0.0524	0.0234	0.0289	0.0518	0.0815
		QUL-ZOO-1	Exposed	5	0.0305	0.0124	0.0175	0.0289	0.0493
Cladocera (organisms/L)	2019	QUL-ZOO-7	Reference	5	0.180	0.0216	0.146	0.183	0.205
		QUL-ZOO-1	Exposed	5	0.144	0.0271	0.116	0.151	0.173
	2020	QUL-ZOO-7	Reference	5	0.175	0.0926	0.0641	0.189	0.279
		QUL-ZOO-1	Exposed	5	0.190	0.0459	0.133	0.176	0.242
	2021	QUL-ZOO-7	Reference	5	0.382	0.141	0.195	0.364	0.524
		QUL-ZOO-1	Exposed	5	0.307	0.197	0.152	0.178	0.592
	2022	QUL-ZOO-7	Reference	5	0.106	0.0504	0.0537	0.0803	0.163
		QUL-ZOO-1	Exposed	5	0.128	0.0241	0.0895	0.136	0.153
	2023	QUL-ZOO-7	Reference	5	0.385	0.246	0.0640	0.312	0.690
		QUL-ZOO-1	Exposed	5	0.337	0.202	0.164	0.307	0.657
	2024	QUL-ZOO-7	Reference	5	0.157	0.0801	0.0789	0.139	0.242
		QUL-ZOO-1	Exposed	5	0.0689	0.0264	0.0361	0.0789	0.100

Notes: organisms/L = organisms per litre. mg/L = milligrams per litre.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.7.

Table C.3.8: Summary Statistics for Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024[a]

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Copepod Nauplii (organisms/L)	2019	QUL-ZOO-7	Reference	5	0.110	0.0545	0.0685	0.0913	0.205
		QUL-ZOO-1	Exposed	5	0.310	0.0816	0.205	0.297	0.434
	2020	QUL-ZOO-7	Reference	5	1.20	0.256	0.789	1.28	1.48
		QUL-ZOO-1	Exposed	5	1.61	1.10	0.542	1.28	3.37
	2021	QUL-ZOO-7	Reference	5	0.739	0.422	0.329	0.575	1.44
		QUL-ZOO-1	Exposed	5	1.12	0.495	0.493	0.986	1.81
	2022	QUL-ZOO-7	Reference	5	0.821	0.341	0.574	0.722	1.42
		QUL-ZOO-1	Exposed	5	1.31	0.564	0.633	1.39	2.07
	2023	QUL-ZOO-7	Reference	5	0.624	0.473	0.230	0.394	1.38
		QUL-ZOO-1	Exposed	5	1.02	0.462	0.559	0.854	1.71
	2024	QUL-ZOO-7	Reference	5	0.167	0.0521	0.105	0.163	0.237
		QUL-ZOO-1	Exposed	5	0.164	0.0354	0.105	0.171	0.197
Cyclopoida (organisms/L)	2019	QUL-ZOO-7	Reference	5	0.699	0.0779	0.589	0.698	0.808
		QUL-ZOO-1	Exposed	5	0.500	0.130	0.347	0.539	0.648
	2020	QUL-ZOO-7	Reference	5	1.13	0.271	0.838	1.15	1.47
		QUL-ZOO-1	Exposed	5	0.927	0.472	0.606	0.818	1.75
	2021	QUL-ZOO-7	Reference	5	0.867	0.323	0.387	0.904	1.27
		QUL-ZOO-1	Exposed	5	0.805	0.221	0.587	0.698	1.09
	2022	QUL-ZOO-7	Reference	5	0.438	0.0978	0.289	0.434	0.549
		QUL-ZOO-1	Exposed	5	0.590	0.105	0.460	0.602	0.692
	2023	QUL-ZOO-7	Reference	5	1.21	0.687	0.299	1.13	2.12
		QUL-ZOO-1	Exposed	5	1.27	0.415	0.749	1.28	1.82
	2024	QUL-ZOO-7	Reference	5	0.214	0.0441	0.162	0.210	0.283
		QUL-ZOO-1	Exposed	5	0.177	0.0402	0.137	0.176	0.242
Rotifera (organisms/L)	2019	QUL-ZOO-7	Reference	5	2.00	0.253	1.70	2.08	2.28
		QUL-ZOO-1	Exposed	5	2.09	0.538	1.35	2.12	2.83
	2020	QUL-ZOO-7	Reference	5	10.2	6.75	5.62	8.13	22.0
		QUL-ZOO-1	Exposed	5	7.71	3.44	3.89	7.31	12.7
	2021	QUL-ZOO-7	Reference	5	5.99	0.671	5.50	5.83	7.15
		QUL-ZOO-1	Exposed	5	5.42	1.72	3.78	4.56	7.82
	2022	QUL-ZOO-7	Reference	5	4.50	3.55	2.11	3.09	10.7
		QUL-ZOO-1	Exposed	5	4.77	2.65	2.36	4.51	9.18
	2023	QUL-ZOO-7	Reference	5	12.1	4.07	5.03	13.7	15.1
		QUL-ZOO-1	Exposed	5	11.8	7.34	5.68	11.2	24.1
	2024	QUL-ZOO-7	Reference	5	2.18	0.601	1.70	1.85	3.15
		QUL-ZOO-1	Exposed	5	1.25	0.122	1.06	1.25	1.38
Calanoida (%)	2019	QUL-ZOO-7	Reference	5	6.68	1.32	4.90	6.68	8.00
		QUL-ZOO-1	Exposed	5	6.79	1.18	5.03	7.01	7.96
	2020	QUL-ZOO-7	Reference	5	3.88	1.87	1.67	3.64	6.24
		QUL-ZOO-1	Exposed	5	5.13	1.72	2.91	4.79	7.29
	2021	QUL-ZOO-7	Reference	5	3.45	1.02	2.47	3.07	4.61
		QUL-ZOO-1	Exposed	5	2.32	0.320	1.77	2.43	2.60
	2022	QUL-ZOO-7	Reference	5	2.38	1.26	0.654	2.45	4.05
		QUL-ZOO-1	Exposed	5	1.98	0.523	1.19	1.99	2.65
	2023	QUL-ZOO-7	Reference	5	3.93	1.35	2.42	4.36	5.31
		QUL-ZOO-1	Exposed	5	5.41	0.712	4.60	5.82	6.00
	2024	QUL-ZOO-7	Reference	5	1.87	0.734	1.29	1.66	3.12
		QUL-ZOO-1	Exposed	5	1.82	0.778	1.00	1.77	3.05
Cladocera (%)	2019	QUL-ZOO-7	Reference	5	5.65	0.743	4.88	5.59	6.76
		QUL-ZOO-1	Exposed	5	4.47	0.874	3.75	4.03	5.89
	2020	QUL-ZOO-7	Reference	5	1.41	0.642	0.564	1.27	2.17
		QUL-ZOO-1	Exposed	5	1.95	0.976	1.33	1.50	3.66
	2021	QUL-ZOO-7	Reference	5	4.54	1.34	2.83	4.27	6.25
		QUL-ZOO-1	Exposed	5	3.62	1.14	2.70	2.98	5.30
	2022	QUL-ZOO-7	Reference	5	2.16	1.32	0.637	1.73	4.05
		QUL-ZOO-1	Exposed	5	2.06	0.738	1.19	1.97	3.24
	2023	QUL-ZOO-7	Reference	5	2.38	1.17	1.11	1.81	3.98
		QUL-ZOO-1	Exposed	5	2.17	0.247	1.89	2.14	2.56
	2024	QUL-ZOO-7	Reference	5	5.61	2.65	3.68	3.77	9.18
		QUL-ZOO-1	Exposed	5	4.12	1.68	1.97	4.70	6.21
Copepod Nauplii (%)	2019	QUL-ZOO-7	Reference	5	3.41	1.50	2.05	3.19	5.91
		QUL-ZOO-1	Exposed	5	9.68	2.67	6.66	10.3	12.5
	2020	QUL-ZOO-7	Reference	5	10.4	3.47	4.60	11.3	13.0
		QUL-ZOO-1	Exposed	5	14.2	6.91	7.50	11.6	25.4
	2021	QUL-ZOO-7	Reference	5	8.63	3.88	4.55	8.33	15.0
		QUL-ZOO-1	Exposed	5	14.0	3.15	9.66	14.4	17.9
	2022	QUL-ZOO-7	Reference	5	16.4	7.83	5.43	17.9	26.8
		QUL-ZOO-1	Exposed	5	19.3	4.96	13.2	19.2	26.7
	2023	QUL-ZOO-7	Reference	5	4.18	2.44	1.90	3.99	7.96
		QUL-ZOO-1	Exposed	5	7.05	1.53	5.70	6.42	8.95
	2024	QUL-ZOO-7	Reference	5	6.07	1.76	4.71	5.22	9.07
		QUL-ZOO-1	Exposed	5	9.69	1.92	6.42	10.2	11.3
Cyclopoida (%)	2019	QUL-ZOO-7	Reference	5	21.9	1.40	20.5	21.8	24.1
		QUL-ZOO-1	Exposed	5	15.5	3.88	11.2	14.0	21.1
	2020	QUL-ZOO-7	Reference	5	9.92	3.99	4.60	11.3	14.9
		QUL-ZOO-1	Exposed	5	9.03	4.03	5.08	8.38	13.2
	2021	QUL-ZOO-7	Reference	5	10.3	3.23	5.62	11.9	13.3
		QUL-ZOO-1	Exposed	5	10.4	0.725	9.76	10.5	11.5
	2022	QUL-ZOO-7	Reference	5	8.66	3.28	3.63	9.31	12.3
		QUL-ZOO-1	Exposed	5	9.45	2.79	5.92	8.90	13.7
	2023	QUL-ZOO-7	Reference	5	7.68	2.93	5.19	6.51	12.2
		QUL-ZOO-1	Exposed	5	9.15	2.31	6.15	8.62	12.5
	2024	QUL-ZOO-7	Reference	5	7.88	1.46	5.72	8.06	9.30
		QUL-ZOO-1	Exposed	5	10.5	2.65	8.41	9.93	14.9
Rotifera (%)	2019	QUL-ZOO-7	Reference	5	62.4	1.85	59.8	62.5	64.8
		QUL-ZOO-1	Exposed	5	63.6	8.15	52.9	66.0	73.3
	2020	QUL-ZOO-7	Reference	5	74.4	8.84	64.0	72.1	88.0
		QUL-ZOO-1	Exposed	5	69.7	10.8	55.2	75.0	78.9
	2021	QUL-ZOO-7	Reference	5	73.0	7.30	61.7	76.2	80.6
		QUL-ZOO-1	Exposed	5	69.6	3.10	65.5	69.7	74.1
	2022	QUL-ZOO-7	Reference	5	70.4	12.4	58.3	68.0	89.7
		QUL-ZOO-1	Exposed	5	67.2	6.88	60.4	66.6	78.5
	2023	QUL-ZOO-7	Reference	5	81.8	6.91	70.5	83.5	87.4
		QUL-ZOO-1	Exposed	5	76.2	3.95	70.4	77.1	81.3
	2024	QUL-ZOO-7	Reference	5	78.6	5.34	70.6	79.4	83.5
		QUL-ZOO-1	Exposed	5	73.8	4.60	65.6	75.9	76.2

Notes: organisms/L = organisms per litre. mg/L = milligrams per litre.

[a] Summary statistics are displayed for replicated data collected in July 2019 to 2024. For results without replicates collected in June and August 2019 to 2024, see Appendix Table C.3.7.

APPENDIX C.4
ZOOPLANKTON TISSUE QUALITY

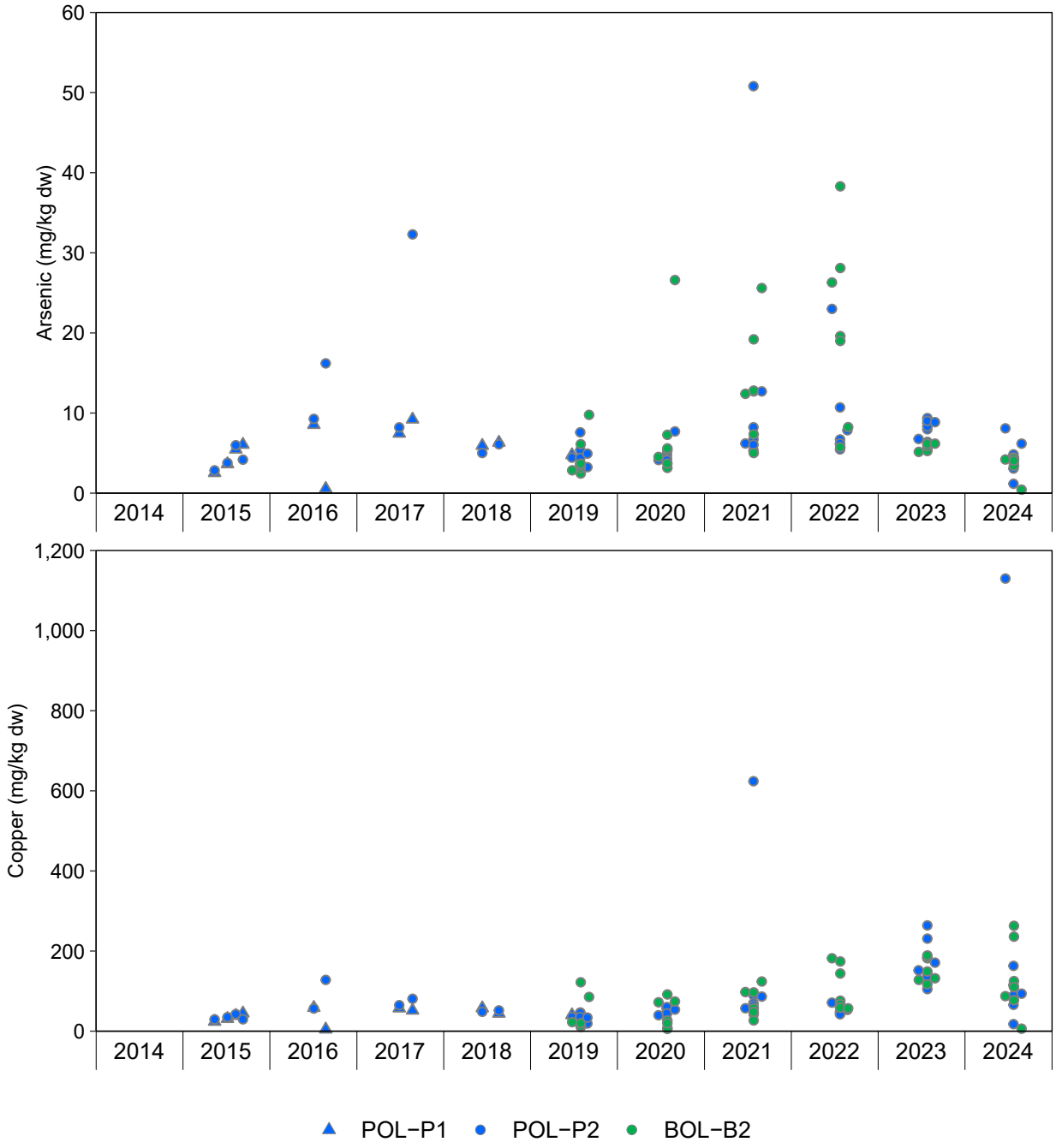
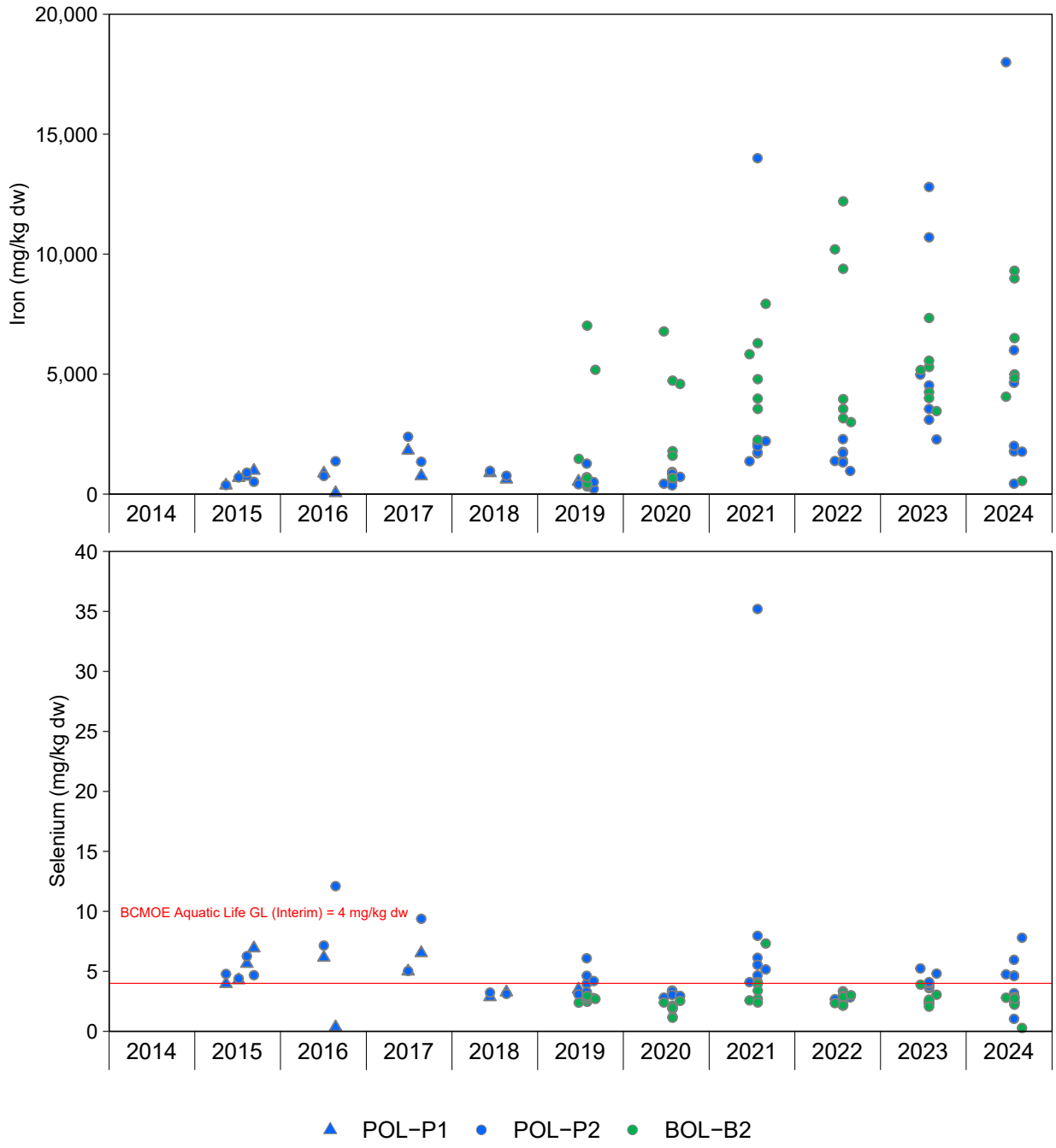


Figure C.4.1: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at POL −P1 was discontinued after 2019.



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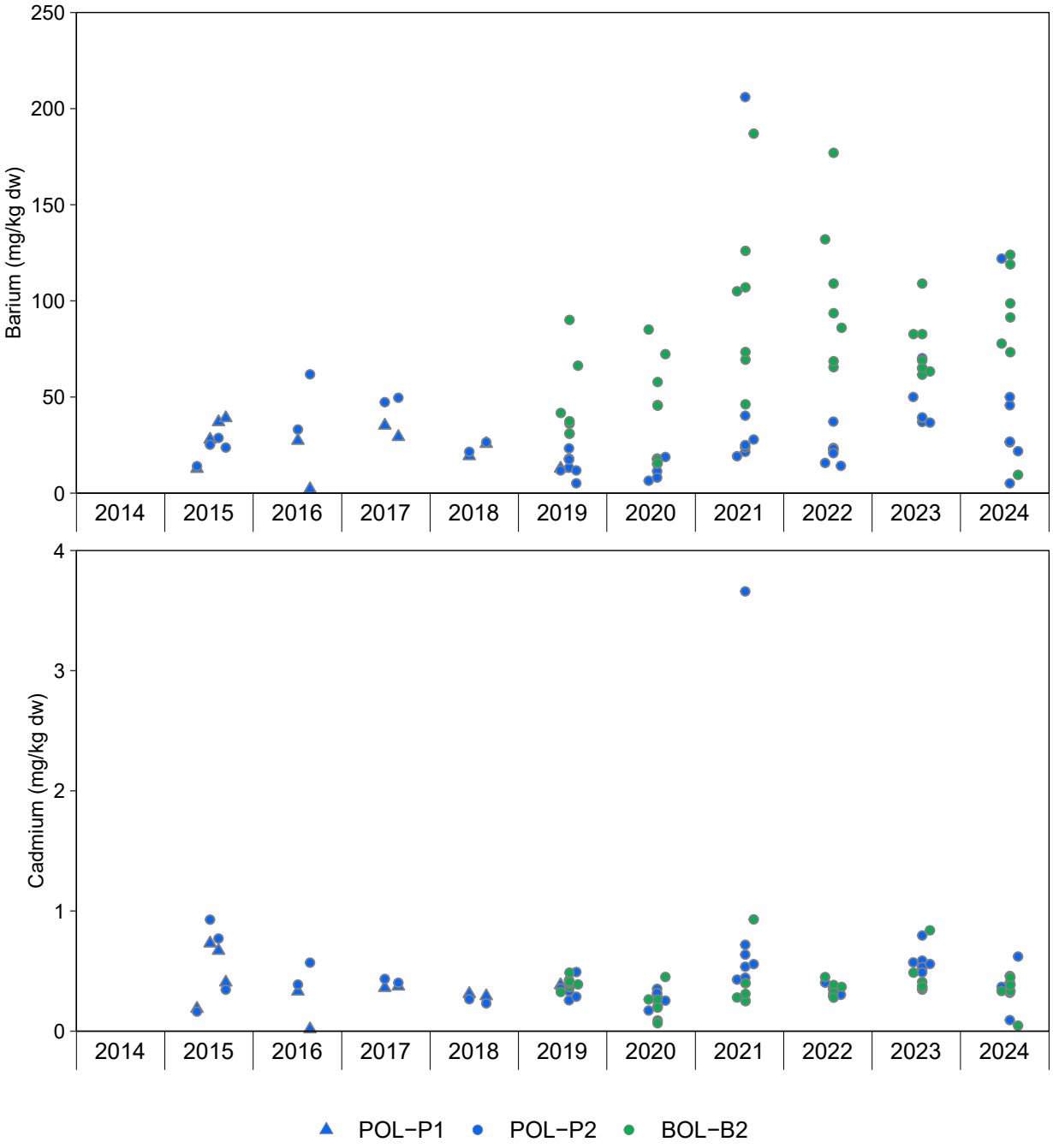

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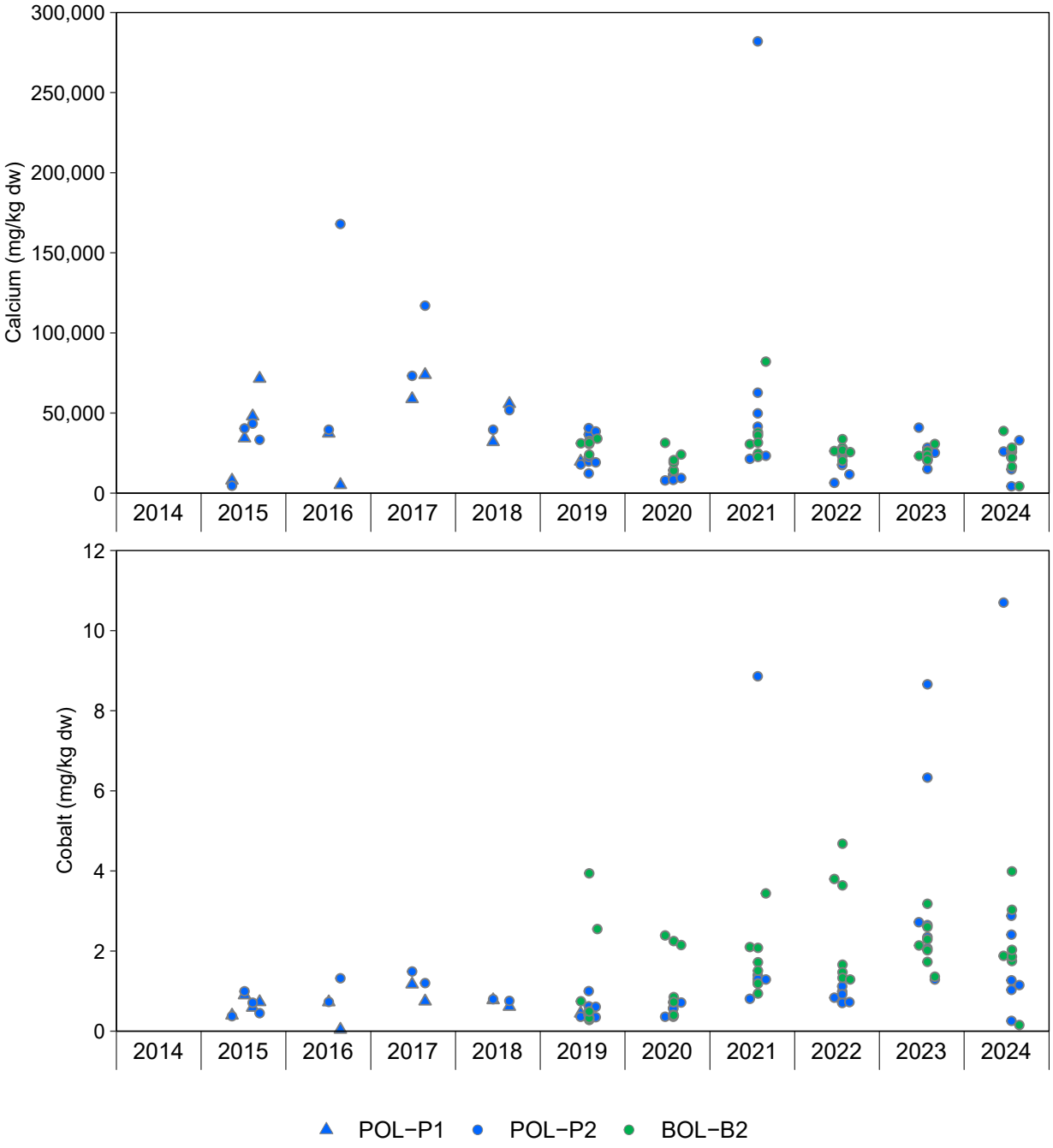

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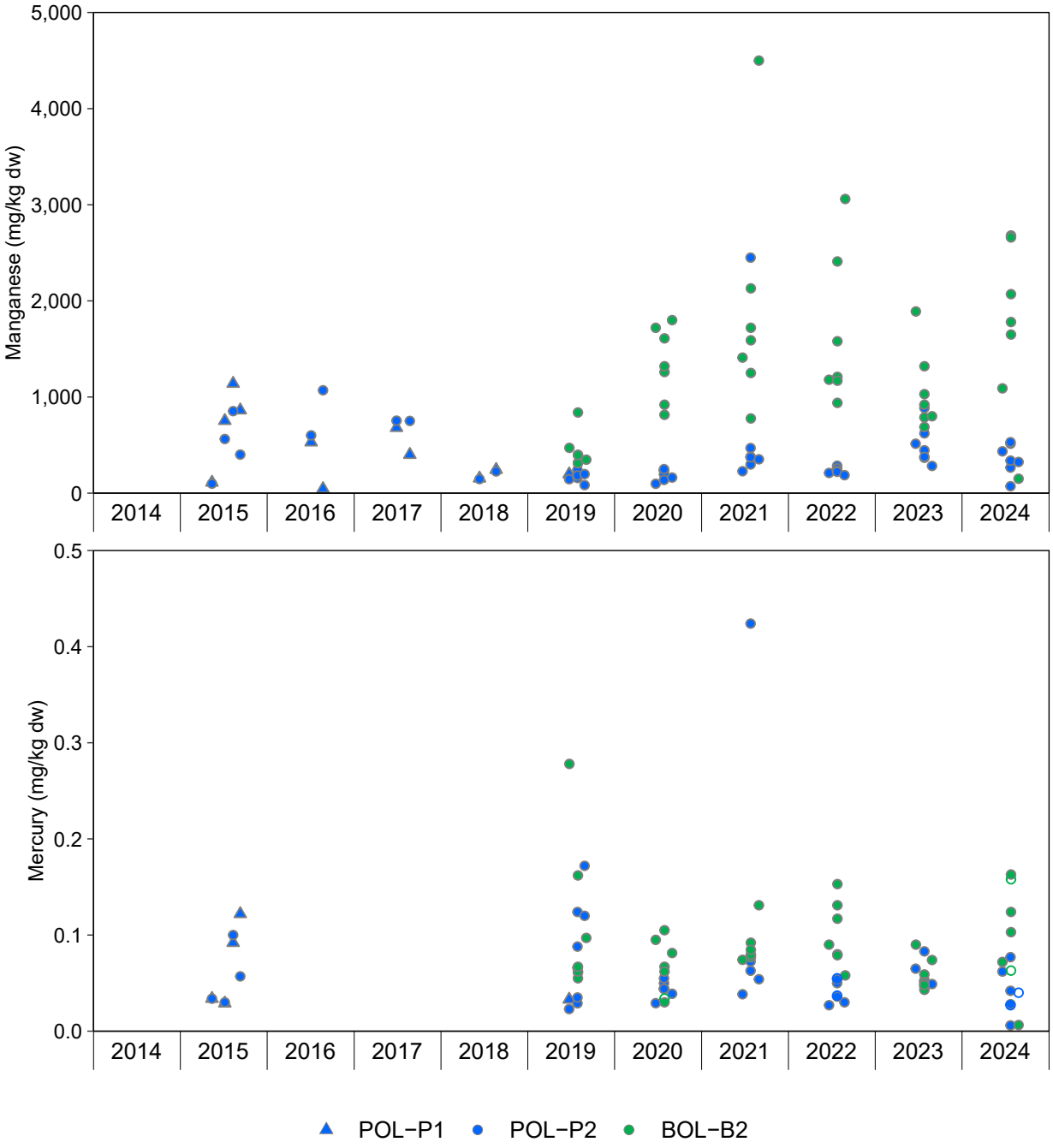

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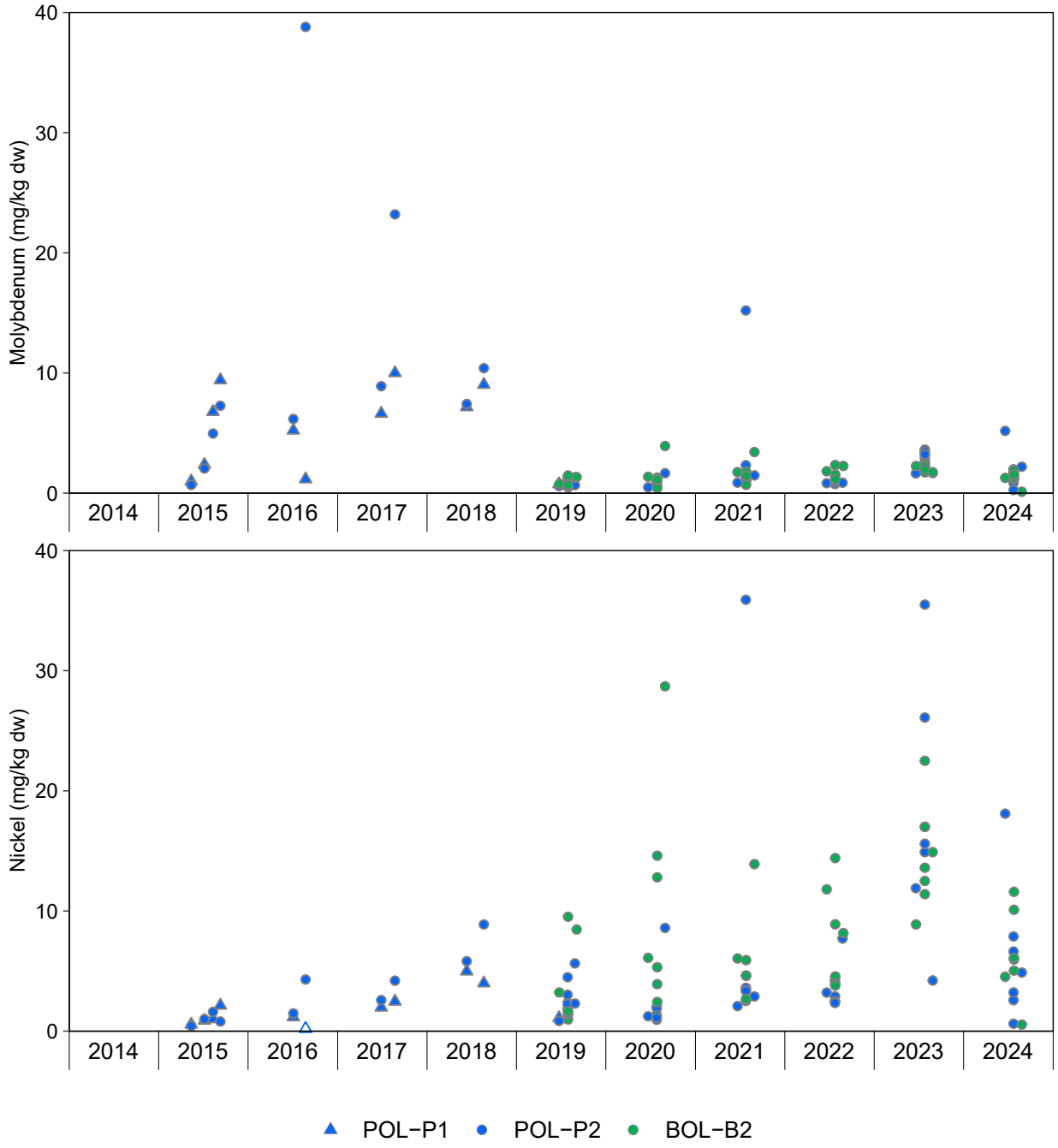

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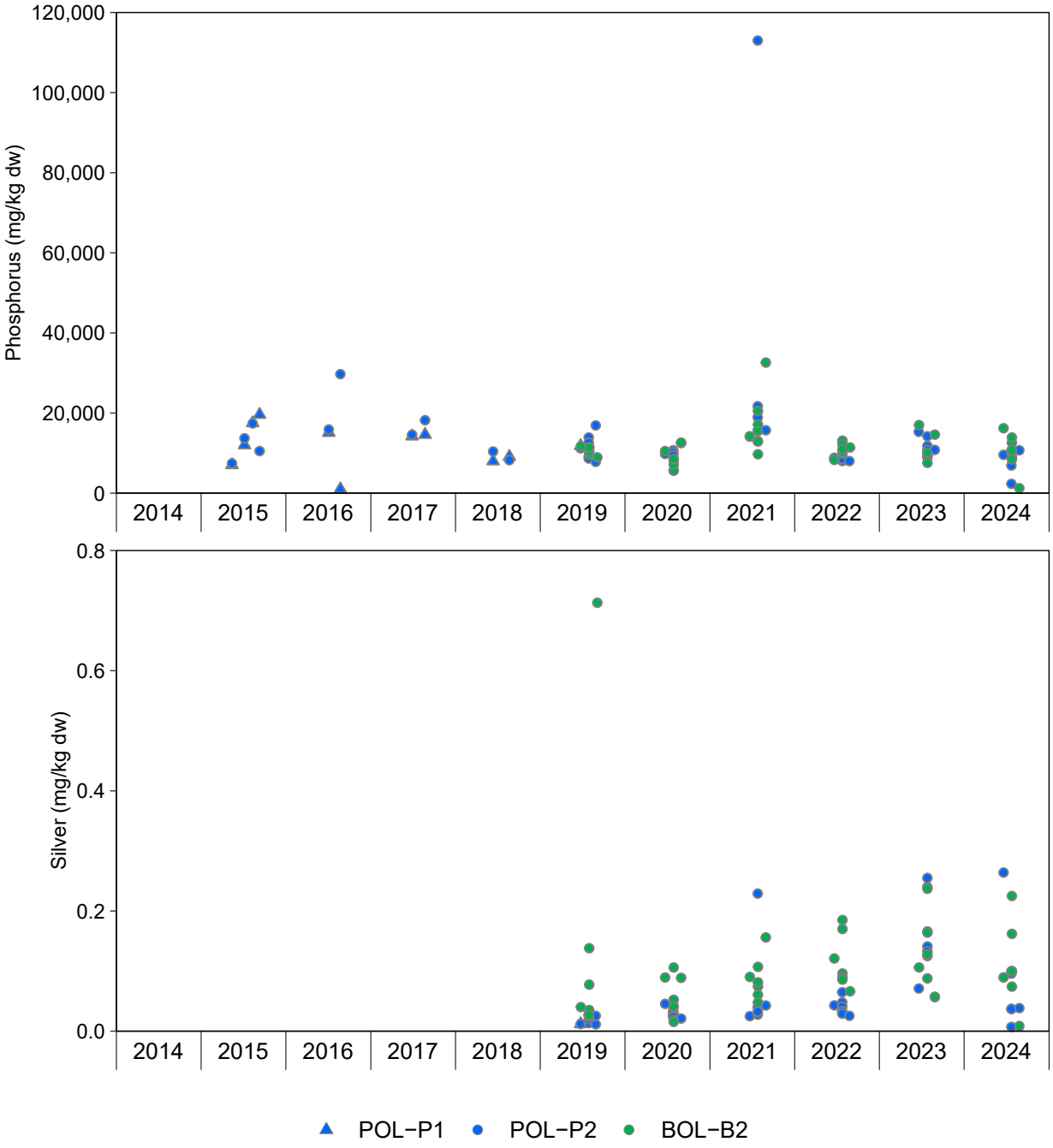

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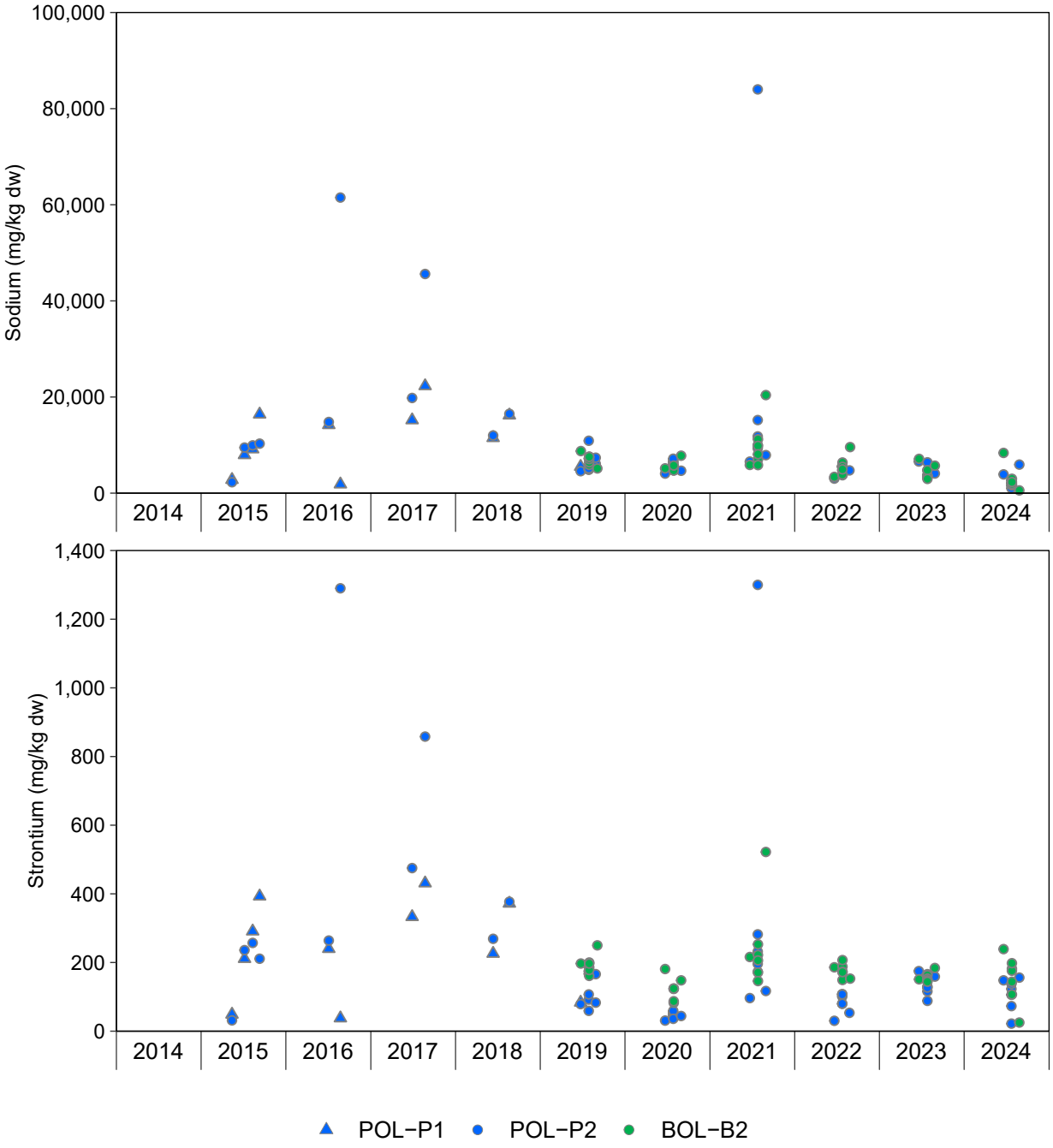

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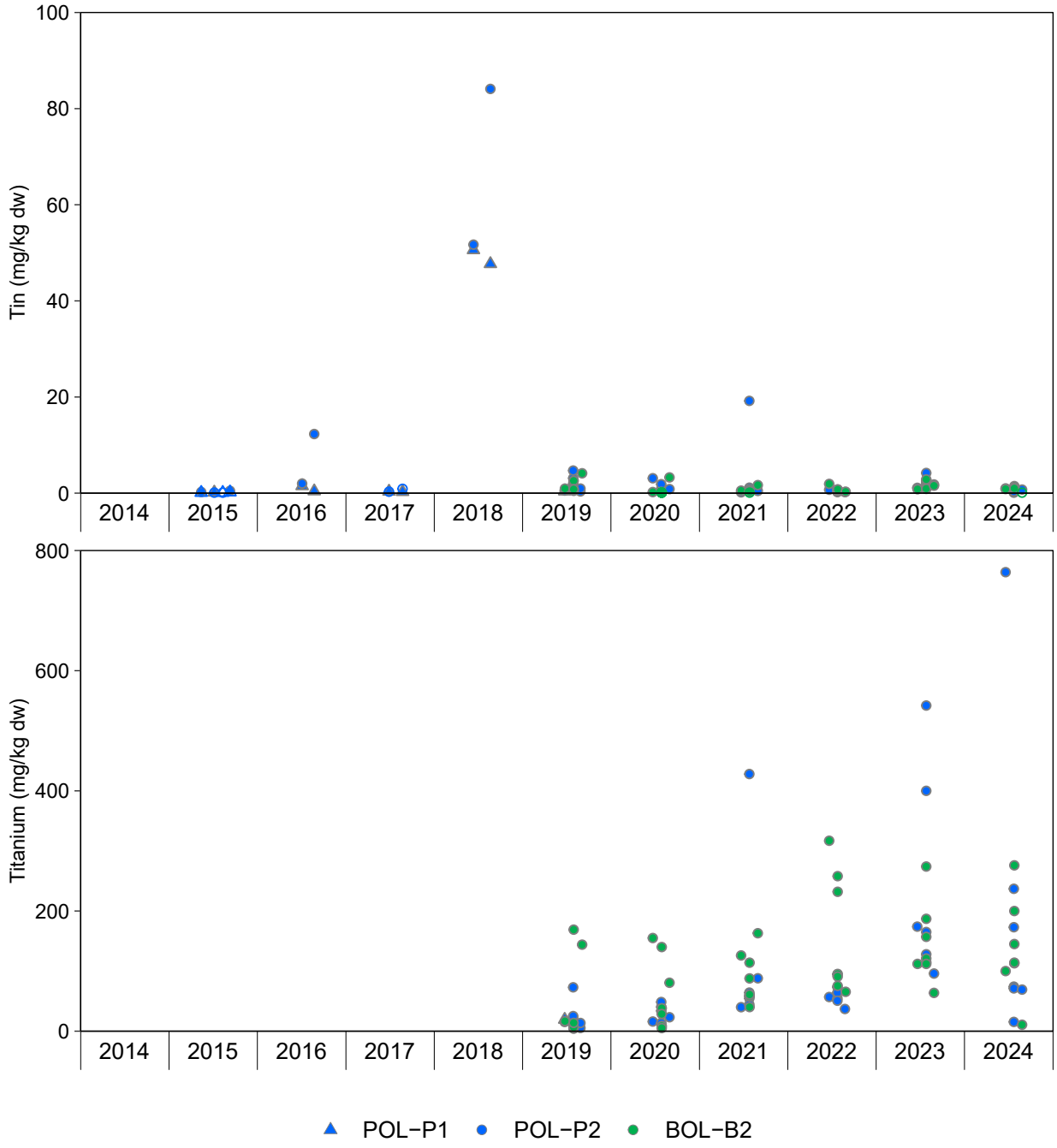

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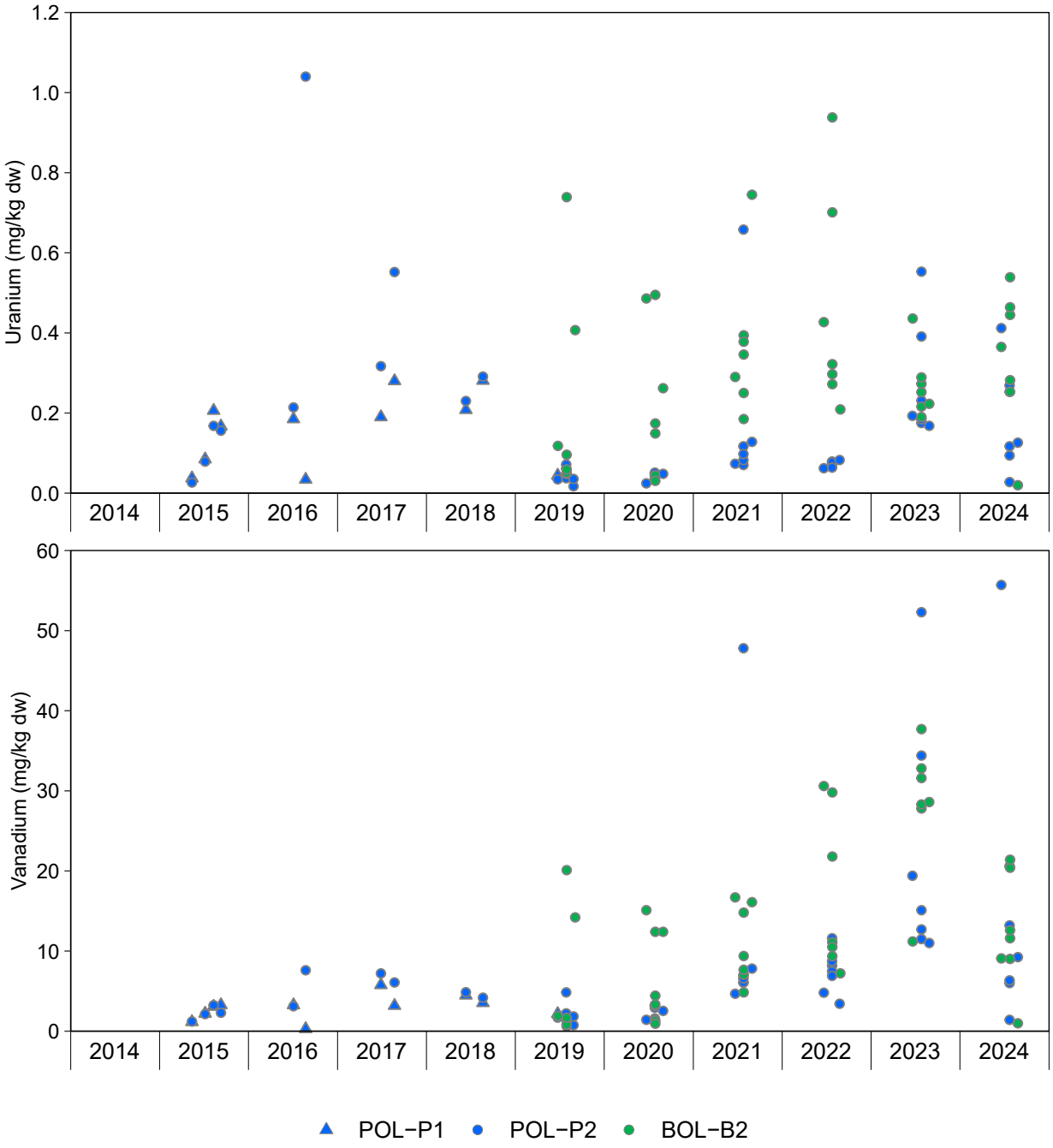

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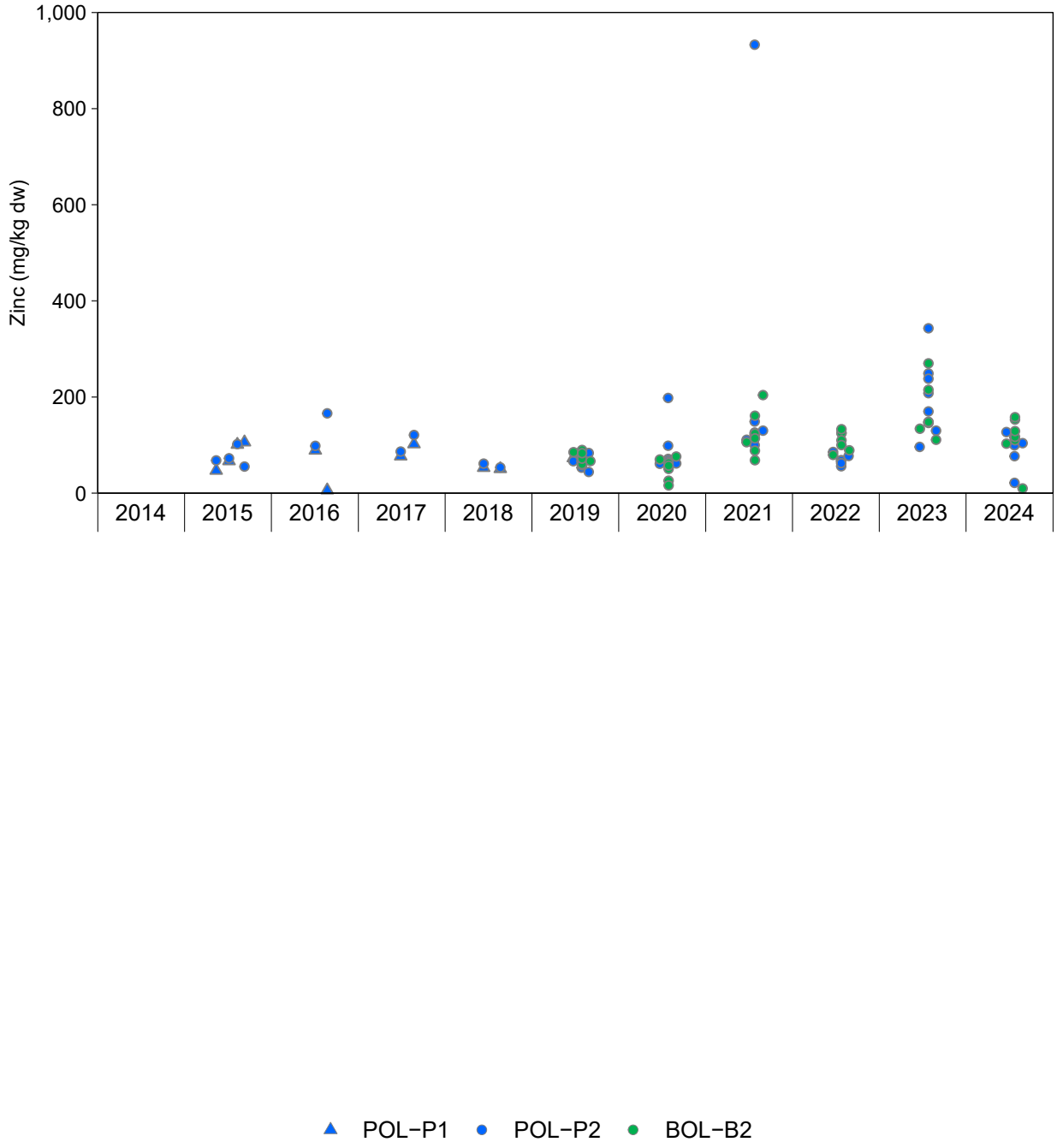

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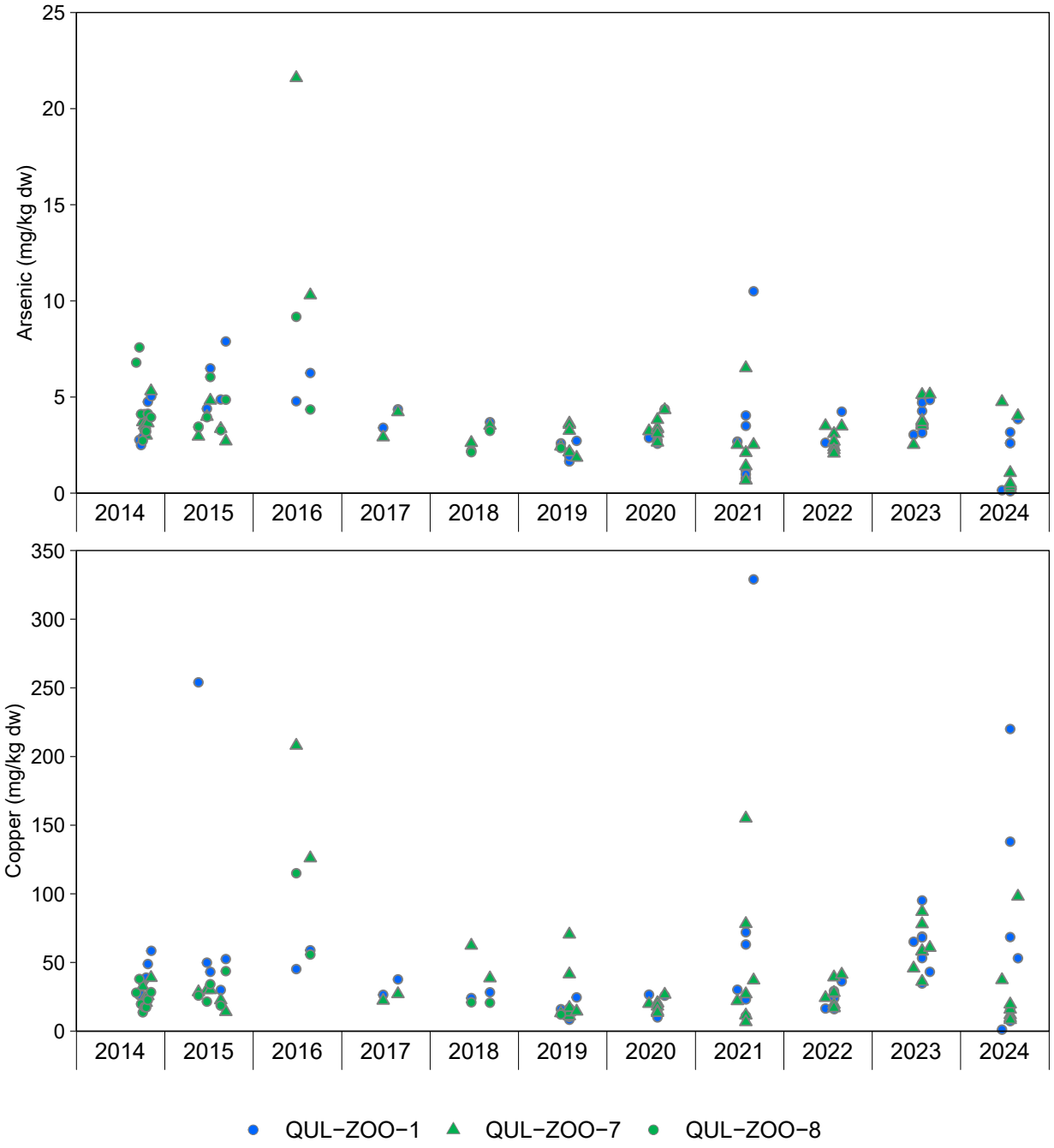
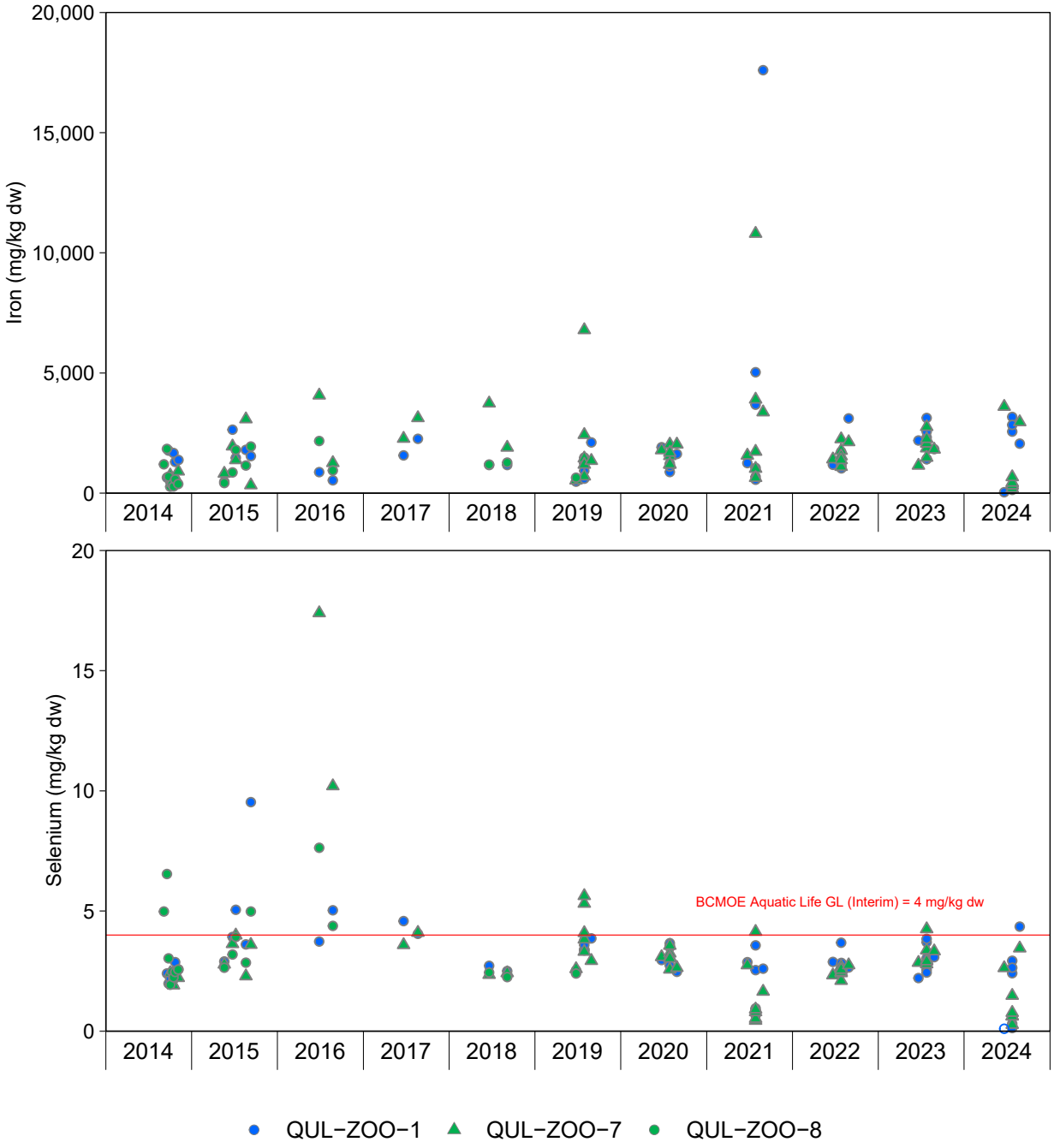


Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL.! Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.



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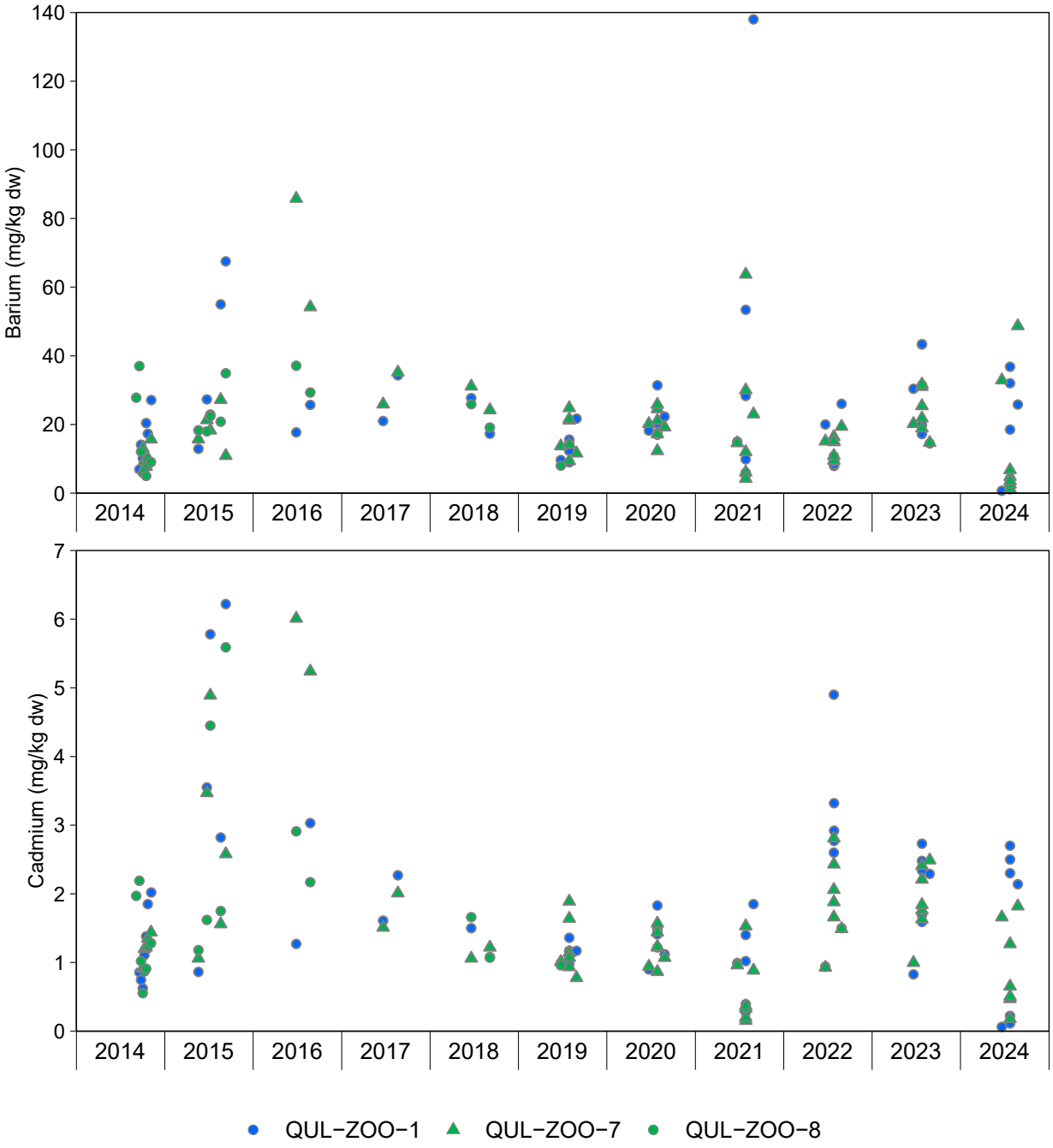

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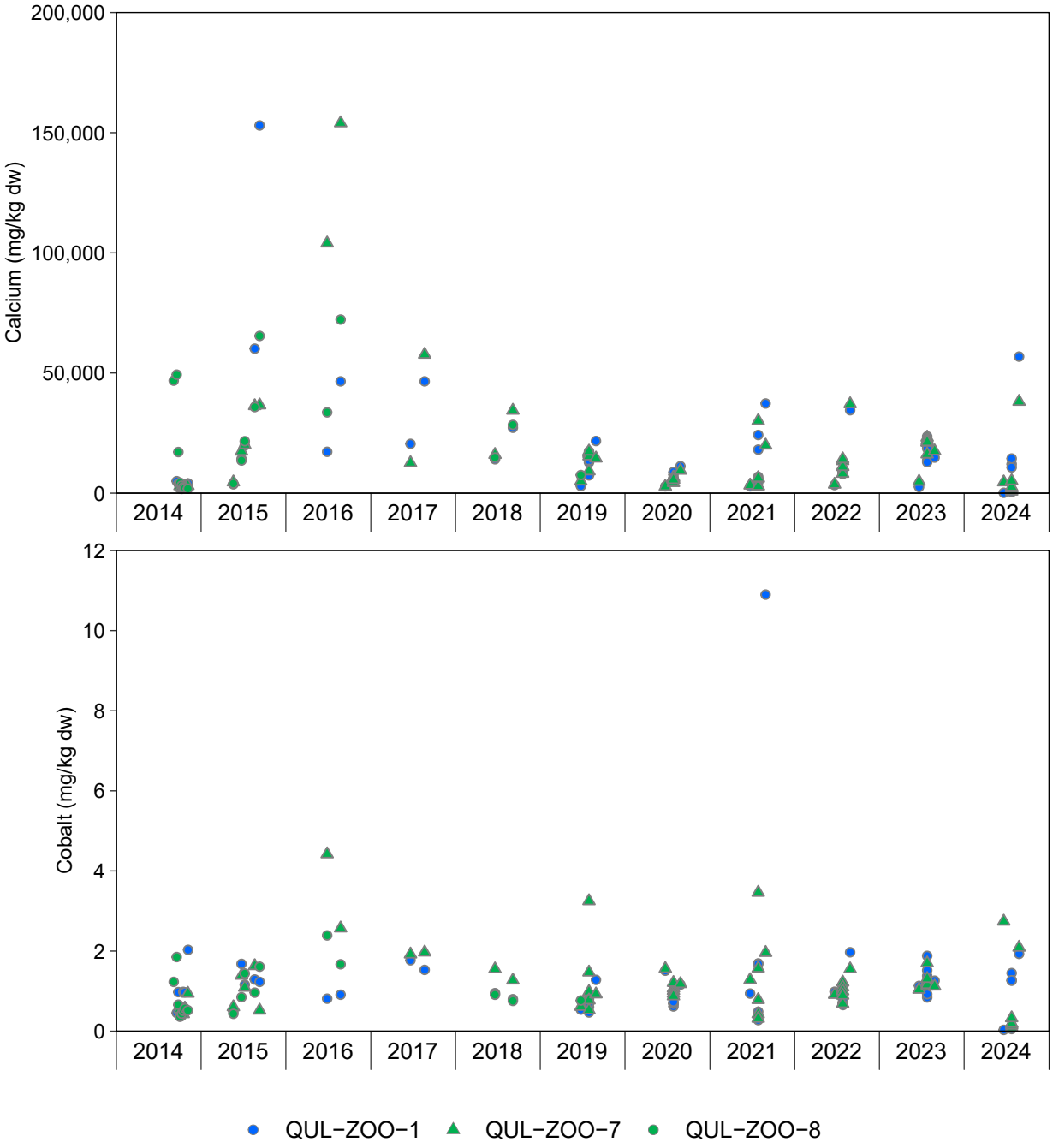

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Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

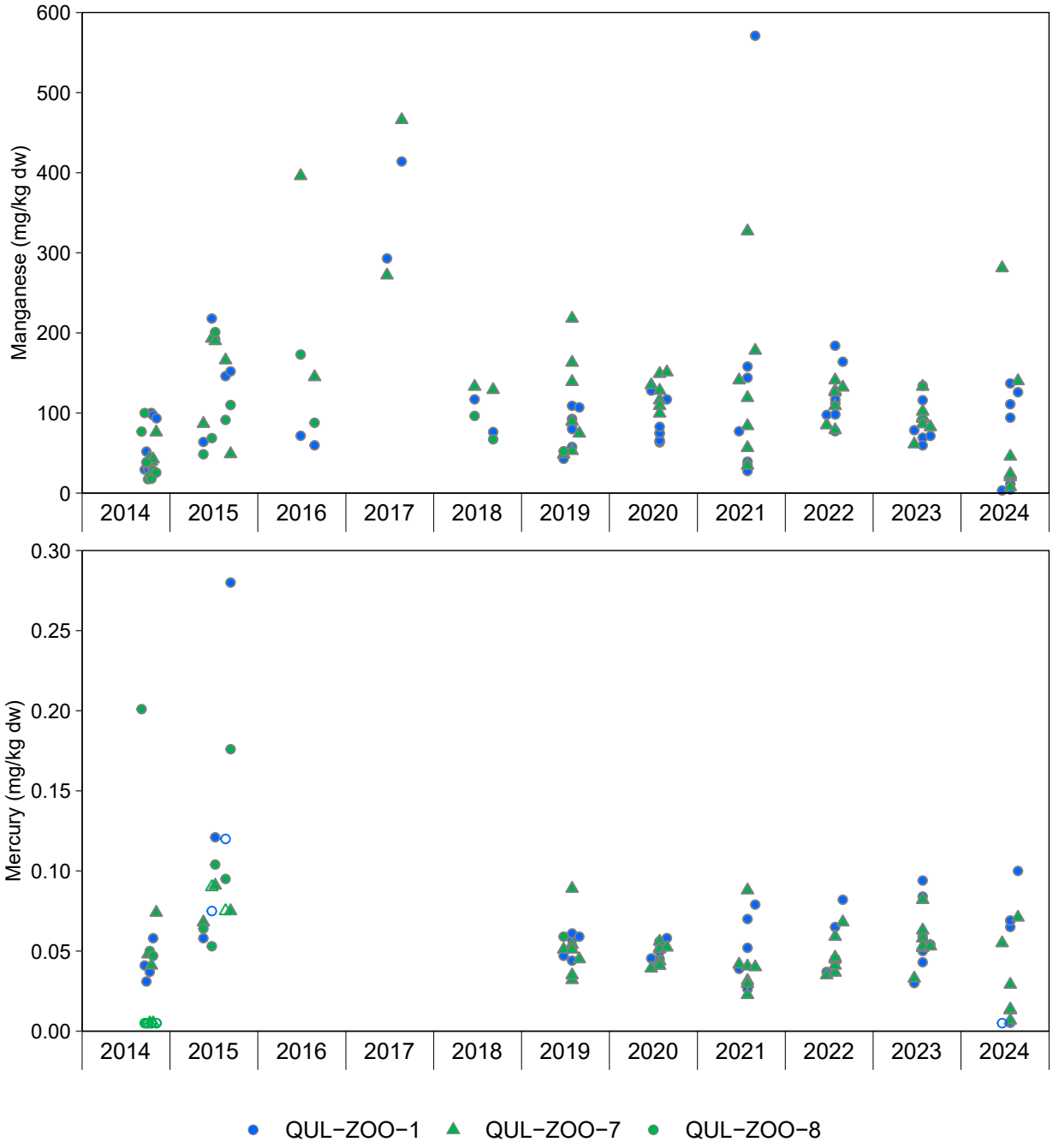

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

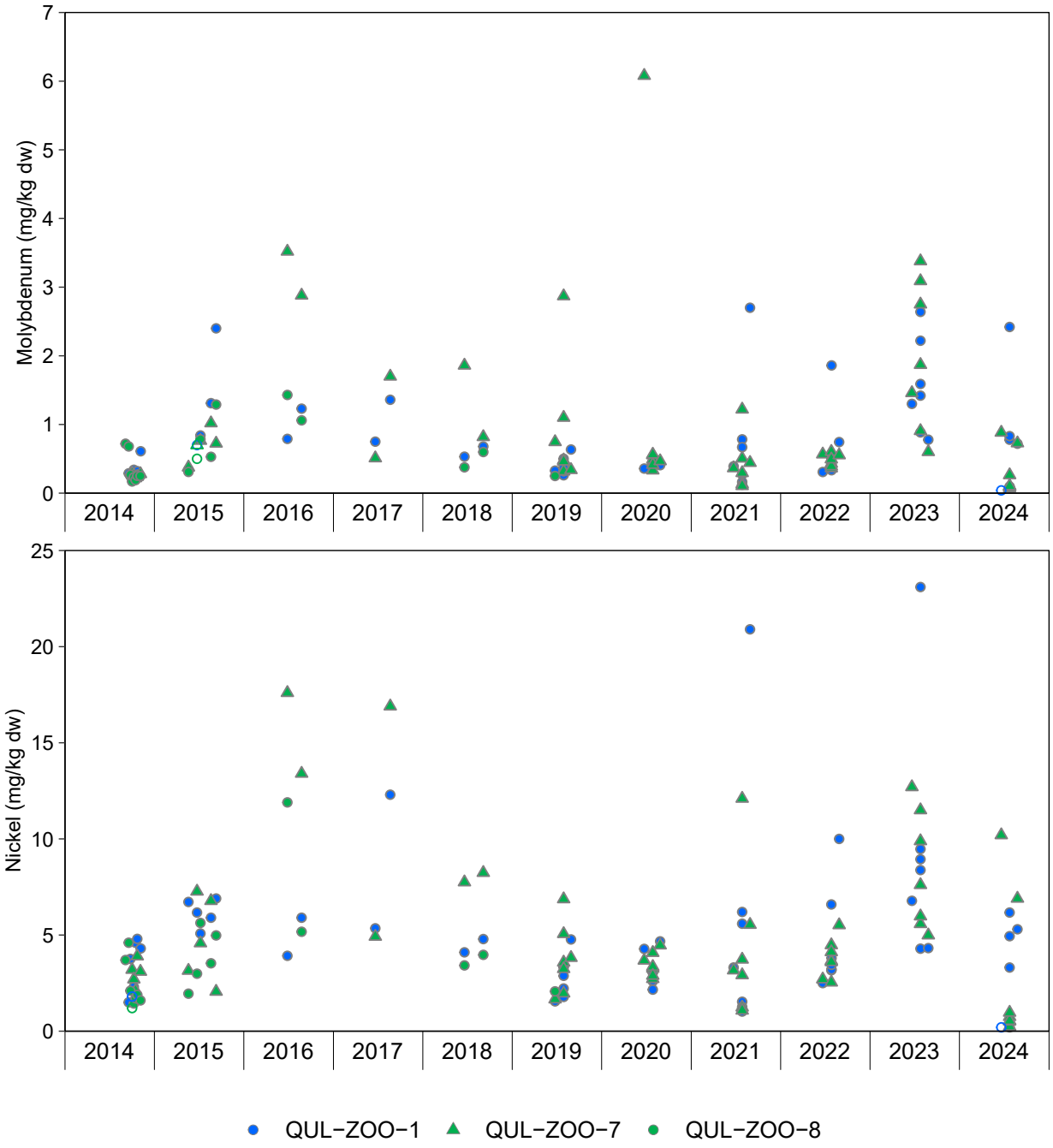

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

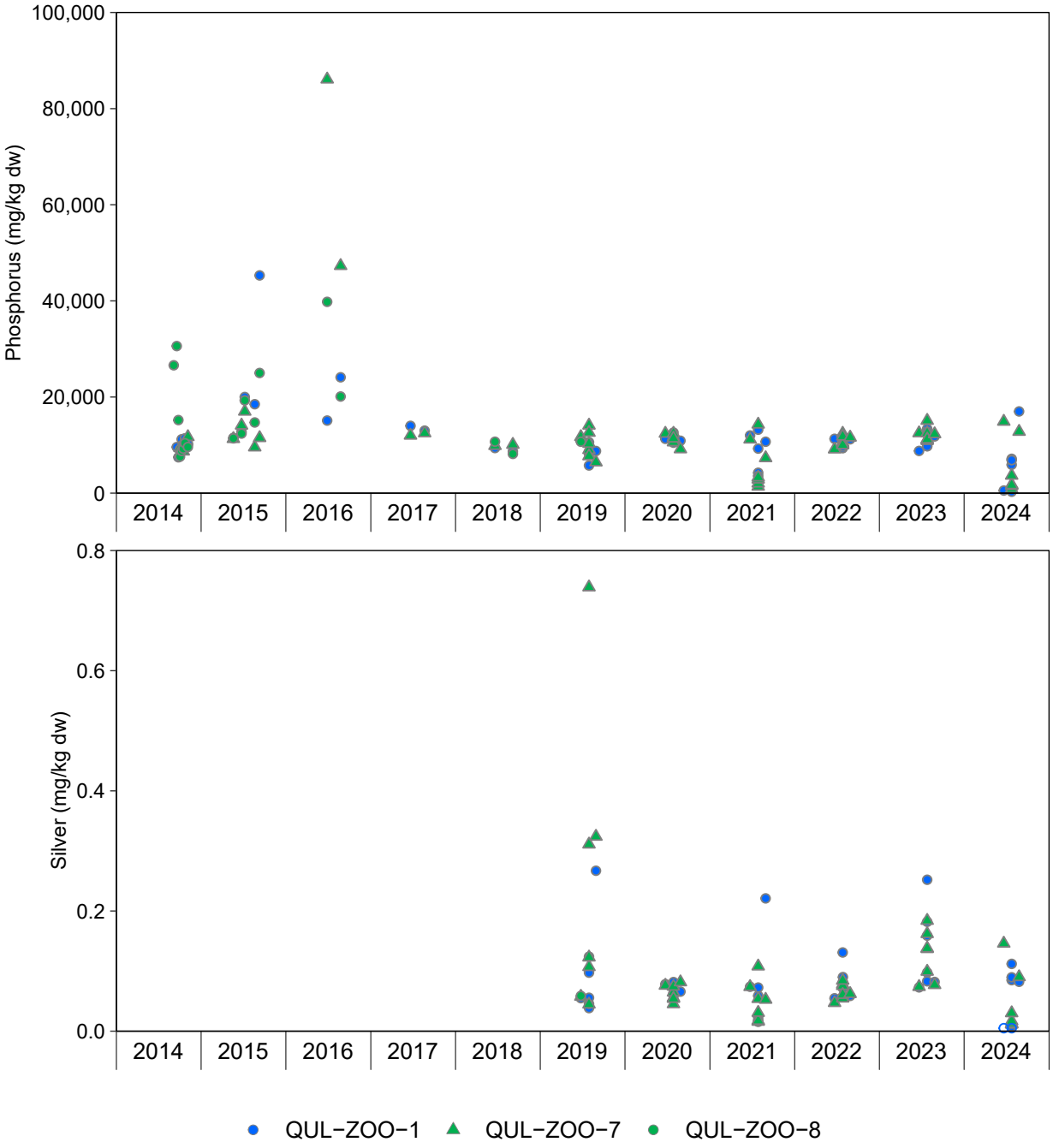

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

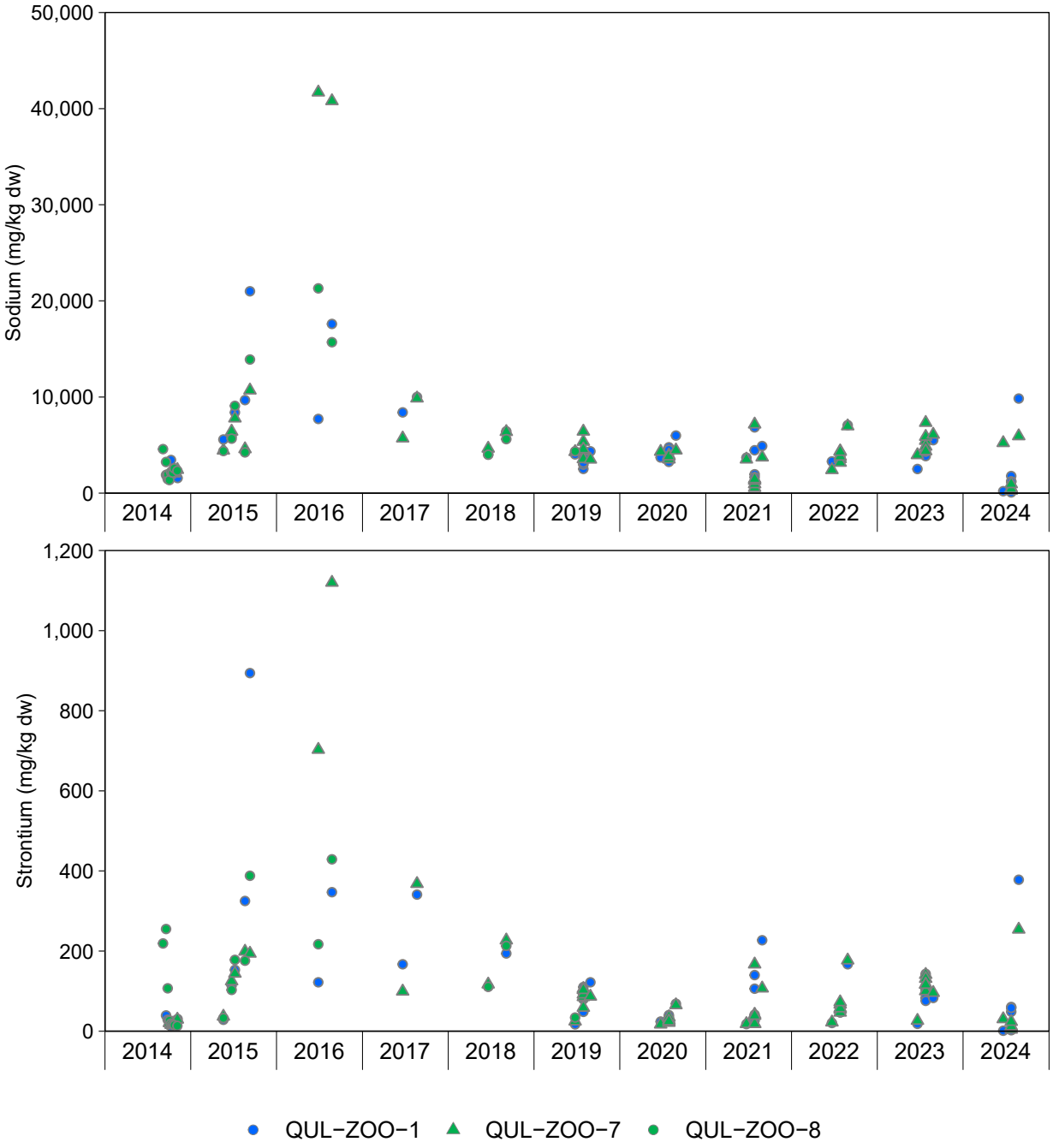

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

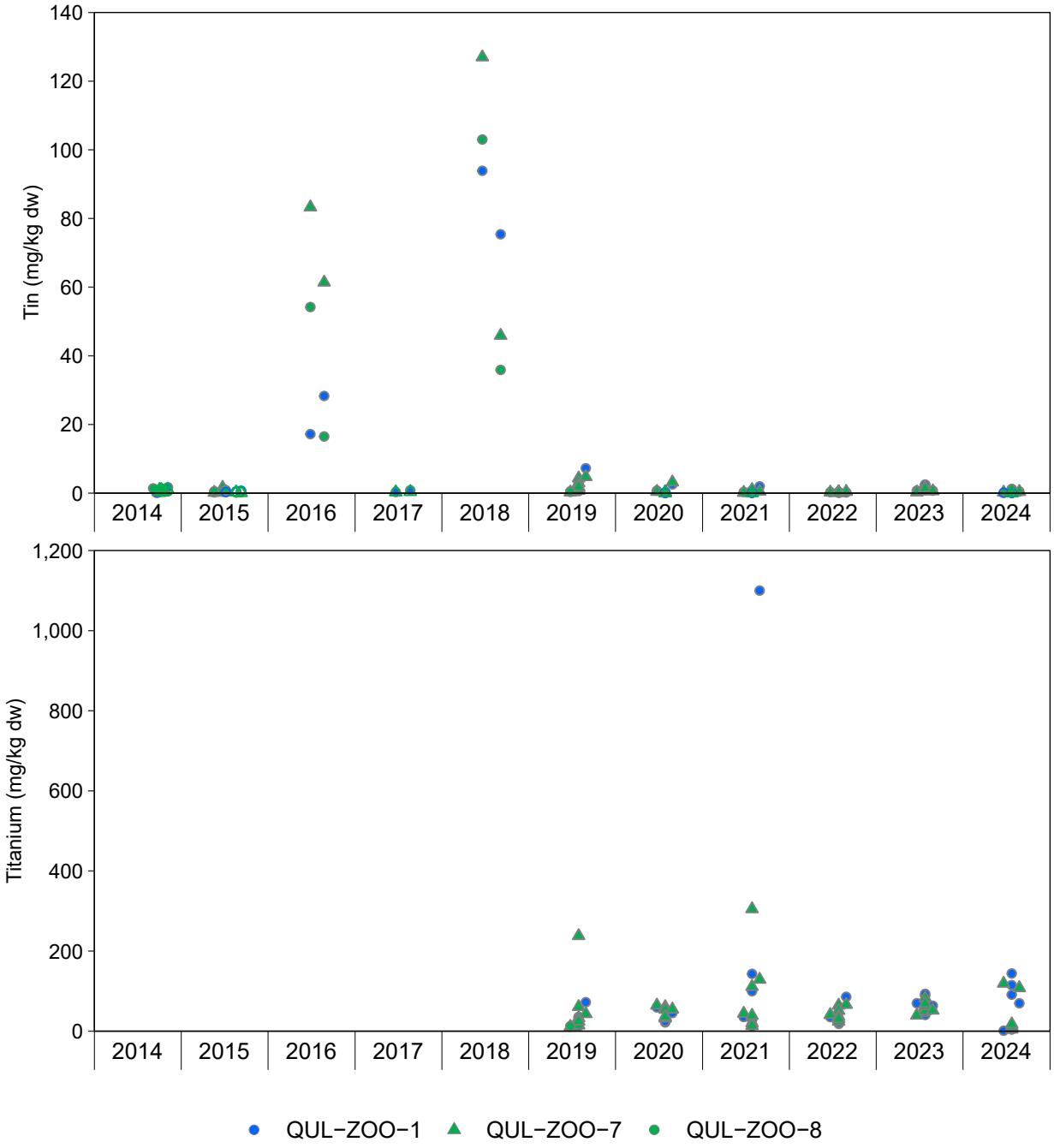

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

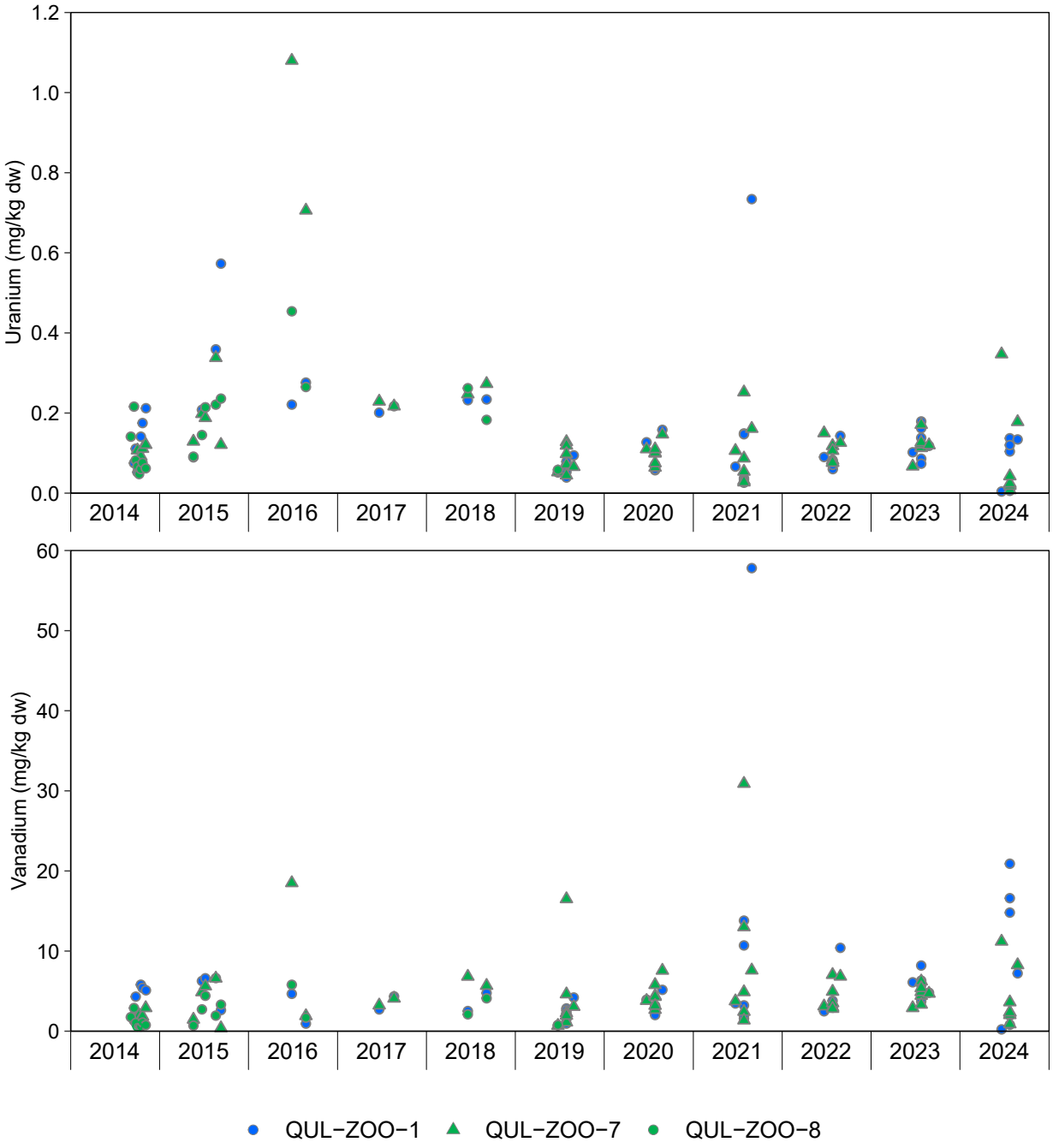

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

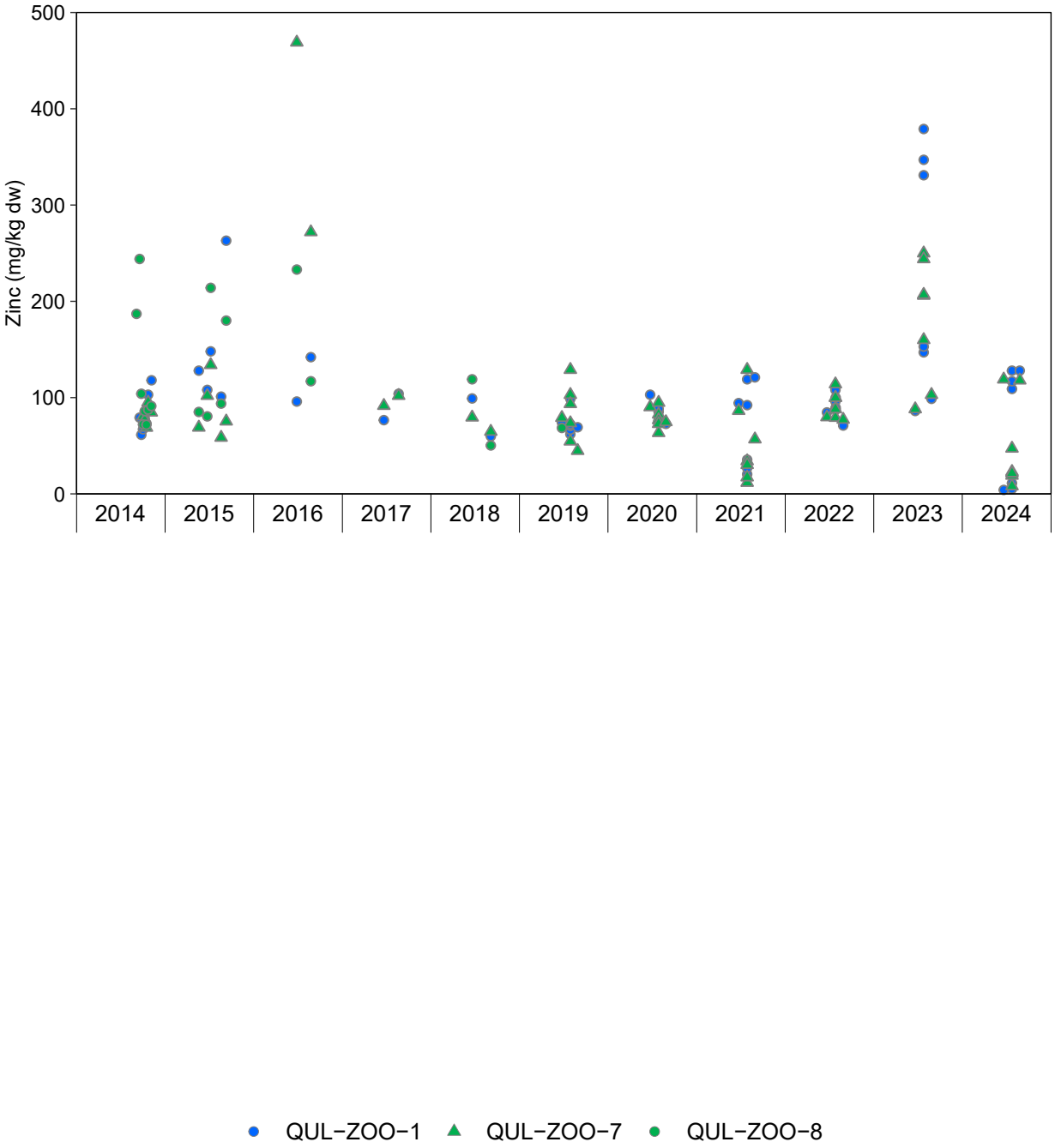

Figure C.4.2: Zooplankton Tissue Primary and Secondary Analyte Concentrations for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Concentrations below the laboratory reporting limit (LRL)!are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Red horizontal line represents British Columbia interim long−term guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014). Green symbols indicate reference while blue symbols indicate exposed. Sampling at QUL−ZOO−8 was discontinued after 2019.

Table C.4.1: Zooplankton Tissue Quality Data for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2024

Analyte	Units	Reference											
		BOL-B2											
		BOL-B2_ZOOT-1	BOL-B2_ZOOT-1	BOL-B2_ZOOT-2	BOL-B2_ZOOT-3	BOL-B2_ZOOT-4	BOL-B2_ZOOT-5	BOL-B2_ZOOT-1	Mean	Standard Deviation	Minimum	Median	Maximum
		19-Jun-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	26-Aug-24					
Moisture	%	97.2	94.8	93.6	94.4	93.5	95.8	91.6	94.4	1.79	91.6	94.4	97.2
Aluminum	mg/kg dw	2,220	3,770	2,280	2,440	6,560	2,820	196	2,898	1,938	196	2,440	6,560
Antimony	mg/kg dw	0.163	0.406	0.240	0.444	0.584	0.213	0.0450	0.299	0.186	0.0450	0.240	0.584
Arsenic	mg/kg dw	4.20	4.32	3.51	3.40	4.36	4.06	0.431	3.47	1.39	0.431	4.06	4.36
Barium	mg/kg dw	77.8	124	73.3	91.4	98.7	119	9.52	84.8	38.3	9.52	91.4	124
Beryllium	mg/kg dw	0.0870	0.139	0.0810	0.0870	0.175	0.128	<0.01	0.101	0.0373	<0.01	0.0870	0.175
Bismuth	mg/kg dw	0.0240	0.0460	<0.037	0.0410	0.0540	0.0320	<0.01	0.0327	0.0125	<0.01	0.0320	0.0540
Boron	mg/kg dw	5.60	10.4	10.0	12.3	15.5	9.90	1.50	9.31	4.55	1.50	10.0	15.5
Cadmium	mg/kg dw	0.334	0.391	0.328	0.333	0.448	0.383	0.0460	0.323	0.130	0.0460	0.334	0.448
Calcium	mg/kg dw	38,800	25,800	22,100	16,500	27,500	28,400	4,310	23,344	10,789	4,310	25,800	38,800
Cesium	mg/kg dw	0.262	0.387	0.283	0.249	0.637	0.302	0.0213	0.306	0.184	0.0213	0.283	0.637
Chromium	mg/kg dw	6.51	10.6	8.28	6.45	16.6	6.08	0.610	7.88	4.89	0.610	6.51	16.6
Cobalt	mg/kg dw	1.88	3.03	1.75	1.86	3.99	2.03	0.154	2.10	1.19	0.154	1.88	3.99
Copper	mg/kg dw	87.4	263	77.3	125	236	110	6.15	129	90.6	6.15	110	263
Iron	mg/kg dw	4,060	8,990	4,990	4,840	9,310	6,500	548	5,605	3,025	548	4,990	9,310
Lead	mg/kg dw	1.71	2.47	1.46	1.94	3.72	1.88	0.185	1.91	1.07	0.185	1.88	3.72
Lithium	mg/kg dw	1.46	2.69	<1.84	1.59	3.52	1.99	<0.5	1.85	0.822	<0.5	1.59	3.52
Magnesium	mg/kg dw	2,520	2,350	1,700	1,690	2,840	1,960	237	1,900	849	237	1,960	2,840
Manganese	mg/kg dw	1,090	2,680	1,780	2,070	1,650	2,660	150	1,726	894	150	1,780	2,680
Mercury	mg/kg dw	0.0720	<0.063	0.103	<0.158	0.124	0.163	0.00640	0.0767	0.0677	0.00640	0.0720	0.163
	mg/kg ww	<0.002	<0.0033	0.00660	<0.0088	0.00800	0.00690	<0.001	0.00408	0.000676	<0.001	0.00380	0.00800
Molybdenum	mg/kg dw	1.27	1.90	1.17	1.30	1.54	1.55	0.118	1.26	0.561	0.118	1.30	1.90
Nickel	mg/kg dw	4.53	10.1	5.96	6.10	11.6	5.04	0.550	6.27	3.66	0.550	5.96	11.6
Phosphorus	mg/kg dw	16,200	12,600	9,040	8,410	10,700	13,900	1,230	10,297	4,842	1,230	10,700	16,200
Potassium	mg/kg dw	11,900	3,330	4,720	3,450	4,100	3,760	669	4,561	3,479	669	3,760	11,900
Rubidium	mg/kg dw	12.6	4.92	6.66	4.91	7.66	5.57	0.850	6.17	3.55	0.850	5.57	12.6
Selenium	mg/kg dw	2.80	2.40	2.41	2.22	2.88	2.73	0.280	2.25	0.900	0.280	2.41	2.88
Silver	mg/kg dw	0.0894	0.225	0.0741	0.100	0.162	0.0994	0.00850	0.108	0.0685	0.00850	0.0994	0.225
Sodium	mg/kg dw	8,370	1,630	2,990	1,650	1,900	2,300	565	2,772	2,576	565	1,900	8,370
Strontium	mg/kg dw	239	182	144	107	176	198	25.1	153	69.9	25.1	176	239
Tellurium	mg/kg dw	<0.02	<0.02	<0.073	<0.054	<0.088	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.088
Thallium	mg/kg dw	0.0227	0.0324	0.0313	0.0262	0.0616	0.0384	0.00250	0.0307	0.0178	0.00250	0.0313	0.0616
Tin	mg/kg dw	0.860	0.910	1.20	1.46	1.15	0.990	<0.1	0.953	0.225	<0.1	0.990	1.46
Titanium	mg/kg dw	100	200	113	145	276	114	10.7	137	83.4	10.7	114	276
Uranium	mg/kg dw	0.365	0.445	0.253	0.282	0.539	0.464	0.0198	0.338	0.173	0.0198	0.365	0.539
Vanadium	mg/kg dw	9.08	20.4	9.02	11.6	21.4	12.6	0.980	12.2	7.05	0.980	11.6	21.4
Zinc	mg/kg dw	103	153	110	117	158	129	9.80	111	49.4	9.80	117	158
Zirconium	mg/kg dw	2.28	2.69	2.37	2.68	5.61	2.33	0.220	2.60	1.58	0.220	2.37	5.61

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = standard deviation not calculated due to insufficient detected data above the laboratory reporting limit. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. All summary statistics are reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 06]) used in the full sample identifiers.

Table C.4.1: Zooplankton Tissue Quality Data for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas, 2024

Analyte	Units	Exposed											
		POL-P2											
		POL-P2_ZOOT-1	POL-P2_ZOOT-1	POL-P2_ZOOT-2	POL-P2_ZOOT-3	POL-P2_ZOOT-4	POL-P2_ZOOT-5	POL-P2_ZOOT-1	Mean	Standard Deviation	Minimum	Median	Maximum
		19-Jun-24	23-Jul-24	23-Jul-24	23-Jul-24	23-Jul-24	23-Jul-24	26-Aug-24					
Moisture	%	93.3	93.0	91.7	85.7	95.7	93.6	99.5	93.2	4.18	85.7	93.3	99.5
Aluminum	mg/kg dw	9,020	1,510	3,440	266	3,140	1,400	1,060	2,834	2,952	266	1,510	9,020
Antimony	mg/kg dw	0.126	0.159	0.278	0.0810	0.176	0.142	0.714	0.239	0.218	0.0810	0.159	0.714
Arsenic	mg/kg dw	8.09	3.07	4.84	1.17	4.46	3.98	6.18	4.54	2.21	1.17	4.46	8.09
Barium	mg/kg dw	122	26.4	45.7	5.08	50.0	26.8	21.8	42.5	38.1	5.08	26.8	122
Beryllium	mg/kg dw	0.302	0.0390	0.113	<0.01	0.104	0.0380	0.0470	0.0933	0.0972	<0.01	0.0470	0.302
Bismuth	mg/kg dw	0.0410	<0.024	0.0320	<0.01	0.0240	0.0100	<0.024	0.0196	0.0138	<0.01	0.0100	0.0410
Boron	mg/kg dw	4.50	4.30	6.30	<1	8.80	4.80	10.4	5.73	2.50	<1	4.80	10.4
Cadmium	mg/kg dw	0.369	0.319	0.390	0.0920	0.459	0.404	0.621	0.379	0.159	0.0920	0.390	0.621
Calcium	mg/kg dw	26,000	14,800	22,300	4,260	26,200	22,300	33,000	21,266	9,288	4,260	22,300	33,000
Cesium	mg/kg dw	0.866	0.146	0.393	0.0301	0.318	0.122	0.120	0.285	0.285	0.0301	0.146	0.866
Chromium	mg/kg dw	25.7	3.22	9.60	0.690	6.61	2.76	7.05	7.95	8.39	0.690	6.61	25.7
Cobalt	mg/kg dw	10.7	1.03	2.88	0.257	2.41	1.27	1.15	2.81	3.59	0.257	1.27	10.7
Copper	mg/kg dw	1,130	65.8	163	17.6	115	88.8	93.6	239	395	17.6	93.6	1,130
Iron	mg/kg dw	18,000	1,780	6,000	435	4,640	2,010	1,770	4,948	6,065	435	2,010	18,000
Lead	mg/kg dw	4.38	0.944	1.78	0.181	1.76	0.828	1.18	1.58	1.35	0.181	1.18	4.38
Lithium	mg/kg dw	6.67	<1.22	2.88	<0.5	2.57	0.970	2.30	2.38	2.10	<0.5	2.30	6.67
Magnesium	mg/kg dw	5,900	1,280	2,550	391	2,590	1,410	2,890	2,430	1,771	391	2,550	5,900
Manganese	mg/kg dw	435	266	514	71.7	530	338	324	354	159	71.7	338	530
Mercury	mg/kg dw	0.0620	0.0280	0.0420	0.00600	0.0770	<0.027	<0.04	0.0335	0.0298	0.00600	0.0280	0.0770
	mg/kg ww	0.00420	<0.002	0.00350	<0.001	0.00330	<0.002	<0.002	0.00214	0.000381	<0.001	<0.00215	0.00420
Molybdenum	mg/kg dw	5.18	0.860	1.98	0.254	1.73	1.14	2.20	1.91	1.59	0.254	1.73	5.18
Nickel	mg/kg dw	18.1	2.58	7.88	0.620	6.63	3.22	4.88	6.27	5.77	0.620	4.88	18.1
Phosphorus	mg/kg dw	9,570	6,890	9,990	2,320	10,700	10,100	10,700	8,610	3,063	2,320	9,990	10,700
Potassium	mg/kg dw	5,810	2,990	2,700	1,470	4,540	3,140	7,720	4,053	2,131	1,470	3,140	7,720
Rubidium	mg/kg dw	8.74	3.09	4.11	1.32	5.04	3.08	6.46	4.55	2.46	1.32	4.11	8.74
Selenium	mg/kg dw	4.75	3.18	4.65	1.04	5.96	4.61	7.80	4.57	2.11	1.04	4.65	7.80
Silver	mg/kg dw	0.264	0.0372	0.0958	0.00700	0.0998	0.0368	0.0383	0.0827	0.0868	0.00700	0.0383	0.264
Sodium	mg/kg dw	3,900	2,020	1,550	1,010	2,690	2,210	5,940	2,760	1,673	1,010	2,210	5,940
Strontium	mg/kg dw	148	73.0	123	22.0	138	106	156	109	47.7	22.0	123	156
Tellurium	mg/kg dw	0.0630	<0.049	<0.029	<0.02	<0.02	<0.02	<0.048	0.0261	-	<0.02	<0.0415	0.0630
Thallium	mg/kg dw	0.0180	0.00910	0.0159	<0.002	0.0177	0.00670	0.0114	0.0115	0.00504	<0.002	0.0114	0.0180
Tin	mg/kg dw	0.980	0.690	0.850	0.100	0.680	0.350	0.740	0.627	0.302	0.100	0.690	0.980
Titanium	mg/kg dw	764	74.1	237	15.4	173	71.2	69.2	201	259	15.4	74.1	764
Uranium	mg/kg dw	0.412	0.0940	0.269	0.0276	0.253	0.117	0.126	0.186	0.132	0.0276	0.126	0.412
Vanadium	mg/kg dw	55.7	6.00	20.6	1.41	13.2	6.34	9.24	16.1	18.5	1.41	9.24	55.7
Zinc	mg/kg dw	127	76.9	103	21.4	116	99.5	104	92.5	35.0	21.4	103	127
Zirconium	mg/kg dw	6.05	1.44	2.86	0.240	3.24	1.30	1.18	2.33	1.94	0.240	1.44	6.05

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = standard deviation not calculated due to insufficient detected data above the laboratory reporting limit. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. All summary statistics are reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 06]) used in the full sample identifiers.

Table C.4.2: Zooplankton Tissue Quality Data for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2024

Analyte	Units	Reference											
		QUL-ZOO-7											
		QUL-ZOO-7_ZOOT-1	QUL-ZOO-7_ZOOT-1	QUL-ZOO-7_ZOOT-2	QUL-ZOO-7_ZOOT-3	QUL-ZOO-7_ZOOT-4	QUL-ZOO-7_ZOOT-5	QUL-ZOO-7_ZOOT-1	Mean	Standard Deviation	Minimum	Median	Maximum
		20-Jun-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	25-Aug-24					
Moisture	%	98.6	64.0	76.2	70.5	75.2	87.6	99.1	94.4	1.79	91.6	94.4	97.2
Aluminum	mg/kg dw	1,620	79.9	208	155	235	343	1,570	2,898	1,938	196	2,440	6,560
Antimony	mg/kg dw	0.232	0.0130	0.0170	0.0120	0.0160	0.0320	1.61	0.299	0.186	0.0450	0.240	0.584
Arsenic	mg/kg dw	4.75	0.219	0.425	0.352	0.507	1.06	4.02	3.47	1.39	0.431	4.06	4.36
Barium	mg/kg dw	32.9	1.27	4.77	2.59	3.51	6.75	48.7	84.8	38.3	9.52	91.4	124
Beryllium	mg/kg dw	0.0590	<0.01	<0.01	<0.01	<0.01	0.0160	0.0570	0.101	0.0373	<0.01	0.0870	0.175
Bismuth	mg/kg dw	0.0290	<0.01	<0.01	<0.01	<0.01	<0.01	0.0280	0.0327	0.0125	<0.01	0.0320	0.0540
Boron	mg/kg dw	2.10	<1	<1	<1	<1	<1	2.60	9.31	4.55	1.50	10.0	15.5
Cadmium	mg/kg dw	1.66	0.180	0.470	0.505	0.652	1.27	1.82	0.323	0.130	0.0460	0.334	0.448
Calcium	mg/kg dw	4,600	763	2,050	2,160	2,580	5,130	38,100	23,344	10,789	4,310	25,800	38,800
Cesium	mg/kg dw	0.233	0.00890	0.0184	0.0162	0.0296	0.0352	0.222	0.306	0.184	0.0213	0.283	0.637
Chromium	mg/kg dw	9.56	<0.2	0.920	0.530	0.460	0.930	18.2	7.88	4.89	0.610	6.51	16.6
Cobalt	mg/kg dw	2.74	0.0890	0.182	0.145	0.189	0.328	2.09	2.10	1.19	0.154	1.88	3.99
Copper	mg/kg dw	37.3	11.8	9.67	8.26	15.8	19.6	98.1	129	90.6	6.15	110	263
Iron	mg/kg dw	3,600	200	400	323	442	672	2,960	5,605	3,025	548	4,990	9,310
Lead	mg/kg dw	1.44	0.0680	0.138	0.124	0.127	0.285	24.6	1.91	1.07	0.185	1.88	3.72
Lithium	mg/kg dw	1.89	<0.5	<0.5	<0.5	<0.5	<0.5	2.01	1.85	0.822	<0.5	1.59	3.52
Magnesium	mg/kg dw	2,360	112	236	184	228	447	2,540	1,900	849	237	1,960	2,840
Manganese	mg/kg dw	281	7.80	20.1	21.9	23.9	45.8	140	1,726	894	150	1,780	2,680
Mercury	mg/kg dw	0.0550	0.00670	0.0135	0.0131	0.0136	0.0291	0.0710	0.0767	0.0677	0.00640	0.0720	0.163
	mg/kg ww	<0.002	0.00240	0.00320	0.00380	0.00340	0.00360	<0.002	0.00408	0.000676	<0.001	0.00380	0.00800
Molybdenum	mg/kg dw	0.883	0.0750	0.104	0.0920	0.102	0.264	0.728	1.26	0.561	0.118	1.30	1.90
Nickel	mg/kg dw	10.2	0.240	0.750	0.510	0.540	0.970	6.90	6.27	3.66	0.550	5.96	11.6
Phosphorus	mg/kg dw	14,900	855	1,740	1,500	1,680	3,670	12,800	10,297	4,842	1,230	10,700	16,200
Potassium	mg/kg dw	12,600	581	994	794	936	2,080	8,850	4,561	3,479	669	3,760	11,900
Rubidium	mg/kg dw	24.0	0.924	1.50	1.24	1.60	3.51	14.0	6.17	3.55	0.850	5.57	12.6
Selenium	mg/kg dw	2.63	0.270	0.620	0.620	0.770	1.48	3.45	2.25	0.900	0.280	2.41	2.88
Silver	mg/kg dw	0.146	0.0114	0.0116	0.0126	0.0169	0.0302	0.0902	0.108	0.0685	0.00850	0.0994	0.225
Sodium	mg/kg dw	5,230	276	518	383	443	946	5,940	2,772	2,576	565	1,900	8,370
Strontium	mg/kg dw	30.3	4.26	10.7	10.4	12.2	23.7	254	153	69.9	25.1	176	239
Tellurium	mg/kg dw	<0.022	<0.02	<0.02	<0.02	<0.02	<0.02	0.0220	<0.02	-	<0.02	<0.02	<0.088
Thallium	mg/kg dw	0.0377	<0.002	0.00280	0.00300	0.00410	0.00830	0.0275	0.0307	0.0178	0.00250	0.0313	0.0616
Tin	mg/kg dw	0.220	<0.1	<0.1	<0.1	<0.1	0.200	0.430	0.953	0.225	<0.1	0.990	1.46
Titanium	mg/kg dw	119	4.65	10.4	7.33	11.7	17.5	108	137	83.4	10.7	114	276
Uranium	mg/kg dw	0.347	0.00780	0.0216	0.0187	0.0245	0.0425	0.178	0.338	0.173	0.0198	0.365	0.539
Vanadium	mg/kg dw	11.2	0.880	2.34	2.03	2.35	3.62	8.26	12.2	7.05	0.980	11.6	21.4
Zinc	mg/kg dw	119	8.10	23.0	19.1	21.5	47.2	118	111	49.4	9.80	117	158
Zirconium	mg/kg dw	<2	<0.2	<0.2	<0.2	<0.2	0.360	0.990	2.60	1.58	0.220	2.37	5.61

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = standard deviation not calculated due to insufficient detected data above the laboratory reporting limit. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. All summary statistics are reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 06]) used in the full sample identifiers.

Table C.4.2: Zooplankton Tissue Quality Data for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas, 2024

Analyte	Units	Exposed											
		QUL-ZOO-1											
		QUL-ZOO-1_ZOOT-1	QUL-ZOO-1_ZOOT-1	QUL-ZOO-1_ZOOT-2	QUL-ZOO-1_ZOOT-3	QUL-ZOO-1_ZOOT-4	QUL-ZOO-1_ZOOT-5	QUL-ZOO-1_ZOOT-1	Mean	Standard Deviation	Minimum	Median	Maximum
		20-Jun-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	25-Aug-24					
Moisture	%	69.5	94.0	57.4	94.3	95.5	49.1	99.1	79.8	20.7	49.1	94.0	99.1
Aluminum	mg/kg dw	16.5	1,360	178	1,770	1,860	65.6	1,050	900	807	16.5	1,050	1,860
Antimony	mg/kg dw	0.0370	0.170	0.0140	0.263	1.14	<0.01	0.209	0.263	0.405	<0.01	0.170	1.14
Arsenic	mg/kg dw	0.150	2.61	0.247	2.60	3.17	0.0980	3.85	1.82	1.60	0.0980	2.60	3.85
Barium	mg/kg dw	0.687	18.5	2.22	32.0	36.8	1.13	25.8	16.7	15.5	0.687	18.5	36.8
Beryllium	mg/kg dw	<0.01	0.0620	<0.01	0.0660	0.0840	<0.01	0.0390	0.0401	0.0195	<0.01	0.0390	0.0840
Bismuth	mg/kg dw	<0.01	<0.022	<0.01	0.0280	<0.036	<0.01	0.0110	0.0132	0.00968	<0.01	<0.0105	0.0280
Boron	mg/kg dw	<1	3.60	<1	4.50	4.90	<1	1.80	2.54	1.50	<1	1.80	4.90
Cadmium	mg/kg dw	0.0630	2.50	0.222	2.30	2.70	0.112	2.14	1.43	1.23	0.0630	2.14	2.70
Calcium	mg/kg dw	157	12,100	1,140	10,700	14,400	494	56,800	13,684	19,938	157	10,700	56,800
Cesium	mg/kg dw	<0.005	0.129	0.0138	0.176	0.159	0.00530	0.195	0.0976	0.0873	<0.005	0.129	0.195
Chromium	mg/kg dw	<0.2	4.06	0.420	6.43	10.8	0.310	15.2	5.35	5.92	<0.2	4.06	15.2
Cobalt	mg/kg dw	0.0330	1.45	0.135	1.26	1.27	0.0550	1.93	0.876	0.783	0.0330	1.26	1.93
Copper	mg/kg dw	1.10	68.5	15.3	220	138	7.26	53.1	71.9	80.7	1.10	53.1	220
Iron	mg/kg dw	37.5	2,560	318	3,170	2,840	135	2,060	1,589	1,376	37.5	2,060	3,170
Lead	mg/kg dw	<0.05	1.12	0.105	1.30	2.08	<0.05	1.18	0.841	0.798	<0.05	1.12	2.08
Lithium	mg/kg dw	<0.5	<1.08	<0.5	<1.35	<1.79	<0.5	1.46	0.660	-	<0.5	<0.98	1.46
Magnesium	mg/kg dw	63.1	1,270	146	1,260	1,430	55.8	2,580	972	941	55.8	1,260	2,580
Manganese	mg/kg dw	3.37	94.2	11.4	111	137	4.48	126	69.6	60.6	3.37	94.2	137
Mercury	mg/kg dw	<0.005	0.0690	0.00520	0.0650	0.0690	0.00560	0.100	0.0455	0.0399	<0.005	0.0650	0.100
	mg/kg ww	<0.001	0.00410	0.00220	0.00370	0.00310	0.00280	<0.002	0.00256	0.000802	<0.001	0.00280	0.00410
Molybdenum	mg/kg dw	<0.04	0.778	0.0960	2.42	0.830	0.0860	0.720	0.710	0.838	<0.04	0.720	2.42
Nickel	mg/kg dw	<0.2	3.31	0.380	4.94	6.17	0.200	5.30	2.93	2.67	<0.2	3.31	6.17
Phosphorus	mg/kg dw	540	7,140	758	5,910	6,860	295	17,000	5,500	5,932	295	5,910	17,000
Potassium	mg/kg dw	458	3,950	441	2,930	3,240	173	11,600	3,256	3,989	173	2,930	11,600
Rubidium	mg/kg dw	0.821	6.90	0.792	5.50	5.67	0.278	15.1	5.01	5.22	0.278	5.50	15.1
Selenium	mg/kg dw	<0.1	2.93	0.310	2.41	2.64	0.130	4.35	1.84	1.69	<0.1	2.41	4.35
Silver	mg/kg dw	<0.005	0.112	0.00780	0.0849	0.0896	<0.005	0.0822	0.0552	0.0477	<0.005	0.0822	0.112
Sodium	mg/kg dw	201	1,780	200	1,220	1,200	76.0	9,840	2,074	3,486	76.0	1,200	9,840
Strontium	mg/kg dw	1.09	60.4	6.01	48.5	58.1	2.38	378	79.2	134	1.09	48.5	378
Tellurium	mg/kg dw	<0.02	<0.043	<0.02	<0.054	<0.072	<0.02	0.0220	0.0205	-	<0.02	<0.021	0.0220
Thallium	mg/kg dw	<0.002	0.0201	<0.002	0.0183	0.0174	<0.002	0.0215	0.0119	0.00177	<0.002	0.0174	0.0215
Tin	mg/kg dw	<0.1	1.13	<0.1	1.21	0.830	<0.1	0.480	0.564	0.352	<0.1	0.480	1.21
Titanium	mg/kg dw	1.10	91.1	9.70	144	115	4.11	69.6	62.1	58.1	1.10	69.6	144
Uranium	mg/kg dw	0.00400	0.137	0.0128	0.104	0.120	0.00580	0.134	0.0739	0.0631	0.00400	0.104	0.137
Vanadium	mg/kg dw	0.220	14.8	1.95	16.6	20.9	0.800	7.22	8.93	8.47	0.220	7.22	20.9
Zinc	mg/kg dw	4.10	109	11.1	117	128	5.20	128	71.8	61.2	4.10	109	128
Zirconium	mg/kg dw	<0.2	1.17	<0.2	2.22	1.90	<0.2	1.69	1.08	0.468	<0.2	1.17	2.22

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = standard deviation not calculated due to insufficient detected data above the laboratory reporting limit. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. All summary statistics are reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 06]) used in the full sample identifiers.

APPENDIX C.5
BENTHIC INVERTEBRATE COMMUNITY

Table C.5.1: **Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024**

Year	Type	Area	Replicate	Density (#/m²)	Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	EPT (#/m²)	Arachnida (#/m²)	Chaoboridae (#/m²)	Chironomidae (#/m²)	Oligochaeta (#/m²)	EPT (%)	Arachnida (%)	Chaoboridae (%)	Chironomidae (%)	Oligochaeta (%)	CA1 (25.7%)	CA2 (16.8%)	CA3 (13.0%)
1999	Reference	BOL-B2	1	2,756	22	0.471	0.903	301	531	362	1,073	158	10.9	19.3	13.2	38.9	5.73	-0.375	-0.653	-0.458
			2	3,531	22	0.504	0.910	502	631	488	1,062	588	14.2	17.9	13.8	30.1	16.7	-0.511	-1.01	0.0524
			3	3,373	24	0.381	0.891	431	832	431	531	718	12.8	24.7	12.8	15.7	21.3	-0.529	-0.494	0.0567
	Exposed	POL-P1	1	301	12	0.623	0.866	43.1	28.7	0	172	43.1	14.3	9.52	0	57.1	14.3	0.401	-0.255	0.370
			2	617	15	0.601	0.889	71.8	71.8	0	273	144	11.6	11.6	0	44.2	23.3	-0.540	-1.06	0.103
			3	445	11	0.340	0.733	28.7	71.8	0	301	28.7	6.45	16.1	0	67.7	6.45	0.352	-0.241	0.403
		POL-P2	1	1,033	7	0.432	0.669	86.1	244	0	646	57.4	8.33	23.6	0	62.5	5.56	-0.597	-1.85	1.05
			2	1,062	6	0.490	0.660	0	158	0	904	0	0	14.9	0	85.1	0	0.475	-0.302	0.538
			3	1,062	10	0.438	0.772	0	115	0	732	158	0	10.8	0	68.9	14.9	-0.424	-1.58	2.03
2014	Reference	BOL-B2	1	2,382	6	0.220	0.241	0	14.3	2,067	57.4	244	0	0.602	86.8	2.41	10.2	-0.359	0.730	0.255
			2	2,669	5	0.265	0.244	0	14.3	2,311	172	172	0	0.538	86.6	6.45	6.45	-0.299	0.740	0.318
			3	4,248	6	0.216	0.230	0	28.7	3,717	201	301	0	0.676	87.5	4.73	7.09	0.398	0.581	0.174
	Exposed	POL-P1	1	14.3	1	1.00	0	0	0	0	0	14.3	0	0	0	0	100	-	-	-
			2	14.3	1	1.00	0	0	0	0	0	14.3	0	0	0	0	100	-	-	-
			3	28.7	2	1.00	0.500	0	14.3	0	0	14.3	0	50.0	0	0	50.0	-	-	-
		POL-P2	1	0	0	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-
			2	0	0	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-
			3	0	0	-	-	0	0	0	0	0	0	0	0	0	0	-	-	-
2015	Reference	BOL-B2	1	2,296	5	0.540	0.629	0	14.3	847	387	1,048	0	0.625	36.9	16.9	45.6	-0.366	0.704	0.300
			2	3,071	5	0.644	0.690	0	14.3	890	947	1,220	0	0.467	29.0	30.8	39.7	-0.0875	0.815	0.302
			3	1,866	5	0.465	0.569	0	57.4	1,048	144	617	0	3.08	56.1	7.69	33.1	-0.361	0.647	0.302
	Exposed	POL-P2	1	258	5	0.285	0.298	8.61	0	0	241	8.61	3.33	0	0	93.3	3.33	-0.314	-2.02	-1.22
			2	310	7	0.247	0.421	17.2	0	0	250	43.1	5.56	0	0	80.6	13.9	-0.558	-1.77	-0.877
			3	155	5	0.540	0.630	0	0	0	60.3	77.5	0	0	0	38.9	50.0	-0.672	-2.52	-0.204
			4	181	5	0.522	0.617	0	17.2	0	121	34.4	0	9.52	0	66.7	19.1	-0.691	-2.55	1.17
			5	775	4	0.299	0.165	0	0	0	766	8.61	0	0	0	98.9	1.11	-0.718	-2.75	1.69
2016	Reference	BOL-B2	1	896	6	0.532	0.687	0	0	258	94.7	542	0	0	28.9	10.6	60.6	-0.531	0.806	-1.20
			2	1,722	7	0.559	0.745	8.61	0	482	370	861	0.500	0	28.0	21.5	50.0	-0.673	0.704	-1.33
			3	1,162	7	0.592	0.759	8.61	0	232	301	620	0.741	0	20.0	25.9	53.3	-0.683	0.672	-1.38
			4	1,292	7	0.417	0.658	0	8.61	577	491	215	0	0.667	44.7	38.0	16.7	-0.522	0.600	-0.741
			5	1,145	6	0.544	0.694	0	51.7	508	112	474	0	4.51	44.4	9.77	41.4	-0.581	0.638	-0.929
	Exposed	POL-P1	1	129	7	0.526	0.729	0	8.61	8.61	51.7	60.3	0	6.67	6.67	40.0	46.7	-0.416	0.515	0.274
			2	1,206	7	0.316	0.548	0	0	0	327	870	0	0	0	27.1	72.1	-0.732	0.146	-1.84
			3	422	7	0.245	0.416	0	8.61	0	353	60.3	0	2.04	0	83.7	14.3	-0.532	-0.0544	-1.35
			4	904	9	0.283	0.608	0	25.8	8.61	654	215	0	2.86	0.952	72.4	23.8	-0.587	-0.727	-1.34
			5	766	10	0.213	0.530	0	8.61	0	189	568	0	1.12	0	24.7	74.2	-0.737	-0.529	-1.40
		POL-P2	1	276	7	0.249	0.426	0	0	0	232	17.2	0	0	0	84.4	6.25	-0.472	-1.48	0.0475
			2	439	4	0.294	0.151	0	0	0	431	0	0	0	0	98.0	0	-0.164	-0.162	0.148
			3	224	6	0.401	0.585	0	138	0	43.1	25.8	0	61.5	0	19.2	11.5	-0.327	0.252	0.606
			4	4,142	9	0.192	0.421	0	0	0	3,315	827	0	0	0	80.0	20.0	-0.741	-0.880	-1.72
			5	1,714	9	0.139	0.199	0	17.2	0	1,653	34.4	0	1.01	0	96.5	2.01	-0.338	-1.10	-0.722
2018	Reference	BOL-B2	1	2,609	6	0.298	0.441	0	8.61	1,808	60.3	732	0	0.330	69.3	2.31	28.1	-0.497	0.176	0.781
			2	3,599	5	0.438	0.543	0	25.8	1,541	155	1,877	0	0.718	42.8	4.31	52.1	-0.391	0.701	0.275
			3	2,902	5	0.478	0.581	0	17.2	1,533	310	1,042	0	0.593	52.8	10.7	35.9	-0.372	0.675	0.266
			4	2,807	5	0.553	0.638	0	17.2	1,317	887	586	0	0.613	46.9	31.6	20.9	-0.345	0.621	0.270
			5	1,981	5	0.395	0.493	8.61	34.4	1,300	103	534	0.435	1.74	65.7	5.22	27.0	-0.348	0.740	0.338

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.1: **Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024**

Year	Type	Area	Replicate	Density (#/m²)	Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	EPT (#/m²)	Arachnida (#/m²)	Chaoboridae (#/m²)	Chironomidae (#/m²)	Oligochaeta (#/m²)	EPT (%)	Arachnida (%)	Chaoboridae (%)	Chironomidae (%)	Oligochaeta (%)	CA1 (25.7%)	CA2 (16.8%)	CA3 (13.0%)
2018	Exposed	POL-P1	1	6,183	7	0.209	0.316	0	17.2	0	5,046	1,102	0	0.279	0	81.6	17.8	-0.355	-0.206	-0.0767
			2	6,148	4	0.510	0.509	0	17.2	0	3,272	2,859	0	0.280	0	53.2	46.5	-0.461	0.304	0.240
			3	8,180	5	0.302	0.338	0	34.4	17.2	6,510	1,619	0	0.421	0.211	79.6	19.8	-0.389	0.391	0.263
			4	7,784	4	0.405	0.382	0	172	0	5,873	1,705	0	2.21	0	75.4	21.9	-0.388	0.271	0.399
			5	8,800	5	0.401	0.501	0	68.9	0	4,994	3,720	0	0.783	0	56.8	42.3	-0.417	0.137	0.398
		POL-P2	1	7,233	5	0.383	0.478	0	68.9	34.4	4,581	2,549	0	0.952	0.476	63.3	35.2	-0.385	0.439	0.295
			2	5,683	5	0.267	0.250	0	68.9	0	4,908	689	0	1.21	0	86.4	12.1	-0.380	0.0756	0.404
			3	6,975	7	0.248	0.423	0	155	17.2	5,063	1,705	0	2.22	0.247	72.6	24.4	-0.365	0.235	0.390
			4	5,373	5	0.314	0.364	0	86.1	34.4	4,185	1,068	0	1.60	0.641	77.9	19.9	-0.366	0.410	0.298
			5	5,373	6	0.231	0.277	0	68.9	17.2	4,564	706	0	1.28	0.321	84.9	13.1	-0.355	0.217	0.380
2021	Reference	BOL-B2	1	1,946	8	0.205	0.390	8.61	17.2	336	103	1,481	0.442	0.885	17.3	5.31	76.1	-0.155	0.527	0.233
			2	2,514	7	0.259	0.449	0	17.2	508	198	1,791	0	0.685	20.2	7.88	71.2	-0.520	0.0147	0.826
			3	2,514	8	0.223	0.440	25.8	43.1	542	103	1,800	1.03	1.71	21.6	4.11	71.6	-0.410	0.662	0.278
			4	1,998	5	0.396	0.495	0	43.1	689	25.8	1,240	0	2.16	34.5	1.29	62.1	-0.428	0.755	0.290
			5	1,602	5	0.321	0.377	0	17.2	319	43.1	1,223	0	1.08	19.9	2.69	76.3	-0.429	0.715	0.269
	Exposed	POL-P1	1	2,954	6	0.209	0.201	0	43.1	0	2,652	258	0	1.46	0	89.8	8.75	-0.216	0.346	0.326
			2	5,924	4	0.513	0.513	0	913	0	3,892	1,119	0	15.4	0	65.7	18.9	-0.182	0.388	0.443
			3	3,987	7	0.210	0.320	0	499	34.4	3,298	146	0	12.5	0.864	82.7	3.67	-0.380	-0.187	0.816
			4	5,752	6	0.202	0.173	0	241	17.2	5,253	241	0	4.19	0.299	91.3	4.19	-0.316	0.329	0.354
			5	4,306	4	0.411	0.392	0	230	0	3,261	815	0	5.33	0	75.7	18.9	-0.384	0.242	0.364
		POL-P2	1	3,754	7	0.211	0.323	0	356	0	3,100	299	0	9.48	0	82.6	7.95	-0.350	0.201	0.390
			2	4,426	6	0.360	0.537	0	680	8.61	2,790	939	0	15.4	0.195	63.0	21.2	-0.331	0.234	0.501
			3	3,754	5	0.353	0.434	0	528	34.4	2,778	413	0	14.1	0.917	74.0	11.0	-0.328	0.372	0.358
			4	3,556	9	0.180	0.382	0	258	17.2	2,816	448	0	7.26	0.484	79.2	12.6	-0.153	0.384	0.409
			5	3,565	6	0.248	0.329	0	258	8.61	2,928	370	0	7.25	0.242	82.1	10.4	-0.162	0.459	0.353
2024	Reference	BOL-B2	1	2,136	6	0.544	0.694	0	25.8	689	448	973	0	1.21	32.3	21.0	45.6	1.54	0.279	-0.00415
			2	2,514	8	0.472	0.735	0	25.8	697	930	861	0	1.03	27.7	37.0	34.2	1.30	-0.0405	-0.300
			3	2,712	8	0.371	0.663	8.61	43.1	680	629	1,343	0.317	1.59	25.1	23.2	49.5	1.48	0.277	0.0225
			4	1,869	6	0.541	0.692	0	0	637	758	474	0	0	34.1	40.5	25.4	1.44	0.356	-0.0912
			5	1,869	10	0.360	0.722	43.1	25.8	577	723	499	2.30	1.38	30.9	38.7	26.7	1.52	0.167	-0.0181
	Exposed	POL-P1	1	1,619	10	0.291	0.656	17.2	25.8	8.61	706	861	1.06	1.60	0.532	43.6	53.2	1.88	-0.0632	-0.0824
			2	1,438	8	0.260	0.519	0	284	0	982	172	0	19.8	0	68.3	12.0	1.35	-0.294	-0.191
			3	2,006	9	0.336	0.669	0	86.1	0	852	1,051	0	4.29	0	42.5	52.4	1.42	-0.478	-0.325
			4	1,309	7	0.450	0.682	0	86.1	8.61	715	499	0	6.58	0.658	54.6	38.2	1.48	-0.0374	-0.0190
			5	990	9	0.338	0.671	0	8.61	25.8	474	474	0	0.870	2.61	47.8	47.8	1.71	-0.174	0.0282
		POL-P2	1	586	10	0.168	0.406	0	17.2	8.61	508	43.1	0	2.94	1.47	86.8	7.35	0.865	-0.400	-0.347
			2	594	9	0.230	0.516	8.61	25.8	0	482	77.5	1.45	4.35	0	81.2	13.0	1.58	-0.313	0.0367
			3	1,137	8	0.172	0.272	0	8.61	0	999	129	0	0.758	0	87.9	11.4	1.47	-0.340	-0.342
			4	542	4	0.276	0.0932	0	0	8.61	534	0	0	0	1.59	98.4	0	0.502	-0.0599	0.229
			5	1,033	8	0.296	0.578	0	8.61	0	689	327	0	0.833	0	66.7	31.7	1.95	-0.585	-0.422

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.2: Summary Statistics for Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (#/m²)	1999	Reference	BOL-B2	3	3,220	410	2,756	3,373	3,531
		Exposed	POL-P1	3	454	158	301	445	617
			POL-P2	3	1,052	16.6	1,033	1,062	1,062
	2014	Reference	BOL-B2	3	3,100	1,005	2,382	2,669	4,248
		Exposed	POL-P1	3	19.1	8.29	14.3	14.3	28.7
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	2,411	611	1,866	2,296	3,071
		Exposed	POL-P2	5	336	253	155	258	775
	2016	Reference	BOL-B2	5	1,243	304	896	1,162	1,722
		Exposed	POL-P1	5	685	419	129	766	1,206
			POL-P2	5	1,359	1,672	224	439	4,142
	2018	Reference	BOL-B2	5	2,780	582	1,981	2,807	3,599
		Exposed	POL-P1	5	7,419	1,201	6,148	7,784	8,800
			POL-P2	5	6,128	905	5,373	5,683	7,233
	2021	Reference	BOL-B2	5	2,115	395	1,602	1,998	2,514
		Exposed	POL-P1	5	4,585	1,250	2,954	4,306	5,924
			POL-P2	5	3,811	357	3,556	3,754	4,426
	2024	Reference	BOL-B2	5	2,220	382	1,869	2,136	2,712
		Exposed	POL-P1	5	1,472	376	990	1,438	2,006
			POL-P2	5	778	283	542	594	1,137
Richness (# of Taxa)	1999	Reference	BOL-B2	3	23	1.15	22	22	24
		Exposed	POL-P1	3	13	2.08	11	12	15
			POL-P2	3	8	2.08	6	7	10
	2014	Reference	BOL-B2	3	6	0.577	5	6	6
		Exposed	POL-P1	3	1	0.577	1	1	2
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	5	0	5	5	5
		Exposed	POL-P2	5	5	1.10	4	5	7
	2016	Reference	BOL-B2	5	7	0.548	6	7	7
		Exposed	POL-P1	5	8	1.41	7	7	10
			POL-P2	5	7	2.12	4	7	9
	2018	Reference	BOL-B2	5	5	0.447	5	5	6
		Exposed	POL-P1	5	5	1.22	4	5	7
			POL-P2	5	6	0.894	5	5	7
	2021	Reference	BOL-B2	5	7	1.52	5	7	8
		Exposed	POL-P1	5	5	1.34	4	6	7
			POL-P2	5	7	1.52	5	6	9
	2024	Reference	BOL-B2	5	8	1.67	6	8	10
		Exposed	POL-P1	5	9	1.14	7	9	10
			POL-P2	5	8	2.28	4	8	10
Simpson's Evenness	1999	Reference	BOL-B2	3	0.452	0.0636	0.381	0.471	0.504
		Exposed	POL-P1	3	0.521	0.157	0.340	0.601	0.623
			POL-P2	3	0.453	0.0322	0.432	0.438	0.490
	2014	Reference	BOL-B2	3	0.234	0.0269	0.216	0.220	0.265
		Exposed	POL-P1	3	1.00	0	1.00	1.00	1.00
			POL-P2	3	-	-	-	-	-
	2015	Reference	BOL-B2	3	0.549	0.0903	0.465	0.540	0.644
		Exposed	POL-P2	5	0.379	0.141	0.247	0.299	0.540
	2016	Reference	BOL-B2	5	0.529	0.0662	0.417	0.544	0.592
		Exposed	POL-P1	5	0.317	0.123	0.213	0.283	0.526
			POL-P2	5	0.255	0.101	0.139	0.249	0.401
	2018	Reference	BOL-B2	5	0.432	0.0950	0.298	0.438	0.553
		Exposed	POL-P1	5	0.365	0.114	0.209	0.401	0.510
			POL-P2	5	0.288	0.0614	0.231	0.267	0.383
	2021	Reference	BOL-B2	5	0.281	0.0783	0.205	0.259	0.396
		Exposed	POL-P1	5	0.309	0.144	0.202	0.210	0.513
			POL-P2	5	0.270	0.0822	0.180	0.248	0.360
	2024	Reference	BOL-B2	5	0.458	0.0890	0.360	0.472	0.544
		Exposed	POL-P1	5	0.335	0.0719	0.260	0.336	0.450
			POL-P2	5	0.228	0.0585	0.168	0.230	0.296
Simpson's Diversity	1999	Reference	BOL-B2	3	0.901	0.00976	0.891	0.903	0.910
		Exposed	POL-P1	3	0.829	0.0845	0.733	0.866	0.889
			POL-P2	3	0.700	0.0618	0.660	0.669	0.772
	2014	Reference	BOL-B2	3	0.238	0.00745	0.230	0.241	0.244
		Exposed	POL-P1	3	0.167	0.289	0	0	0.500
			POL-P2	3	-	-	-	-	-
	2015	Reference	BOL-B2	3	0.629	0.0601	0.569	0.629	0.690
		Exposed	POL-P2	5	0.426	0.201	0.165	0.421	0.630
	2016	Reference	BOL-B2	5	0.708	0.0420	0.658	0.694	0.759
		Exposed	POL-P1	5	0.566	0.114	0.416	0.548	0.729
			POL-P2	5	0.356	0.179	0.151	0.421	0.585
	2018	Reference	BOL-B2	5	0.539	0.0765	0.441	0.543	0.638
		Exposed	POL-P1	5	0.409	0.0910	0.316	0.382	0.509
			POL-P2	5	0.358	0.0960	0.250	0.364	0.478
	2021	Reference	BOL-B2	5	0.430	0.0478	0.377	0.440	0.495
		Exposed	POL-P1	5	0.320	0.139	0.173	0.320	0.513
			POL-P2	5	0.401	0.0881	0.323	0.382	0.537
	2024	Reference	BOL-B2	5	0.701	0.0282	0.663	0.694	0.735
		Exposed	POL-P1	5	0.640	0.0678	0.519	0.669	0.682
			POL-P2	5	0.373	0.195	0.0932	0.406	0.578
EPT (#/m²)	1999	Reference	BOL-B2	3	411	102	301	431	502
		Exposed	POL-P1	3	47.8	21.9	28.7	43.1	71.8
			POL-P2	3	28.7	49.7	0	0	86.1
	2014	Reference	BOL-B2	3	0	0	0	0	0
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	0	0	0	0	0
		Exposed	POL-P2	5	5.17	7.70	0	0	17.2
	2016	Reference	BOL-B2	5	3.44	4.72	0	0	8.61
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2018	Reference	BOL-B2	5	1.72	3.85	0	0	8.61
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2021	Reference	BOL-B2	5	6.89	11.2	0	0	25.8
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2024	Reference	BOL-B2	5	10.3	18.7	0	0	43.1
		Exposed	POL-P1	5	3.44	7.70	0	0	17.2
			POL-P2	5	1.72	3.85	0	0	8.61

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.2: Summary Statistics for Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Arachnida (#/m²)	1999	Reference	BOL-B2	3	665	153	531	631	832
		Exposed	POL-P1	3	57.4	24.9	28.7	71.8	71.8
			POL-P2	3	172	65.8	115	158	244
	2014	Reference	BOL-B2	3	19.1	8.29	14.3	14.3	28.7
		Exposed	POL-P1	3	4.78	8.29	0	0	14.3
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	28.7	24.9	14.3	14.3	57.4
		Exposed	POL-P2	5	3.44	7.70	0	0	17.2
	2016	Reference	BOL-B2	5	12.1	22.4	0	0	51.7
		Exposed	POL-P1	5	10.3	9.43	0	8.61	25.8
			POL-P2	5	31.0	60.1	0	0	138
	2018	Reference	BOL-B2	5	20.7	9.82	8.61	17.2	34.4
		Exposed	POL-P1	5	62.0	65.1	17.2	34.4	172
			POL-P2	5	89.5	37.3	68.9	68.9	155
	2021	Reference	BOL-B2	5	27.6	14.2	17.2	17.2	43.1
		Exposed	POL-P1	5	385	337	43.1	241	913
			POL-P2	5	416	184	258	356	680
	2024	Reference	BOL-B2	5	24.1	15.4	0	25.8	43.1
		Exposed	POL-P1	5	98.2	110	8.61	86.1	284
			POL-P2	5	12.1	9.82	0	8.61	25.8
Chaoboridae (#/m²)	1999	Reference	BOL-B2	3	427	62.9	362	431	488
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2014	Reference	BOL-B2	3	2,698	891	2,067	2,311	3,717
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	928	106	847	890	1,048
		Exposed	POL-P2	5	0	0	0	0	0
	2016	Reference	BOL-B2	5	412	156	232	482	577
		Exposed	POL-P1	5	3.44	4.72	0	0	8.61
			POL-P2	5	0	0	0	0	0
	2018	Reference	BOL-B2	5	1,500	207	1,300	1,533	1,808
		Exposed	POL-P1	5	3.44	7.70	0	0	17.2
			POL-P2	5	20.7	14.4	0	17.2	34.4
	2021	Reference	BOL-B2	5	479	154	319	508	689
		Exposed	POL-P1	5	10.3	15.4	0	0	34.4
			POL-P2	5	13.8	13.1	0	8.61	34.4
	2024	Reference	BOL-B2	5	656	50.0	577	680	697
		Exposed	POL-P1	5	8.61	10.6	0	8.61	25.8
			POL-P2	5	3.44	4.72	0	0	8.61
Chironomidae (#/m²)	1999	Reference	BOL-B2	3	889	310	531	1,062	1,073
		Exposed	POL-P1	3	249	67.8	172	273	301
			POL-P2	3	761	132	646	732	904
	2014	Reference	BOL-B2	3	144	75.9	57.4	172	201
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	493	412	144	387	947
		Exposed	POL-P2	5	288	279	60.3	241	766
	2016	Reference	BOL-B2	5	274	170	94.7	301	491
		Exposed	POL-P1	5	315	225	51.7	327	654
			POL-P2	5	1,135	1,372	43.1	431	3,315
	2018	Reference	BOL-B2	5	303	340	60.3	155	887
		Exposed	POL-P1	5	5,139	1,218	3,272	5,046	6,510
			POL-P2	5	4,660	341	4,185	4,581	5,063
	2021	Reference	BOL-B2	5	94.7	67.5	25.8	103	198
		Exposed	POL-P1	5	3,671	987	2,652	3,298	5,253
			POL-P2	5	2,882	135	2,778	2,816	3,100
	2024	Reference	BOL-B2	5	697	177	448	723	930
		Exposed	POL-P1	5	746	190	474	715	982
			POL-P2	5	642	215	482	534	999
Oligochaeta (#/m²)	1999	Reference	BOL-B2	3	488	293	158	588	718
		Exposed	POL-P1	3	71.8	62.6	28.7	43.1	144
			POL-P2	3	71.8	79.9	0	57.4	158
	2014	Reference	BOL-B2	3	239	64.7	172	244	301
		Exposed	POL-P1	3	14.3	0	14.3	14.3	14.3
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	962	310	617	1,048	1,220
		Exposed	POL-P2	5	34.4	28.6	8.61	34.4	77.5
	2016	Reference	BOL-B2	5	542	234	215	542	861
		Exposed	POL-P1	5	355	355	60.3	215	870
			POL-P2	5	181	361	0	25.8	827
	2018	Reference	BOL-B2	5	954	553	534	732	1,877
		Exposed	POL-P1	5	2,201	1,064	1,102	1,705	3,720
			POL-P2	5	1,343	790	689	1,068	2,549
	2021	Reference	BOL-B2	5	1,507	282	1,223	1,481	1,800
		Exposed	POL-P1	5	516	428	146	258	1,119
			POL-P2	5	494	255	299	413	939
	2024	Reference	BOL-B2	5	830	361	474	861	1,343
		Exposed	POL-P1	5	611	346	172	499	1,051
			POL-P2	5	115	128	0	77.5	327
EPT (%)	1999	Reference	BOL-B2	3	12.6	1.65	10.9	12.8	14.2
		Exposed	POL-P1	3	10.8	3.98	6.45	11.6	14.3
			POL-P2	3	2.78	4.81	0	0	8.33
	2014	Reference	BOL-B2	3	0	0	0	0	0
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	0	0	0	0	0
		Exposed	POL-P2	5	1.78	2.56	0	0	5.56
	2016	Reference	BOL-B2	5	0.248	0.350	0	0	0.741
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2018	Reference	BOL-B2	5	0.0870	0.194	0	0	0.435
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2021	Reference	BOL-B2	5	0.294	0.453	0	0	1.03
		Exposed	POL-P1	5	0	0	0	0	0
			POL-P2	5	0	0	0	0	0
	2024	Reference	BOL-B2	5	0.524	1.00	0	0	2.30
		Exposed	POL-P1	5	0.213	0.476	0	0	1.06
			POL-P2	5	0.290	0.648	0	0	1.45

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.2: Summary Statistics for Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Arachnida (%)	1999	Reference	BOL-B2	3	20.6	3.59	17.9	19.3	24.7
		Exposed	POL-P1	3	12.4	3.37	9.52	11.6	16.1
			POL-P2	3	16.4	6.54	10.8	14.9	23.6
	2014	Reference	BOL-B2	3	0.605	0.0691	0.538	0.602	0.676
		Exposed	POL-P1	3	16.7	28.9	0	0	50.0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	1.39	1.46	0.467	0.625	3.08
		Exposed	POL-P2	5	1.90	4.26	0	0	9.52
	2016	Reference	BOL-B2	5	1.04	1.96	0	0	4.51
		Exposed	POL-P1	5	2.54	2.54	0	2.04	6.67
			POL-P2	5	12.5	27.4	0	0	61.5
	2018	Reference	BOL-B2	5	0.799	0.545	0.330	0.613	1.74
		Exposed	POL-P1	5	0.795	0.819	0.279	0.421	2.21
			POL-P2	5	1.45	0.488	0.952	1.28	2.22
	2021	Reference	BOL-B2	5	1.30	0.613	0.685	1.08	2.16
		Exposed	POL-P1	5	7.78	5.91	1.46	5.33	15.4
			POL-P2	5	10.7	3.82	7.25	9.48	15.4
	2024	Reference	BOL-B2	5	1.04	0.618	0	1.21	1.59
		Exposed	POL-P1	5	6.62	7.69	0.870	4.29	19.8
			POL-P2	5	1.78	1.81	0	0.833	4.35
Chaoboridae (%)	1999	Reference	BOL-B2	3	13.2	0.534	12.8	13.2	13.8
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2014	Reference	BOL-B2	3	86.9	0.498	86.6	86.8	87.5
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	40.7	14.0	29.0	36.9	56.1
		Exposed	POL-P2	5	0	0	0	0	0
	2016	Reference	BOL-B2	5	33.2	10.9	20.0	28.9	44.7
		Exposed	POL-P1	5	1.52	2.90	0	0	6.67
			POL-P2	5	0	0	0	0	0
	2018	Reference	BOL-B2	5	55.5	11.6	42.8	52.8	69.3
		Exposed	POL-P1	5	0.0421	0.0942	0	0	0.211
			POL-P2	5	0.337	0.242	0	0.321	0.641
	2021	Reference	BOL-B2	5	22.7	6.78	17.3	20.2	34.5
		Exposed	POL-P1	5	0.233	0.376	0	0	0.864
			POL-P2	5	0.368	0.352	0	0.242	0.917
	2024	Reference	BOL-B2	5	30.0	3.61	25.1	30.9	34.1
		Exposed	POL-P1	5	0.760	1.08	0	0.532	2.61
			POL-P2	5	0.612	0.838	0	0	1.59
Chironomidae (%)	1999	Reference	BOL-B2	3	28.2	11.7	15.7	30.1	38.9
		Exposed	POL-P1	3	56.4	11.8	44.2	57.1	67.7
			POL-P2	3	72.2	11.7	62.5	68.9	85.1
	2014	Reference	BOL-B2	3	4.53	2.03	2.41	4.73	6.45
		Exposed	POL-P1	3	0	0	0	0	0
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	18.5	11.7	7.69	16.9	30.8
		Exposed	POL-P2	5	75.7	24.0	38.9	80.6	98.9
	2016	Reference	BOL-B2	5	21.2	11.7	9.77	21.5	38.0
		Exposed	POL-P1	5	49.6	26.9	24.7	40.0	83.7
			POL-P2	5	75.6	32.5	19.2	84.4	98.0
	2018	Reference	BOL-B2	5	10.8	12.0	2.31	5.22	31.6
		Exposed	POL-P1	5	69.3	13.3	53.2	75.4	81.6
			POL-P2	5	77.0	9.46	63.3	77.9	86.4
	2021	Reference	BOL-B2	5	4.26	2.52	1.29	4.11	7.88
		Exposed	POL-P1	5	81.0	10.6	65.7	82.7	91.3
			POL-P2	5	76.2	8.10	63.0	79.2	82.6
	2024	Reference	BOL-B2	5	32.1	9.25	21.0	37.0	40.5
		Exposed	POL-P1	5	51.4	10.6	42.5	47.8	68.3
			POL-P2	5	84.2	11.6	66.7	86.8	98.4
Oligochaeta (%)	1999	Reference	BOL-B2	3	14.6	7.99	5.73	16.7	21.3
		Exposed	POL-P1	3	14.7	8.41	6.45	14.3	23.3
			POL-P2	3	6.81	7.51	0	5.56	14.9
	2014	Reference	BOL-B2	3	7.93	2.03	6.45	7.09	10.2
		Exposed	POL-P1	3	83.3	28.9	50.0	100	100
			POL-P2	3	0	0	0	0	0
	2015	Reference	BOL-B2	3	39.5	6.28	33.1	39.7	45.6
		Exposed	POL-P2	5	17.5	19.6	1.11	13.9	50.0
	2016	Reference	BOL-B2	5	44.4	17.0	16.7	50.0	60.6
		Exposed	POL-P1	5	46.2	27.3	14.3	46.7	74.2
			POL-P2	5	7.95	8.04	0	6.25	20.0
	2018	Reference	BOL-B2	5	32.8	12.1	20.9	28.1	52.1
		Exposed	POL-P1	5	29.7	13.6	17.8	21.9	46.5
			POL-P2	5	21.0	9.44	12.1	19.9	35.2
	2021	Reference	BOL-B2	5	71.5	5.78	62.1	71.6	76.3
		Exposed	POL-P1	5	10.9	7.59	3.67	8.75	18.9
			POL-P2	5	12.6	5.08	7.95	11.0	21.2
	2024	Reference	BOL-B2	5	36.3	10.9	25.4	34.2	49.5
		Exposed	POL-P1	5	40.7	17.1	12.0	47.8	53.2
			POL-P2	5	12.7	11.7	0	11.4	31.7
CA1 (25.7%)	1999	Reference	BOL-B2	3	-0.472	0.0843	-0.529	-0.511	-0.375
		Exposed	POL-P1	3	0.0710	0.530	-0.540	0.352	0.401
			POL-P2	3	-0.182	0.576	-0.597	-0.424	0.475
	2014	Reference	BOL-B2	3	-0.0867	0.421	-0.359	-0.299	0.398
		Exposed	POL-P1	3	-	-	-	-	-
			POL-P2	3	-	-	-	-	-
	2015	Reference	BOL-B2	3	-0.272	0.160	-0.366	-0.361	-0.0875
		Exposed	POL-P2	5	-0.591	0.166	-0.718	-0.672	-0.314
	2016	Reference	BOL-B2	5	-0.598	0.0762	-0.683	-0.581	-0.522
		Exposed	POL-P1	5	-0.601	0.137	-0.737	-0.587	-0.416
			POL-P2	5	-0.408	0.216	-0.741	-0.338	-0.164
	2018	Reference	BOL-B2	5	-0.391	0.0623	-0.497	-0.372	-0.345
		Exposed	POL-P1	5	-0.402	0.0395	-0.461	-0.389	-0.355
			POL-P2	5	-0.370	0.0120	-0.385	-0.366	-0.355
	2021	Reference	BOL-B2	5	-0.388	0.137	-0.520	-0.428	-0.155
		Exposed	POL-P1	5	-0.295	0.0930	-0.384	-0.316	-0.182
			POL-P2	5	-0.265	0.0982	-0.350	-0.328	-0.153
	2024	Reference	BOL-B2	5	1.46	0.0941	1.30	1.48	1.54
		Exposed	POL-P1	5	1.57	0.219	1.35	1.48	1.88
			POL-P2	5	1.27	0.583	0.502	1.47	1.95

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.2: Summary Statistics for Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
CA2 (16.8%)	1999	Reference	BOL-B2	3	-0.720	0.266	-1.01	-0.653	-0.494
		Exposed	POL-P1	3	-0.519	0.469	-1.06	-0.255	-0.241
			POL-P2	3	-1.25	0.829	-1.85	-1.58	-0.302
	2014	Reference	BOL-B2	3	0.684	0.0894	0.581	0.730	0.740
		Exposed	POL-P1	3	-	-	-	-	-
			POL-P2	3	-	-	-	-	-
	2015	Reference	BOL-B2	3	0.722	0.0857	0.647	0.704	0.815
		Exposed	POL-P2	5	-2.32	0.408	-2.75	-2.52	-1.77
	2016	Reference	BOL-B2	5	0.684	0.0784	0.600	0.672	0.806
		Exposed	POL-P1	5	-0.130	0.503	-0.727	-0.0544	0.515
			POL-P2	5	-0.674	0.705	-1.48	-0.880	0.252
	2018	Reference	BOL-B2	5	0.583	0.231	0.176	0.675	0.740
		Exposed	POL-P1	5	0.179	0.234	-0.206	0.271	0.391
			POL-P2	5	0.275	0.150	0.0756	0.235	0.439
	2021	Reference	BOL-B2	5	0.535	0.303	0.0147	0.662	0.755
		Exposed	POL-P1	5	0.224	0.236	-0.187	0.329	0.388
			POL-P2	5	0.330	0.109	0.201	0.372	0.459
	2024	Reference	BOL-B2	5	0.208	0.154	-0.0405	0.277	0.356
		Exposed	POL-P1	5	-0.209	0.181	-0.478	-0.174	-0.0374
			POL-P2	5	-0.339	0.189	-0.585	-0.340	-0.0599
CA3 (13.0%)	1999	Reference	BOL-B2	3	-0.116	0.296	-0.458	0.0524	0.0567
		Exposed	POL-P1	3	0.292	0.164	0.103	0.370	0.403
			POL-P2	3	1.21	0.757	0.538	1.05	2.03
	2014	Reference	BOL-B2	3	0.249	0.0726	0.174	0.255	0.318
		Exposed	POL-P1	3	-	-	-	-	-
			POL-P2	3	-	-	-	-	-
	2015	Reference	BOL-B2	3	0.301	0.00123	0.300	0.302	0.302
		Exposed	POL-P2	5	0.111	1.27	-1.22	-0.204	1.69
	2016	Reference	BOL-B2	5	-1.12	0.273	-1.38	-1.20	-0.741
		Exposed	POL-P1	5	-1.13	0.812	-1.84	-1.35	0.274
			POL-P2	5	-0.328	0.913	-1.72	0.0475	0.606
	2018	Reference	BOL-B2	5	0.386	0.223	0.266	0.275	0.781
		Exposed	POL-P1	5	0.245	0.194	-0.0767	0.263	0.399
			POL-P2	5	0.354	0.0525	0.295	0.380	0.404
	2021	Reference	BOL-B2	5	0.379	0.251	0.233	0.278	0.826
		Exposed	POL-P1	5	0.461	0.203	0.326	0.364	0.816
			POL-P2	5	0.402	0.0599	0.353	0.390	0.501
	2024	Reference	BOL-B2	5	-0.0782	0.131	-0.300	-0.0181	0.0225
		Exposed	POL-P1	5	-0.118	0.142	-0.325	-0.0824	0.0282
			POL-P2	5	-0.169	0.286	-0.422	-0.342	0.229

Notes: "-" indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. No organisms were present in all replicate samples from POL-P2 in 2014, therefore Simpson's Evenness, and Simpson's Diversity could not be calculated. Results from POL-P1 and POL-P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤ 1 taxon / sample). Results displayed for post-breach richness, Simpson's Evenness, and Simpson's Diversity differ from those presented in Minnow (2022a) due to revised calculations.

Table C.5.3: **Benthic Invertebrate Community Supporting Measures for the Polley Lake (POL-P2, POL-P1; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024**

Year	Type	Area	Station	Station Depth (m)	Bottom Water Quality					Sediment Parameters					
					Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductance (µS/cm)	pH	% Fines	% TOC	PC Axis 1 (52 %)	PC Axis 2 (14 %)	Arsenic (mg/kg)	Copper (mg/kg)
1999	Reference	BOL-B2	BOL-B2-1	10.0	12.0	2.20	-	104	7.00	0	20.0	-6.85	1.42	5.70	300
			BOL-B2-2	10.0	12.0	2.20	-	104	7.00	0	20.0	-6.26	0.544	5.70	310
			BOL-B2-3	10.0	12.0	2.20	-	104	7.00	0	20.0	-7.06	0.481	5.70	310
	Exposed	POL-P1	POL-P1-1	17.0	6.80	6.20	-	203	7.50	0	14.0	-5.84	3.98	8.30	160
			POL-P1-2	17.0	6.80	6.20	-	203	7.50	0	14.0	-5.14	5.48	9.00	180
			POL-P1-3	17.0	6.80	6.20	-	203	7.50	0	14.0	-6.37	3.96	7.10	180
		POL-P2	POL-P2-1	17.0	7.60	6.70	-	196	7.60	0	18.0	-7.87	4.74	5.10	170
			POL-P2-2	17.0	7.60	6.70	-	196	7.60	0	18.0	-7.58	2.85	5.60	200
			POL-P2-3	17.0	7.60	6.70	-	196	7.60	0	18.0	-7.40	3.30	5.20	210
2014	Reference	BOL-B2	BOL-B2-1	16.2	9.43	8.80	76.9	108	7.28	99.5	16.8	-3.64	0.582	5.89	333
			BOL-B2-2	16.2	9.44	8.84	77.3	108	7.25	99.6	15.7	-4.10	-3.91	6.25	381
			BOL-B2-3	16.2	9.09	8.99	77.8	91.5	7.21	99.4	14.7	-3.78	0.889	6.12	305
	Exposed	POL-P1	POL-P1-1	27.7	8.31	0.300	2.60	302	7.13	99.7	11.5	2.58	-3.65	12.0	641
			POL-P1-2	27.7	8.24	0.370	3.20	290	7.35	99.6	9.02	3.25	-1.77	12.1	714
			POL-P1-3	27.7	8.24	0.370	3.20	290	7.35	99.7	6.94	4.12	1.03	13.0	811
		POL-P2	POL-P2-1	29.3	8.57	0.550	4.80	303	7.45	99.4	9.93	4.64	1.93	13.2	850
			POL-P2-2	29.3	8.57	0.550	4.80	303	7.45	98.9	8.67	0.432	-4.32	10.8	534
			POL-P2-3	29.3	8.57	0.550	4.80	303	7.45	99.5	4.42	4.96	6.18	13.8	683
2015	Reference	BOL-B2	BOL-B2-1	18.0	8.60	0.160	1.40	102	6.71	99.5	16.8	-2.81	-1.39	7.46	375
			BOL-B2-2	16.0	8.50	0.150	1.30	103	6.54	99.6	15.7	-3.11	-2.40	8.48	409
			BOL-B2-3	17.0	8.60	0.370	3.20	101	6.67	99.4	14.7	-3.29	-0.931	7.23	363
	Exposed	POL-P2	POL-P2-1	28.0	6.00	3.00	24.1	288	7.14	99.9	3.80	5.66	0.334	14.7	851
			POL-P2-2	28.0	5.90	3.12	24.9	288	7.22	99.7	10.1	5.47	0.565	14.1	855
			POL-P2-3	29.0	5.90	3.10	24.7	288	7.08	100	7.37	4.41	-0.413	13.4	774
			POL-P2-4	28.0	5.90	3.03	24.4	288	7.22	99.8	7.51	4.60	0.160	13.0	772
			POL-P2-5	28.0	5.90	3.26	25.4	288	7.18	100	8.32	4.98	-0.233	14.7	864
2016	Reference	BOL-B2	BOL-B2-1	17.0	8.40	0.280	2.40	118	7.34	99.7	13.9	-3.08	-0.252	6.75	333
			BOL-B2-2	15.0	8.51	0.360	3.00	115	7.56	99.4	15.0	-3.34	-1.89	7.80	373
			BOL-B2-3	16.0	8.47	0.270	2.30	116	7.48	99.5	14.3	-3.40	-0.148	6.72	328
			BOL-B2-4	15.0	8.38	0.450	3.80	117	7.50	99.2	14.5	-3.33	-0.964	6.68	335
			BOL-B2-5	17.0	8.41	0.340	2.80	116	7.09	99.6	15.6	-3.47	-1.37	6.91	357
	Exposed	POL-P1	POL-P1-1	30.6	5.97	3.74	29.8	-	7.23	99.1	4.14	2.91	1.00	12.1	578
			POL-P1-2	29.7	5.91	0.310	2.50	316	7.23	99.6	16.9	-1.94	-1.85	8.11	381
			POL-P1-3	29.8	5.77	3.78	30.5	299	7.32	99.7	5.37	3.11	-0.842	12.2	674
			POL-P1-4	29.6	5.93	0.270	2.20	312	7.20	99.9	5.93	3.74	1.18	13.2	671
			POL-P1-5	30.8	5.96	1.25	10.0	328	7.31	99.3	5.58	2.96	-1.00	11.9	665
		POL-P2	POL-P2-1	28.8	5.76	3.55	28.3	311	7.24	99.2	5.66	4.27	1.67	12.7	734
			POL-P2-2	29.1	5.76	3.60	28.8	310	7.43	99.6	1.59	4.64	0.934	13.9	840
			POL-P2-3	28.9	5.77	3.55	28.4	311	7.49	99.7	3.09	4.36	0.252	13.1	702
			POL-P2-4	28.5	5.77	3.50	28.0	311	7.45	99.6	10.6	0.800	-0.690	10.5	428
			POL-P2-5	28.8	5.74	3.57	28.6	311	7.50	99.7	4.32	4.69	0.491	13.4	719

Notes: " - " indicates no data, °C = degrees Celsius, mg/ L = milligrams per litre, % = percent, µS/cm = microSiemens per centimeter, TOC = Total Organic Carbon, PC Axis = Principal Components Axis, mg/kg = milligrams per kilogram (dry weight). POL-P2 did not record any benthic organisms in all replicates collected in 2014.

Table C.5.3: **Benthic Invertebrate Community Supporting Measures for the Polley Lake (POL-P2, POL-P1; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024**

Year	Type	Area	Station	Station Depth (m)	Bottom Water Quality					Sediment Parameters					
					Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductance (µS/cm)	pH	% Fines	% TOC	PC Axis 1 (52 %)	PC Axis 2 (14 %)	Arsenic (mg/kg)	Copper (mg/kg)
2018	Reference	BOL-B2	BOL-B2-1	16.5	7.31	0.510	4.40	114	7.05	99.6	15.0	-2.95	-1.42	7.00	359
			BOL-B2-2	15.9	7.31	0.460	4.00	114	7.10	99.7	16.0	-2.95	-2.45	7.57	399
			BOL-B2-3	16.0	7.24	0	0	114	6.92	99.6	15.0	-3.36	-2.08	7.14	388
			BOL-B2-4	14.8	7.37	0.380	3.40	111	7.01	99.3	16.3	-3.56	-2.41	7.33	378
			BOL-B2-5	16.2	7.36	0.450	4.00	111	7.06	99.3	15.0	-3.07	-2.14	7.26	390
	Exposed	POL-P1	POL-P1-1	29.0	4.52	2.85	22.1	295	7.16	99.7	8.86	1.97	-1.46	12.0	549
			POL-P1-2	28.0	4.58	3.59	28.2	295	7.71	99.6	2.21	1.95	4.17	10.9	477
			POL-P1-3	29.0	4.55	3.31	25.6	279	7.45	99.9	8.25	1.94	-0.238	11.6	583
			POL-P1-4	29.0	4.54	3.35	26.1	294	7.47	99.9	5.67	3.50	1.05	12.0	643
			POL-P1-5	28.0	4.54	3.68	29.2	295	7.59	99.9	6.20	3.26	1.30	12.3	587
		POL-P2	POL-P2-1	28.0	4.62	3.26	25.4	295	7.47	99.4	8.49	1.62	-0.148	10.7	532
			POL-P2-2	28.0	4.55	3.29	25.7	295	7.44	99.9	5.06	4.09	1.08	12.7	710
			POL-P2-3	28.0	4.60	3.33	26.0	295	7.54	99.8	11.1	-0.804	-2.66	8.62	409
			POL-P2-4	27.0	4.65	3.38	26.7	295	7.54	99.7	4.63	3.99	0.971	12.5	695
			POL-P2-5	28.0	4.57	3.53	27.7	295	7.54	99.6	5.58	3.38	0.742	12.5	648
2021	Reference	BOL-B2	BOL-B2-1	18.0	6.62	0.950	7.80	127	7.24	99.1	15.7	-2.09	-0.0637	6.88	334
			BOL-B2-2	17.2	6.65	1.28	10.4	112	6.97	99.9	16.6	-2.27	-1.33	7.20	381
			BOL-B2-3	16.6	6.80	1.64	13.4	102	6.97	99.9	16.4	-2.19	-2.09	7.89	416
			BOL-B2-4	17.9	6.61	1.39	11.4	103	6.98	99.9	15.8	-2.75	-0.439	7.43	387
			BOL-B2-5	18.0	6.76	1.95	16.0	103	6.99	99.8	14.8	-2.31	-0.963	7.50	379
	Exposed	POL-P1	POL-P1-1	29.0	4.98	6.73	52.7	231	7.31	99.6	13.7	1.25	-2.70	10.4	533
			POL-P1-2	27.0	4.98	6.74	52.8	231	7.31	99.9	10.8	1.77	0.205	11.7	528
			POL-P1-3	28.0	4.95	6.44	55.9	232	7.29	99.9	11.4	1.08	0.129	10.3	475
			POL-P1-4	28.0	4.93	6.39	50.0	232	7.36	99.3	10.9	1.54	0.505	9.72	502
			POL-P1-5	29.0	4.90	6.41	50.1	232	7.33	99.9	9.85	2.53	0.823	11.1	591
		POL-P2	POL-P2-1	29.8	4.97	6.42	50.3	238	7.33	99.9	6.73	3.96	0.0473	12.8	712
			POL-P2-2	29.8	4.96	6.18	48.4	238	7.36	99.9	15.3	0.0574	-1.05	8.76	466
			POL-P2-3	29.8	5.01	6.63	58.1	238	7.38	99.8	11.8	1.26	-0.489	9.96	553
			POL-P2-4	27.0	4.96	6.34	49.6	238	7.35	99.9	13.1	0.928	-1.25	10.2	513
			POL-P2-5	27.5	4.98	6.36	49.8	238	7.33	99.9	8.32	2.98	0.581	10.8	624
2024	Reference	BOL-B2	BOL-B2-1	16.6	8.60	0.0200	0.200	121	6.87	99.4	13.6	-2.57	-2.16	8.22	408
			BOL-B2-2	14.3	8.71	0.220	1.90	120	7.02	99.3	15.6	-2.10	-1.71	9.80	375
			BOL-B2-3	16.7	8.45	0.290	2.40	124	7.04	98.9	14.9	-2.50	-0.224	7.94	350
			BOL-B2-4	16.1	8.48	0.290	2.40	123	7.04	99.6	14.8	-2.69	-0.345	7.90	342
			BOL-B2-5	16.7	8.50	0.300	2.60	124	7.07	99.5	14.2	-2.84	0.239	7.66	334
	Exposed	POL-P1	POL-P1-1	29.7	5.46	6.14	48.6	255	7.41	99.2	6.36	1.34	-1.18	10.8	497
			POL-P1-2	29.2	5.57	6.22	49.5	256	7.50	99.5	10.2	1.26	0.533	10.5	470
			POL-P1-3	30.2	5.48	6.14	48.8	255	7.45	99.6	6.75	1.62	0.571	10.2	501
			POL-P1-4	30.2	5.48	6.38	49.8	254	7.41	99.2	9.13	1.99	0.0680	11.0	538
			POL-P1-5	29.3	5.50	6.20	49.0	254	7.42	98.8	8.34	1.69	0.302	10.6	498
		POL-P2	POL-P2-1	31.2	5.48	6.18	49.0	254	7.36	99.6	10.8	3.28	1.58	11.6	624
			POL-P2-2	29.4	5.51	6.55	52.0	255	7.39	99.4	10.5	1.45	0.190	10.4	524
			POL-P2-3	31.4	5.64	6.12	48.8	254	7.55	98.4	9.34	3.01	1.41	11.2	598
			POL-P2-4	31.0	5.49	6.00	47.6	255	7.39	99.2	9.04	2.33	-0.664	11.7	559
			POL-P2-5	31.2	5.45	5.98	47.4	255	7.26	99.8	9.04	3.02	-0.757	13.0	595

Notes: " - " indicates no data, °C = degrees Celsius, mg/ L = milligrams per litre, % = percent, µS/cm = microSiemens per centimeter, TOC = Total Organic Carbon, PC Axis = Principal Components Axis, mg/kg = milligrams per kilogram (dry weight). POL-P2 did not record any benthic organisms in all replicates collected in 2014.

Table C.5.4: Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Type	Area	Replicate	Density (#/m²)	Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	EPT (#/m²)	Arachnida (#/m²)	Chironomidae (#/m²)	Oligochaeta (#/m²)	EPT (%)	Arachnida (%)	Chironomidae (%)	Oligochaeta (%)	CA1 (30.9%)	CA2 (16.5%)	CA3 (12.6%)
2014	Reference	QUL-PREF1	1	5,752	7	0.259	0.448	17.2	17.2	4,529	1,171	0.299	0.299	78.7	20.4	1.19	-0.551	0.418
			2	7,767	6	0.176	0.0523	0	17.2	7,595	103	0	0.222	97.8	1.33	0.981	-1.23	0.374
			3	7,027	9	0.207	0.462	0	17.2	5,012	1,912	0	0.245	71.3	27.2	0.776	-0.922	0.377
			4	4,624	9	0.185	0.400	8.61	8.61	3,410	1,154	0.186	0.186	73.7	24.9	0.844	-0.976	0.401
			5	3,892	8	0.270	0.537	0	11.5	1,745	2,078	0	0.295	44.8	53.4	1.00	-0.986	0.346
	Exposed	QUL-PNF	1	17.2	2	1.00	0.500	0	8.61	0	0	0	50.0	0	0	0.0590	-1.66	-6.80
			2	17.2	1	1.00	0	0	0	17.2	0	0	0	100	0	-1.65	-0.146	0.668
			3	60.3	4	0.817	0.694	0	8.61	34.4	17.2	0	14.3	57.1	28.6	-0.502	0.176	-0.681
			4	8.61	1	1.00	0	0	0	0	8.61	0	0	0	100	-	-	-
			5	94.7	5	0.810	0.753	0	17.2	68.9	0	0	18.2	72.7	0	-0.709	-0.255	-2.33
		QUL-PFF1	1	60.3	5	0.754	0.735	0	25.8	8.61	0	0	42.9	14.3	0	-0.330	0.620	-0.111
			2	25.8	2	0.900	0.444	0	8.61	17.2	0	0	33.3	66.7	0	-0.502	0.176	-0.681
			3	25.8	2	0.900	0.444	0	17.2	8.61	0	0	66.7	33.3	0	0.0590	-1.66	-6.80
			4	0	0	-	-	0	0	0	0	0	0	0	0	-	-	-
			5	0	0	-	-	0	0	0	0	0	0	0	0	-	-	-
2015	Reference	QUL-PREF1	1	11,539	4	0.416	0.399	0	0	2,790	8,749	0	0	24.2	75.8	0.921	-0.956	0.513
			2	7,761	6	0.271	0.386	0	0	1,699	6,062	0	0	21.9	78.1	0.935	-0.952	0.510
			3	22,940	6	0.223	0.253	0	0	2,859	20,081	0	0	12.5	87.5	0.880	-0.899	0.505
			4	33,549	3	0.371	0.101	0	0	1,791	31,758	0	0	5.34	94.7	0.923	-0.878	0.493
			5	10,574	4	0.340	0.264	0	0	1,481	8,955	0	0	14.0	84.7	0.906	-0.912	0.504
	Exposed	QUL-PNF	1	43.1	4	0.893	0.720	0	0	25.8	8.61	0	0	60.0	20.0	0.521	-0.790	0.534
			2	51.7	6	1.00	0.833	8.61	8.61	25.8	8.61	16.7	16.7	50.0	16.7	0.0872	-0.656	-1.34
			3	103	3	0.889	0.625	0	0	103	0	0	0	100	0	-1.22	0.182	-0.0518
			4	138	5	0.545	0.633	0	17.2	121	0	0	12.5	87.5	0	-1.09	0.102	-0.147
			5	741	5	0.432	0.537	0	8.61	715	17.2	0	1.16	96.5	2.33	-0.283	-0.978	-0.281
2016	Reference	QUL-PREF1	1	7,027	7	0.249	0.426	23.0	23.0	1,998	4,983	0.327	0.327	28.4	70.9	0.734	1.10	-0.0249
			2	2,256	13	0.212	0.637	0	138	1,352	766	0	6.11	59.9	34.0	0.621	0.454	-0.882
			3	8,152	8	0.236	0.470	23.0	23.0	2,365	5,741	0.282	0.282	29.0	70.4	0.764	1.11	-0.0104
			4	8,663	12	0.128	0.350	0	0	1,567	7,078	0	0	18.1	81.7	0.953	1.18	0.0926
			5	2,308	13	0.190	0.596	0	0	818	1,429	0	0	35.5	61.9	0.642	1.03	0.183
	Exposed	QUL-PNF	1	663	7	0.244	0.414	0	0	568	77.5	0	0	85.7	11.7	0.424	1.22	0.195
			2	1,326	10	0.201	0.503	0	861	422	34.4	0	64.9	31.8	2.60	-0.0206	0.531	-1.85
			3	577	6	0.332	0.498	0	0	577	0	0	0	100	0	-0.922	0.675	-0.0901
			4	198	3	0.435	0.234	0	0	189	0	0	0	95.7	0	0.338	2.02	-0.0125
			5	172	5	0.435	0.540	0	0	146	25.8	0	0	85.0	15.0	0.600	0.864	0.231
		QUL-PFF1	1	396	5	0.395	0.493	0	0	379	0	0	0	95.7	0	-1.06	0.228	0.308
			2	250	5	0.482	0.585	0	8.61	241	0	0	3.45	96.5	0	-1.14	0.0328	0.0326
			3	207	4	0.561	0.554	0	0	198	0	0	0	95.8	0	-1.23	0.0649	0.186
			4	215	2	0.927	0.461	0	0	215	0	0	0	100	0	-1.17	-0.155	0.615
			5	258	3	0.412	0.190	0	0	258	0	0	0	100	0	-1.34	0.0798	0.171
2018	Reference	QUL-PREF1	1	2,997	11	0.149	0.390	8.61	8.61	2,342	620	0.287	0.287	78.2	20.7	0.870	-0.902	-0.179
			2	5,907	6	0.245	0.319	0	0	4,857	999	0	0	82.2	16.9	0.737	-0.754	0.570
			3	7,250	8	0.167	0.253	0	0	6,476	775	0	0	89.3	10.7	1.01	-0.731	0.567
			4	4,926	14	0.123	0.420	0	8.61	3,944	956	0	0.175	80.1	19.4	0.831	-0.482	0.469
			5	5,408	14	0.155	0.540	0	0	3,858	1,481	0	0	71.3	27.4	0.888	-0.400	0.577
	Exposed	QUL-PNF	1	1,266	10	0.345	0.710	51.7	0	586	586	4.08	0	46.3	46.3	-0.0721	-0.368	0.495
			2	1,369	9	0.280	0.603	0	0	1,223	112	0	0	89.3	8.18	-0.296	-0.353	0.516
			3	1,059	4	0.375	0.333	0	0	1,042	0	0	0	98.4	0	-0.983	0.123	0.638
			4	1,051	6	0.652	0.744	8.61	0	715	327	0.820	0	68.0	31.1	-0.111	-0.599	0.494
			5	525	5	0.463	0.568	0	8.61	517	0	0	1.64	98.4	0	-0.812	-0.489	0.465
		QUL-PFF1	1	861	3	0.440	0.243	0	0	861	0	0	0	100	0	-1.27	-0.166	0.484
			2	801	2	0.542	0.0768	0	0	801	0	0	0	100	0	-1.30	-0.152	0.629
			3	887	2	0.550	0.0907	0	0	887	0	0	0	100	0	-1.28	-0.153	0.628
			4	1,042	2	0.764	0.346	0	0	1,042	0	0	0	100	0	-1.19	-0.154	0.618
			5	654	4	0.305	0.179	0	0	646	8.61	0	0	98.7	1.32	-1.31	-0.167	0.479
2019	Reference	QUL-PREF1	1	7,089	7	0.267	0.465	40.0	0	4,686	2,303	0.565	0	66.1	32.5	0.792	1.40	0.119
			2	11,298	3	0.427	0.219	0	0	9,885	1,378	0	0	87.5	12.2	1.09	1.95	-0.246
			3	7,819	7	0.236	0.395	17.2	34.4	5,804	1,946	0.220	0.441	74.2	24.9	0.841	1.44	-0.0648
			4	10,333	6	0.232	0.283	71.8	0	8,635	1,555	0.694	0	83.6	15.1	1.21	1.76	-0.0965
			5	13,519	9	0.215	0.483	43.1	0	9,214	4,176	0.318	0	68.2	30.9	0.569	1.34	0.0889
	Exposed	QUL-PNF	1	3,419	5	0.215	0.0688	0	0	121	3,298	0	0	3.53	96.5	0.275	0.515	0.234
			2	2,463	9	0.276	0.597	25.8	0	1,627	792	1.05	0	66.1	32.2	-0.200	0.374	0.338
			3	921	10	0.154	0.349	77.5	8.61	809	17.2	8.41	0.935	87.8	1.87	-1.12	-0.0959	0.398
			4	1,206	9	0.228	0.512	60.3	0	1,111	0	5.00	0	92.1	0	-1.17	-0.155	0.616
			5	1,438	8	0.196	0.361	60.3	0	1,317	8.61	4.19	0	91.6	0.599	-1.21	-0.154	0.620

Notes: " - " indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023. No organisms were present in all replicate samples from QUL-PFF1-1 and QUL-PFF1-2 in 2014, therefore CA site scores could not be calculated.

Table C.5.4: Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Type	Area	Replicate	Density (#/m²)	Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	EPT (#/m²)	Arachnida (#/m²)	Chironomidae (#/m²)	Oligochaeta (#/m²)	EPT (%)	Arachnida (%)	Chironomidae (%)	Oligochaeta (%)	CA1 (30.9%)	CA2 (16.5%)	CA3 (12.6%)
2020	Exposed	QUL-PNF	1	1,051	10	0.245	0.592	25.8	0	327	697	2.46	0	31.1	66.4	-0.0242	0.617	0.171
			2	844	8	0.365	0.657	0	17.2	741	77.5	0	2.04	87.8	9.18	-0.575	-0.140	-0.281
			3	818	9	0.244	0.544	8.61	17.2	784	0	1.05	2.11	95.8	0	-0.748	-0.634	-0.548
			4	1,240	8	0.292	0.573	0	43.1	1,137	43.1	0	3.47	91.7	3.47	-0.719	-0.110	0.270
			5	1,042	6	0.278	0.400	0	25.8	999	0	0	2.48	95.9	0	-1.19	-0.154	0.618
2021	Reference	QUL-PREF1	1	2,833	5	0.394	0.492	0	0	1,757	1,068	0	0	62.0	37.7	0.989	-0.793	0.545
			2	10,781	8	0.266	0.531	0	172	4,891	5,718	0	1.60	45.4	53.0	1.13	-0.915	-0.771
			3	6,768	13	0.151	0.492	0	138	4,461	2,118	0	2.04	65.9	31.3	0.871	-0.929	-0.669
			4	4,641	8	0.259	0.517	8.61	25.8	2,118	2,454	0.186	0.557	45.6	52.9	0.820	-1.12	-0.588
			5	10,299	15	0.159	0.579	17.2	0	6,992	3,255	0.167	0	67.9	31.6	1.00	-0.160	0.565
	Exposed	QUL-PNF	1	1,266	8	0.590	0.788	17.2	379	577	293	1.36	29.9	45.6	23.1	0.0541	-0.864	-1.04
			2	1,705	5	0.304	0.342	0	17.2	319	1,369	0	1.01	18.7	80.3	0.0467	-0.464	0.379
			3	1,309	6	0.274	0.391	0	25.8	1,283	0	0	1.97	98.0	0	-1.05	-0.0851	0.346
			4	1,550	7	0.276	0.483	0	25.8	1,472	43.1	0	1.67	95.0	2.78	-0.587	0.0180	0.559
			5	1,533	7	0.288	0.504	0	112	1,386	25.8	0	7.30	90.5	1.69	-0.495	-0.258	-0.885
		QUL-PFF1	1	1,076	3	0.381	0.125	0	0	1,068	0	0	0	99.2	0	-1.06	0.0878	0.641
			2	534	3	0.365	0.0870	0	0	525	0	0	0	98.4	0	-1.08	0.132	0.650
			3	1,137	3	0.366	0.0904	0	25.8	1,111	0	0	2.27	97.7	0	-1.12	-0.0728	0.315
			4	1,300	4	0.268	0.0658	0	17.2	1,274	8.61	0	1.32	98.0	0.662	-1.16	-0.0782	0.341
			5	1,154	6	0.209	0.203	0	8.61	1,111	25.8	0	0.746	96.3	2.24	-0.981	0.0986	0.450
2022	Exposed	QUL-PNF	1	818	5	0.396	0.495	0	34.4	749	17.2	0	4.21	91.6	2.11	-1.18	-0.154	0.616
			2	603	9	0.337	0.671	0	86.1	456	60.3	0	14.3	75.7	10.00	-0.374	-0.659	-0.901
			3	1,016	5	0.361	0.446	0	0	999	17.2	0	0	98.3	1.69	-1.24	-0.168	0.472
			4	1,180	6	0.282	0.410	8.61	0	1,111	60.3	0.730	0	94.2	5.11	-0.702	-0.553	0.648
			5	1,361	6	0.281	0.407	0	68.9	1,283	8.61	0	5.06	94.3	0.633	-1.12	-0.105	0.278
2023	Exposed	QUL-PNF	1	844	12	0.455	0.817	43.1	293	422	77.5	5.10	34.7	50.0	9.18	-0.227	0.153	-1.20
			2	680	7	0.550	0.740	0	77.5	534	68.9	0	11.4	78.5	10.1	-0.238	0.558	0.0919
			3	499	9	0.412	0.730	0	34.4	344	121	0	6.90	69.0	24.1	-0.487	-0.310	-0.660
			4	758	9	0.346	0.679	0	8.61	517	224	0	1.14	68.2	29.6	-0.560	0.299	0.179
			5	603	9	0.405	0.726	0	138	413	43.1	0	22.9	68.6	7.14	-0.442	-0.406	-1.19
2024	Reference	QUL-PREF1	1	5,528	10	0.389	0.743	17.2	121	2,446	2,911	0.312	2.18	44.2	52.6	0.615	0.162	-0.763
			2	3,117	10	0.394	0.746	0	0	1,498	1,619	0	0	48.1	51.9	1.07	0.372	0.252
			3	3,952	10	0.401	0.751	8.61	0	1,998	1,929	0.218	0	50.5	48.8	0.811	0.450	0.0817
			4	1,963	8	0.491	0.745	0	0	982	982	0	0	50.0	50.0	0.889	0.527	-0.0678
			5	1,894	15	0.252	0.736	0	0	1,042	844	0	0	55.0	44.5	0.782	0.601	0.0703
	Exposed	QUL-PNF	1	215	11	0.738	0.877	0	0	181	34.4	0	0	84.0	16.0	-0.514	0.639	-0.0875
			2	327	9	0.699	0.841	0	0	276	51.7	0	0	84.2	15.8	-0.303	0.453	0.00621
			3	301	6	0.507	0.671	0	34.4	267	0	0	11.4	88.6	0	-0.885	0.647	-0.314
			4	344	8	0.539	0.768	0	0	310	25.8	0	0	90.0	7.50	-0.858	0.183	0.0788
			5	319	8	0.276	0.548	8.61	8.61	301	0	2.70	2.70	94.6	0	-1.21	0.0736	-0.0360
		QUL-PFF1	1	396	12	0.330	0.748	8.61	43.1	310	25.8	2.17	10.9	78.3	6.52	-0.763	-0.168	-1.07
			2	276	5	0.361	0.445	0	8.61	267	0	0	3.12	96.9	0	-1.29	0.152	-0.186
			3	284	6	0.364	0.542	0	0	258	8.61	0	0	90.9	3.03	-0.854	0.215	0.183
			4	387	6	0.380	0.562	0	17.2	327	0	0	4.44	84.4	0	-1.34	0.295	-0.382
			5	241	5	0.449	0.554	0	8.61	224	0	0	3.57	92.9	0	-1.15	0.377	0.0383

Notes: " - " indicates no data, EPT = Ephemeroptera, Plecoptera, Trichoptera, CA = Correspondence Analysis. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023. No organisms were present in all replicate samples from QUL-PFF1-1 and QUL-PFF1-2 in 2014, therefore CA site scores could not be calculated.

Table C.5.5: Summary Statistics for Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (#/m²)	2014	Reference	QUL-PREF1	5	5,812	1,612	3,892	5,752	7,767
		Exposed	QUL-PNF	5	39.6	36.8	8.61	17.2	94.7
			QUL-PFF1	5	22.4	24.8	0	25.8	60.3
	2015	Reference	QUL-PREF1	5	17,273	10,785	7,761	11,539	33,549
		Exposed	QUL-PNF	5	215	296	43.1	103	741
	2016	Reference	QUL-PREF1	5	5,681	3,159	2,256	7,027	8,663
		Exposed	QUL-PNF	5	587	468	172	577	1,326
			QUL-PFF1	5	265	76.4	207	250	396
	2018	Reference	QUL-PREF1	5	5,298	1,552	2,997	5,408	7,250
		Exposed	QUL-PNF	5	1,054	325	525	1,059	1,369
			QUL-PFF1	5	849	141	654	861	1,042
	2019	Reference	QUL-PREF1	5	10,012	2,618	7,089	10,333	13,519
		Exposed	QUL-PNF	5	1,889	1,034	921	1,438	3,419
	2020	Exposed	QUL-PNF	5	999	173	818	1,042	1,240
	2021	Reference	QUL-PREF1	5	7,064	3,469	2,833	6,768	10,781
		Exposed	QUL-PNF	5	1,472	182	1,266	1,533	1,705
			QUL-PFF1	5	1,040	295	534	1,137	1,300
	2022	Exposed	QUL-PNF	5	995	297	603	1,016	1,361
	2023	Exposed	QUL-PNF	5	677	134	499	680	844
	2024	Reference	QUL-PREF1	5	3,291	1,515	1,894	3,117	5,528
		Exposed	QUL-PNF	5	301	50.6	215	319	344
			QUL-PFF1	5	317	70.3	241	284	396
Richness (# of Taxa)	2014	Reference	QUL-PREF1	5	8	1.30	6	8	9
		Exposed	QUL-PNF	5	3	1.82	1	2	5
			QUL-PFF1	5	2	2.05	0	2	5
	2015	Reference	QUL-PREF1	5	5	1.34	3	4	6
		Exposed	QUL-PNF	5	5	1.14	3	5	6
	2016	Reference	QUL-PREF1	5	11	2.88	7	12	13
		Exposed	QUL-PNF	5	6	2.59	3	6	10
			QUL-PFF1	5	4	1.30	2	4	5
	2018	Reference	QUL-PREF1	5	11	3.58	6	11	14
		Exposed	QUL-PNF	5	7	2.59	4	6	10
			QUL-PFF1	5	3	0.894	2	2	4
	2019	Reference	QUL-PREF1	5	6	2.19	3	7	9
		Exposed	QUL-PNF	5	8	1.92	5	9	10
	2020	Exposed	QUL-PNF	5	8	1.48	6	8	10
	2021	Reference	QUL-PREF1	5	10	4.09	5	8	15
		Exposed	QUL-PNF	5	7	1.14	5	7	8
			QUL-PFF1	5	4	1.30	3	3	6
	2022	Exposed	QUL-PNF	5	6	1.64	5	6	9
	2023	Exposed	QUL-PNF	5	9	1.79	7	9	12
	2024	Reference	QUL-PREF1	5	11	2.61	8	10	15
		Exposed	QUL-PNF	5	8	1.82	6	8	11
			QUL-PFF1	5	6.80	2.95	5	6	12
Simpson's Evenness	2014	Reference	QUL-PREF1	5	0.219	0.0428	0.176	0.207	0.270
		Exposed	QUL-PNF	5	0.925	0.102	0.810	1.00	1.00
			QUL-PFF1	5	0.851	0.0844	0.754	0.900	0.900
	2015	Reference	QUL-PREF1	5	0.324	0.0771	0.223	0.340	0.416
		Exposed	QUL-PNF	5	0.752	0.248	0.432	0.889	1.00
	2016	Reference	QUL-PREF1	5	0.203	0.0475	0.128	0.212	0.249
		Exposed	QUL-PNF	5	0.329	0.107	0.201	0.332	0.435
			QUL-PFF1	5	0.555	0.218	0.395	0.482	0.927
	2018	Reference	QUL-PREF1	5	0.168	0.0460	0.123	0.155	0.245
		Exposed	QUL-PNF	5	0.423	0.144	0.280	0.375	0.652
			QUL-PFF1	5	0.520	0.169	0.305	0.542	0.764
	2019	Reference	QUL-PREF1	5	0.275	0.0868	0.215	0.236	0.427
		Exposed	QUL-PNF	5	0.213	0.0446	0.154	0.215	0.276
	2020	Exposed	QUL-PNF	5	0.285	0.0494	0.244	0.278	0.365
	2021	Reference	QUL-PREF1	5	0.246	0.0987	0.151	0.259	0.394
		Exposed	QUL-PNF	5	0.347	0.137	0.274	0.288	0.590
			QUL-PFF1	5	0.318	0.0757	0.209	0.365	0.381
	2022	Exposed	QUL-PNF	5	0.332	0.0501	0.281	0.337	0.396
	2023	Exposed	QUL-PNF	5	0.434	0.0760	0.346	0.412	0.550
	2024	Reference	QUL-PREF1	5	0.385	0.0856	0.252	0.394	0.491
		Exposed	QUL-PNF	5	0.552	0.183	0.276	0.539	0.738
			QUL-PFF1	5	0.377	0.0441	0.330	0.364	0.449
Simpson's Diversity	2014	Reference	QUL-PREF1	5	0.380	0.190	0.0523	0.448	0.537
		Exposed	QUL-PNF	5	0.389	0.368	0	0.500	0.753
			QUL-PFF1	5	0.541	0.168	0.444	0.444	0.735
	2015	Reference	QUL-PREF1	5	0.281	0.121	0.101	0.264	0.399
		Exposed	QUL-PNF	5	0.670	0.112	0.537	0.633	0.833
	2016	Reference	QUL-PREF1	5	0.496	0.119	0.350	0.470	0.637
		Exposed	QUL-PNF	5	0.438	0.123	0.234	0.498	0.540
			QUL-PFF1	5	0.457	0.157	0.190	0.493	0.585
	2018	Reference	QUL-PREF1	5	0.384	0.108	0.253	0.390	0.540
		Exposed	QUL-PNF	5	0.592	0.162	0.333	0.603	0.744
			QUL-PFF1	5	0.187	0.112	0.0768	0.179	0.346
	2019	Reference	QUL-PREF1	5	0.369	0.115	0.219	0.395	0.483
		Exposed	QUL-PNF	5	0.378	0.202	0.0688	0.361	0.597
	2020	Exposed	QUL-PNF	5	0.553	0.0952	0.400	0.573	0.657
	2021	Reference	QUL-PREF1	5	0.522	0.0361	0.492	0.517	0.579
		Exposed	QUL-PNF	5	0.502	0.173	0.342	0.483	0.788
			QUL-PFF1	5	0.114	0.0538	0.0658	0.0904	0.203
	2022	Exposed	QUL-PNF	5	0.486	0.109	0.407	0.446	0.671
	2023	Exposed	QUL-PNF	5	0.738	0.0499	0.679	0.730	0.817
	2024	Reference	QUL-PREF1	5	0.744	0.00565	0.736	0.745	0.751
		Exposed	QUL-PNF	5	0.741	0.134	0.548	0.768	0.877
			QUL-PFF1	5	0.570	0.110	0.445	0.554	0.748
EPT (#/m²)	2014	Reference	QUL-PREF1	5	5.17	7.70	0	0	17.2
		Exposed	QUL-PNF	5	0	0	0	0	0
			QUL-PFF1	5	0	0	0	0	0
	2015	Reference	QUL-PREF1	5	0	0	0	0	0
		Exposed	QUL-PNF	5	1.72	3.85	0	0	8.61
	2016	Reference	QUL-PREF1	5	9.19	12.6	0	0	23.0
		Exposed	QUL-PNF	5	0	0	0	0	0
			QUL-PFF1	5	0	0	0	0	0
	2018	Reference	QUL-PREF1	5	1.72	3.85	0	0	8.61
		Exposed	QUL-PNF	5	12.1	22.4	0	0	51.7
			QUL-PFF1	5	0	0	0	0	0
	2019	Reference	QUL-PREF1	5	34.4	27.3	0	40.0	71.8
		Exposed	QUL-PNF	5	44.8	31.3	0	60.3	77.5
	2020	Exposed	QUL-PNF	5	6.89	11.2	0	0	25.8
	2021	Reference	QUL-PREF1	5	5.17	7.70	0	0	17.2
		Exposed	QUL-PNF	5	3.44	7.70	0	0	17.2
			QUL-PFF1	5	0	0	0	0	0
	2022	Exposed	QUL-PNF	5	1.72	3.85	0	0	8.61
	2023	Exposed	QUL-PNF	5	8.61	19.2	0	0	43.1
	2024	Reference	QUL-PREF1	5	5.17	7.70	0	0	17.2
		Exposed	QUL-PNF	5	1.72	3.85	0	0	8.61
			QUL-PFF1	5	1.72	3.85	0	0	8.61

Notes: " - " indicates no data. EPT = Ephemeroptera, Plecoptera, Trichoptera. CA = Correspondence Analysis. QUL-PREF1 was not sampled in 2020, 2022, or 2023. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023. No organisms were present in all replicate samples from QUL-PFF1-1 and QUL-PFF1-2 in 2014, therefore CA site scores could not be

Table C.5.5: Summary Statistics for Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Arachnida (#/m²)	2014	Reference	QUL-PREF1	5	14.3	4.06	8.61	17.2	17.2
		Exposed	QUL-PNF	5	6.89	7.20	0	8.61	17.2
			QUL-PFF1	5	10.3	11.2	0	8.61	25.8
	2015	Reference	QUL-PREF1	5	0	0	0	0	0
		Exposed	QUL-PNF	5	6.89	7.20	0	8.61	17.2
	2016	Reference	QUL-PREF1	5	36.7	57.6	0	23.0	138
		Exposed	QUL-PNF	5	172	385	0	0	861
			QUL-PFF1	5	1.72	3.85	0	0	8.61
	2018	Reference	QUL-PREF1	5	3.44	4.72	0	0	8.61
		Exposed	QUL-PNF	5	1.72	3.85	0	0	8.61
			QUL-PFF1	5	0	0	0	0	0
	2019	Reference	QUL-PREF1	5	6.89	15.4	0	0	34.4
		Exposed	QUL-PNF	5	1.72	3.85	0	0	8.61
	2020	Exposed	QUL-PNF	5	20.7	15.6	0	17.2	43.1
	2021	Reference	QUL-PREF1	5	67.2	81.8	0	25.8	172
		Exposed	QUL-PNF	5	112	154	17.2	25.8	379
			QUL-PFF1	5	10.3	11.2	0	8.61	25.8
	2022	Exposed	QUL-PNF	5	37.9	39.3	0	34.4	86.1
	2023	Exposed	QUL-PNF	5	110	113	8.61	77.5	293
	2024	Reference	QUL-PREF1	5	24.1	53.9	0	0	121
		Exposed	QUL-PNF	5	8.61	14.9	0	0	34.4
			QUL-PFF1	5	15.5	16.6	0	8.61	43.1
Chironomidae (#/m²)	2014	Reference	QUL-PREF1	5	4,458	2,157	1,745	4,529	7,595
		Exposed	QUL-PNF	5	24.1	28.8	0	17.2	68.9
			QUL-PFF1	5	6.89	7.20	0	8.61	17.2
	2015	Reference	QUL-PREF1	5	2,124	650	1,481	1,791	2,859
		Exposed	QUL-PNF	5	198	292	25.8	103	715
	2016	Reference	QUL-PREF1	5	1,620	595	818	1,567	2,365
		Exposed	QUL-PNF	5	381	204	146	422	577
			QUL-PFF1	5	258	71.3	198	241	379
	2018	Reference	QUL-PREF1	5	4,295	1,516	2,342	3,944	6,476
		Exposed	QUL-PNF	5	816	304	517	715	1,223
			QUL-PFF1	5	847	144	646	861	1,042
	2019	Reference	QUL-PREF1	5	7,645	2,270	4,686	8,635	9,885
		Exposed	QUL-PNF	5	997	574	121	1,111	1,627
	2020	Exposed	QUL-PNF	5	797	308	327	784	1,137
	2021	Reference	QUL-PREF1	5	4,044	2,152	1,757	4,461	6,992
		Exposed	QUL-PNF	5	1,007	523	319	1,283	1,472
			QUL-PFF1	5	1,018	286	525	1,111	1,274
	2022	Exposed	QUL-PNF	5	920	323	456	999	1,283
	2023	Exposed	QUL-PNF	5	446	78.5	344	422	534
	2024	Reference	QUL-PREF1	5	1,593	628	982	1,498	2,446
		Exposed	QUL-PNF	5	267	51.3	181	276	310
			QUL-PFF1	5	277	41.5	224	267	327
Oligochaeta (#/m²)	2014	Reference	QUL-PREF1	5	1,284	782	103	1,171	2,078
		Exposed	QUL-PNF	5	5.17	7.70	0	0	17.2
			QUL-PFF1	5	0	0	0	0	0
	2015	Reference	QUL-PREF1	5	15,121	10,748	6,062	8,955	31,758
		Exposed	QUL-PNF	5	6.89	7.20	0	8.61	17.2
	2016	Reference	QUL-PREF1	5	4,000	2,763	766	4,983	7,078
		Exposed	QUL-PNF	5	27.6	31.9	0	25.8	77.5
			QUL-PFF1	5	0	0	0	0	0
	2018	Reference	QUL-PREF1	5	966	325	620	956	1,481
		Exposed	QUL-PNF	5	205	251	0	112	586
			QUL-PFF1	5	1.72	3.85	0	0	8.61
	2019	Reference	QUL-PREF1	5	2,272	1,123	1,378	1,946	4,176
		Exposed	QUL-PNF	5	823	1,424	0	17.2	3,298
	2020	Exposed	QUL-PNF	5	164	300	0	43.1	697
	2021	Reference	QUL-PREF1	5	2,923	1,749	1,068	2,454	5,718
		Exposed	QUL-PNF	5	346	584	0	43.1	1,369
			QUL-PFF1	5	6.89	11.2	0	0	25.8
	2022	Exposed	QUL-PNF	5	32.7	25.4	8.61	17.2	60.3
	2023	Exposed	QUL-PNF	5	107	71.2	43.1	77.5	224
	2024	Reference	QUL-PREF1	5	1,657	831	844	1,619	2,911
		Exposed	QUL-PNF	5	22.4	22.4	0	25.8	51.7
			QUL-PFF1	5	6.89	11.2	0	0	25.8
EPT (%)	2014	Reference	QUL-PREF1	5	0.0971	0.139	0	0	0.299
		Exposed	QUL-PNF	5	0	0	0	0	0
			QUL-PFF1	5	0	0	0	0	0
	2015	Reference	QUL-PREF1	5	0	0	0	0	0
		Exposed	QUL-PNF	5	3.33	7.45	0	0	16.7
	2016	Reference	QUL-PREF1	5	0.122	0.167	0	0	0.327
		Exposed	QUL-PNF	5	0	0	0	0	0
			QUL-PFF1	5	0	0	0	0	0
	2018	Reference	QUL-PREF1	5	0.0575	0.129	0	0	0.287
		Exposed	QUL-PNF	5	0.980	1.77	0	0	4.08
			QUL-PFF1	5	0	0	0	0	0
	2019	Reference	QUL-PREF1	5	0.360	0.276	0	0.318	0.694
		Exposed	QUL-PNF	5	3.73	3.35	0	4.19	8.41
	2020	Exposed	QUL-PNF	5	0.702	1.08	0	0	2.46
	2021	Reference	QUL-PREF1	5	0.0706	0.0968	0	0	0.186
		Exposed	QUL-PNF	5	0.272	0.608	0	0	1.36
			QUL-PFF1	5	0	0	0	0	0
	2022	Exposed	QUL-PNF	5	0.146	0.326	0	0	0.730
	2023	Exposed	QUL-PNF	5	1.02	2.28	0	0	5.10
	2024	Reference	QUL-PREF1	5	0.106	0.149	0	0	0.312
		Exposed	QUL-PNF	5	0.541	1.21	0	0	2.70
			QUL-PFF1	5	0.435	0.972	0	0	2.17
Arachnida (%)	2014	Reference	QUL-PREF1	5	0.249	0.0484	0.186	0.245	0.299
		Exposed	QUL-PNF	5	16.5	20.5	0	14.3	50.0
			QUL-PFF1	5	28.6	28.8	0	33.3	66.7
	2015	Reference	QUL-PREF1	5	0	0	0	0	0
		Exposed	QUL-PNF	5	6.07	7.93	0	1.16	16.7
	2016	Reference	QUL-PREF1	5	1.34	2.67	0	0.282	6.11
		Exposed	QUL-PNF	5	13.0	29.0	0	0	64.9
			QUL-PFF1	5	0.690	1.54	0	0	3.45
	2018	Reference	QUL-PREF1	5	0.0924	0.133	0	0	0.287
		Exposed	QUL-PNF	5	0.328	0.733	0	0	1.64
			QUL-PFF1	5	0	0	0	0	0
	2019	Reference	QUL-PREF1	5	0.0881	0.197	0	0	0.441
		Exposed	QUL-PNF	5	0.187	0.418	0	0	0.935
	2020	Exposed	QUL-PNF	5	2.02	1.27	0	2.11	3.47
	2021	Reference	QUL-PREF1	5	0.838	0.935	0	0.557	2.04
		Exposed	QUL-PNF	5	8.38	12.3	1.01	1.97	29.9
			QUL-PFF1	5	0.869	0.962	0	0.746	2.27
	2022	Exposed	QUL-PNF	5	4.71	5.84	0	4.21	14.3
	2023	Exposed	QUL-PNF	5	15.4	13.4	1.14	11.4	34.7
	2024	Reference	QUL-PREF1	5	0.436	0.975	0	0	2.18
		Exposed	QUL-PNF	5	2.83	4.95	0	0	11.4
			QUL-PFF1	5	4.40	3.99	0	3.57	10.9

Notes: " - " indicates no data. EPT = Ephemeroptera, Plecoptera, Trichoptera. CA = Correspondence Analysis. QUL-PREF1 was not sampled in 2020, 2022, or 2023. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023. No organisms were present in all replicate samples from QUL-PFF1-1 and QUL-PFF1-2 in 2014, therefore CA site scores could not be

Table C.5.5: Summary Statistics for Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Year	Type	Area	n	Mean	Standard Deviation	Minimum	Median	Maximum
Chironomidae (%)	2014	Reference	QUL-PREF1	5	73.3	19.0	44.8	73.7	97.8
		Exposed	QUL-PNF	5	46.0	44.7	0	57.1	100
			QUL-PFF1	5	22.9	28.1	0	14.3	66.7
	2015	Reference	QUL-PREF1	5	15.6	7.60	5.34	14.0	24.2
		Exposed	QUL-PNF	5	78.8	22.5	50.0	87.5	100
	2016	Reference	QUL-PREF1	5	34.2	15.7	18.1	29.0	59.9
		Exposed	QUL-PNF	5	79.6	27.5	31.8	85.7	100
			QUL-PFF1	5	97.6	2.21	95.7	96.5	100
	2018	Reference	QUL-PREF1	5	80.2	6.52	71.3	80.1	89.3
		Exposed	QUL-PNF	5	80.1	22.6	46.3	89.3	98.4
			QUL-PFF1	5	99.7	0.588	98.7	100	100
	2019	Reference	QUL-PREF1	5	75.9	9.38	66.1	74.2	87.5
		Exposed	QUL-PNF	5	68.2	37.7	3.53	87.8	92.1
	2020	Exposed	QUL-PNF	5	80.5	27.8	31.1	91.7	95.9
	2021	Reference	QUL-PREF1	5	57.4	11.0	45.4	62.0	67.9
		Exposed	QUL-PNF	5	69.5	35.6	18.7	90.5	98.0
			QUL-PFF1	5	97.9	1.08	96.3	98.0	99.2
	2022	Exposed	QUL-PNF	5	90.8	8.78	75.7	94.2	98.3
	2023	Exposed	QUL-PNF	5	66.8	10.3	50.0	68.6	78.5
	2024	Reference	QUL-PREF1	5	49.6	3.92	44.2	50.0	55.0
		Exposed	QUL-PNF	5	88.3	4.41	84.0	88.6	94.6
			QUL-PFF1	5	88.7	7.35	78.3	90.9	96.9
Oligochaeta (%)	2014	Reference	QUL-PREF1	5	25.4	18.6	1.33	24.9	53.4
		Exposed	QUL-PNF	5	25.7	43.3	0	0	100
			QUL-PFF1	5	0	0	0	0	0
	2015	Reference	QUL-PREF1	5	84.2	7.55	75.8	84.7	94.7
		Exposed	QUL-PNF	5	7.80	9.74	0	2.33	20.0
	2016	Reference	QUL-PREF1	5	63.8	18.1	34.0	70.4	81.7
		Exposed	QUL-PNF	5	5.86	7.01	0	2.60	15.0
			QUL-PFF1	5	0	0	0	0	0
	2018	Reference	QUL-PREF1	5	19.0	6.06	10.7	19.4	27.4
		Exposed	QUL-PNF	5	17.1	20.7	0	8.18	46.3
			QUL-PFF1	5	0.263	0.588	0	0	1.32
	2019	Reference	QUL-PREF1	5	23.1	9.16	12.2	24.9	32.5
		Exposed	QUL-PNF	5	26.2	41.6	0	1.87	96.5
	2020	Exposed	QUL-PNF	5	15.8	28.5	0	3.47	66.4
	2021	Reference	QUL-PREF1	5	41.3	10.9	31.3	37.7	53.0
		Exposed	QUL-PNF	5	21.6	34.1	0	2.78	80.3
			QUL-PFF1	5	0.580	0.971	0	0	2.24
	2022	Exposed	QUL-PNF	5	3.91	3.79	0.633	2.11	10.00
	2023	Exposed	QUL-PNF	5	16.0	10.1	7.14	10.1	29.6
	2024	Reference	QUL-PREF1	5	49.6	3.20	44.5	50.0	52.6
		Exposed	QUL-PNF	5	7.86	7.95	0	7.50	16.0
			QUL-PFF1	5	1.91	2.89	0	0	6.52
CA1 (30.9%)	2014	Reference	QUL-PREF1	5	0.958	0.159	0.776	0.981	1.19
		Exposed	QUL-PNF	5	-0.700	0.711	-1.65	-0.606	0.0590
			QUL-PFF1	5	-0.258	0.287	-0.502	-0.330	0.0590
	2015	Reference	QUL-PREF1	5	0.913	0.0212	0.880	0.921	0.935
		Exposed	QUL-PNF	5	-0.397	0.750	-1.22	-0.283	0.521
	2016	Reference	QUL-PREF1	5	0.743	0.132	0.621	0.734	0.953
		Exposed	QUL-PNF	5	0.0839	0.606	-0.922	0.338	0.600
			QUL-PFF1	5	-1.19	0.104	-1.34	-1.17	-1.06
	2018	Reference	QUL-PREF1	5	0.866	0.0977	0.737	0.870	1.01
		Exposed	QUL-PNF	5	-0.455	0.417	-0.983	-0.296	-0.0721
			QUL-PFF1	5	-1.27	0.0478	-1.31	-1.28	-1.19
	2019	Reference	QUL-PREF1	5	0.899	0.251	0.569	0.841	1.21
		Exposed	QUL-PNF	5	-0.687	0.683	-1.21	-1.12	0.275
	2020	Exposed	QUL-PNF	5	-0.652	0.421	-1.19	-0.719	-0.0242
	2021	Reference	QUL-PREF1	5	0.962	0.121	0.820	0.989	1.13
		Exposed	QUL-PNF	5	-0.406	0.466	-1.05	-0.495	0.0541
			QUL-PFF1	5	-1.08	0.0676	-1.16	-1.08	-0.981
	2022	Exposed	QUL-PNF	5	-0.922	0.372	-1.24	-1.12	-0.374
	2023	Exposed	QUL-PNF	5	-0.391	0.150	-0.560	-0.442	-0.227
	2024	Reference	QUL-PREF1	5	0.833	0.165	0.615	0.811	1.07
		Exposed	QUL-PNF	5	-0.754	0.353	-1.21	-0.858	-0.303
			QUL-PFF1	5	-1.08	0.258	-1.34	-1.15	-0.763
CA2 (16.5%)	2014	Reference	QUL-PREF1	5	-0.932	0.243	-1.23	-0.976	-0.551
		Exposed	QUL-PNF	5	-0.472	0.814	-1.66	-0.201	0.176
			QUL-PFF1	5	-0.289	1.21	-1.66	0.176	0.620
	2015	Reference	QUL-PREF1	5	-0.919	0.0339	-0.956	-0.912	-0.878
		Exposed	QUL-PNF	5	-0.428	0.534	-0.978	-0.656	0.182
	2016	Reference	QUL-PREF1	5	0.975	0.296	0.454	1.10	1.18
		Exposed	QUL-PNF	5	1.06	0.595	0.531	0.864	2.02
			QUL-PFF1	5	0.0502	0.137	-0.155	0.0649	0.228
	2018	Reference	QUL-PREF1	5	-0.654	0.207	-0.902	-0.731	-0.400
		Exposed	QUL-PNF	5	-0.337	0.276	-0.599	-0.368	0.123
			QUL-PFF1	5	-0.158	0.00735	-0.167	-0.154	-0.152
	2019	Reference	QUL-PREF1	5	1.58	0.264	1.34	1.44	1.95
		Exposed	QUL-PNF	5	0.0970	0.322	-0.155	-0.0959	0.515
	2020	Exposed	QUL-PNF	5	-0.0844	0.448	-0.634	-0.140	0.617
	2021	Reference	QUL-PREF1	5	-0.783	0.367	-1.12	-0.915	-0.160
		Exposed	QUL-PNF	5	-0.331	0.350	-0.864	-0.258	0.0180
			QUL-PFF1	5	0.0335	0.101	-0.0782	0.0878	0.132
	2022	Exposed	QUL-PNF	5	-0.328	0.258	-0.659	-0.168	-0.105
	2023	Exposed	QUL-PNF	5	0.0590	0.409	-0.406	0.153	0.558
	2024	Reference	QUL-PREF1	5	0.423	0.169	0.162	0.450	0.601
		Exposed	QUL-PNF	5	0.399	0.262	0.0736	0.453	0.647
			QUL-PFF1	5	0.174	0.209	-0.168	0.215	0.377
CA3 (12.6%)	2014	Reference	QUL-PREF1	5	0.383	0.0275	0.346	0.377	0.418
		Exposed	QUL-PNF	5	-2.29	3.25	-6.80	-1.51	0.668
			QUL-PFF1	5	-2.53	3.71	-6.80	-0.681	-0.111
	2015	Reference	QUL-PREF1	5	0.505	0.00775	0.493	0.505	0.513
		Exposed	QUL-PNF	5	-0.257	0.681	-1.34	-0.147	0.534
	2016	Reference	QUL-PREF1	5	-0.128	0.430	-0.882	-0.0104	0.183
		Exposed	QUL-PNF	5	-0.304	0.872	-1.85	-0.0125	0.231
			QUL-PFF1	5	0.262	0.220	0.0326	0.186	0.615
	2018	Reference	QUL-PREF1	5	0.401	0.327	-0.179	0.567	0.577
		Exposed	QUL-PNF	5	0.522	0.0677	0.465	0.495	0.638
			QUL-PFF1	5	0.568	0.0788	0.479	0.618	0.629
	2019	Reference	QUL-PREF1	5	-0.0398	0.149	-0.246	-0.0648	0.119
		Exposed	QUL-PNF	5	0.441	0.172	0.234	0.398	0.620
	2020	Exposed	QUL-PNF	5	0.0460	0.462	-0.548	0.171	0.618
	2021	Reference	QUL-PREF1	5	-0.184	0.677	-0.771	-0.588	0.565
		Exposed	QUL-PNF	5	-0.128	0.768	-1.04	0.346	0.559
			QUL-PFF1	5	0.480	0.160	0.315	0.450	0.650
	2022	Exposed	QUL-PNF	5	0.223	0.645	-0.901	0.472	0.648
	2023	Exposed	QUL-PNF	5	-0.556	0.669	-1.20	-0.660	0.179
	2024	Reference	QUL-PREF1	5	-0.0855	0.395	-0.763	0.0703	0.252
		Exposed	QUL-PNF	5	-0.0706	0.149	-0.314	-0.0360	0.0788
			QUL-PFF1	5	-0.284	0.490	-1.07	-0.186	0.183

Notes: " - " indicates no data. EPT = Ephemeroptera, Plecoptera, Trichoptera. CA = Correspondence Analysis. QUL-PREF1 was not sampled in 2020, 2022, or 2023. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023. No organisms were present in all replicate samples from QUL-PFF1-1 and QUL-PFF1-2 in 2014, therefore CA site scores could not be

Table C.5.6: Benthic Invertebrate Community Supporting Measures for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Type	Area	Station	Station Depth (m)	Bottom Water Quality					Sediment Parameters							
					Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductance (µS/cm)	pH	% Fines	% TOC	PC Axis 1 (65 %)	PC Axis 2 (22 %)	Arsenic (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)
2014	Reference	QUL-PREF1	QUL-PREF1-1	115	4.61	10.8	83.8	116	7.71	69.5	1.62	6.27	-1.27	7.15	46.7	29,200	456
			QUL-PREF1-2	108	4.61	2.14	14.9	119	7.71	68.3	1.70	7.29	-0.494	6.95	39.1	26,900	421
			QUL-PREF1-3	117	4.48	10.8	83.8	117	7.48	78.6	1.72	6.32	-1.20	8.60	44.0	29,900	484
			QUL-PREF1-4	107	4.63	10.5	81.3	118	7.52	83.3	1.64	6.46	-0.967	8.15	42.2	29,500	494
			QUL-PREF1-5	103	4.57	10.8	83.5	115	7.61	82.9	1.71	7.25	-0.0734	7.89	38.8	27,400	496
	Exposed	QUL-PNF	QUL-PNF-1	106	6.72	6.42	52.5	169	8.00	95.8	0.120	-2.10	3.41	15.5	766	27,900	863
			QUL-PNF-2	109	6.86	6.12	50.3	167	8.06	99.6	0.120	-3.68	1.55	18.6	865	31,100	948
			QUL-PNF-3	104	7.04	5.24	43.8	172	8.06	99.7	0.270	-1.85	3.96	15.4	690	25,500	811
			QUL-PNF-4	104	7.09	5.13	42.7	176	8.09	96.0	0.170	-0.0382	5.31	14.4	566	33,700	650
			QUL-PNF-5	107	6.99	7.21	59.2	156	8.15	69.9	0.150	-0.389	3.47	13.2	681	68,000	711
		QUL-PFF1	QUL-PFF1-4	115	4.61	10.8	83.8	116	7.71	69.5	1.62	-2.88	-2.51	16.0	643	36,300	1,150
			QUL-PFF1-5	108	4.61	2.14	14.9	119	7.71	68.3	1.70	0.958	4.01	13.1	431	26,200	654
			QUL-PFF1-1	117	4.48	10.8	83.8	117	7.48	78.6	1.72	1.04	4.00	12.9	501	29,400	661
			QUL-PFF1-2	107	4.63	10.5	81.3	118	7.52	83.3	1.64	2.08	5.83	12.4	413	24,600	578
			QUL-PFF1-3	103	4.57	10.8	83.5	115	7.61	82.9	1.71	2.06	6.42	11.7	419	21,900	580
2015	Reference	QUL-PREF1	QUL-PREF1-1	115	3.80	11.1	84.5	110	7.51	78.9	1.76	4.91	-2.84	8.64	59.4	32,300	477
			QUL-PREF1-2	103	3.83	11.0	83.4	110	7.35	71.8	-	-	-	-	-	-	-
			QUL-PREF1-3	120	4.45	10.4	81.0	110	7.50	84.8	1.71	5.18	-1.85	8.98	55.8	32,700	479
			QUL-PREF1-4	102	4.12	10.3	80.0	113	7.66	81.3	-	-	-	-	-	-	-
			QUL-PREF1-5	103	4.26	10.4	79.8	112	7.40	85.7	1.98	6.08	-0.900	9.02	50.0	28,900	516
	Exposed	QUL-PNF	QUL-PNF-1	112	4.42	11.0	83.4	115	7.46	98.6	0.420	-5.53	-1.48	16.2	1,110	38,700	1,250
			QUL-PNF-2	111	4.40	10.3	79.4	146	7.41	98.4	0.520	-6.11	-1.96	17.0	1,190	41,200	1,310
			QUL-PNF-3	104	4.31	10.3	79.1	146	7.46	98.2	0.250	-4.11	0.0858	16.1	904	38,600	1,090
			QUL-PNF-4	97.3	4.32	10.1	77.8	147	7.51	98.1	<0.100	0.395	4.75	13.4	536	35,100	716
			QUL-PNF-5	106	4.32	10.2	78.2	151	7.57	71.8	0.180	-0.797	3.41	14.1	557	49,500	801
2016	Reference	QUL-PREF1	QUL-PREF1-1	116	3.82	10.4	78.8	118	7.60	70.9	2.02	4.99	-2.18	9.89	61.1	30,900	469
			QUL-PREF1-2	103	3.80	10.5	79.7	116	7.76	76.5	2.01	5.87	-1.76	9.57	56.4	29,000	457
			QUL-PREF1-3	119	3.81	10.5	79.5	116	7.25	79.8	2.03	5.02	-2.45	11.0	59.4	32,100	495
			QUL-PREF1-4	100	3.79	10.3	78.0	117	7.41	86.5	1.67	5.66	-1.58	9.05	56.3	30,700	451
			QUL-PREF1-5	98.8	3.88	10.2	77.6	118	7.29	87.3	1.89	6.51	-1.02	8.37	47.5	29,400	480
	Exposed	QUL-PNF	QUL-PNF-1	109	4.51	10.6	82.2	115	7.38	99.0	0.390	-6.18	-1.96	17.9	1,230	38,500	1,360
			QUL-PNF-2	112	4.51	10.6	81.8	115	7.04	97.7	0.410	-6.32	-1.78	18.4	1,250	38,300	1,350
			QUL-PNF-3	105	4.50	10.3	79.4	116	7.18	96.1	0.200	-5.99	-1.06	19.4	1,180	39,400	1,330
			QUL-PNF-4	112	4.76	10.1	78.7	118	7.02	99.0	0.380	-6.46	-2.23	18.9	1,260	39,900	1,450
			QUL-PNF-5	113	4.60	10.5	81.5	119	7.18	99.5	0.350	-5.60	-1.24	17.9	1,130	37,000	1,250
		QUL-PFF1	QUL-PFF1-1	89.9	4.73	10.4	80.9	119	7.35	99.1	0.210	-2.45	1.14	14.2	706	27,800	1,030
			QUL-PFF1-2	85.3	4.62	10.5	81.4	119	7.58	99.4	<0.0880	3.00	7.37	11.5	384	19,000	533
			QUL-PFF1-3	93.5	4.53	10.6	81.8	120	6.80	100	0.170	-3.00	2.11	13.8	744	25,800	924
			QUL-PFF1-4	92.5	4.60	10.6	81.8	120	7.77	99.8	0.180	0.373	5.64	13.6	498	22,500	670
			QUL-PFF1-5	89.3	4.56	10.5	81.3	120	7.70	99.8	<0.0890	-0.168	5.36	13.1	502	24,100	678

Notes: "-" indicates no data, °C = degrees Celsius, mg/ L = milligrams per litre, % = percent, µS/cm = microSiemens per centimeter, TOC = Total Organic Carbon, PC Axis = Principal Components Axis, mg/kg = milligrams per kilogram (dry weight). QUL-PFF1 (exposed) and QUL-PREF1 (reference) were not sampled in 2020, 2022, or 2023. % Fines represents the sum of the silt and clay fraction of sediments.

Table C.5.6: Benthic Invertebrate Community Supporting Measures for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Type	Area	Station	Station Depth (m)	Bottom Water Quality					Sediment Parameters							
					Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductance (µS/cm)	pH	% Fines	% TOC	PC Axis 1 (65 %)	PC Axis 2 (22 %)	Arsenic (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)
2018	Reference	QUL-PREF1	QUL-PREF1-1	112	3.73	11.8	89.1	113	7.57	84.9	2.07	6.69	-1.40	8.47	48.9	29,500	416
			QUL-PREF1-2	105	3.78	11.8	89.3	113	7.52	82.2	2.22	6.70	-1.07	8.47	46.8	29,200	397
			QUL-PREF1-3	112	3.76	11.8	89.4	113	7.43	86.5	2.13	6.76	-0.512	7.99	45.3	28,400	425
			QUL-PREF1-4	107	3.97	11.4	87.2	113	7.50	84.7	2.26	7.00	-0.752	7.50	46.7	28,100	405
			QUL-PREF1-5	97.0	3.75	11.7	88.9	113	7.50	85.9	1.92	7.12	-0.553	7.39	43.2	28,300	449
	Exposed	QUL-PNF	QUL-PNF-1	108	4.46	11.5	88.8	121	7.19	97.6	0.370	-3.85	-1.05	15.6	881	43,200	1,420
			QUL-PNF-2	112	4.39	11.0	84.5	114	7.17	98.5	0.420	-4.72	-0.857	16.7	1,000	38,300	1,280
			QUL-PNF-3	105	4.40	11.5	88.6	120	7.52	92.1	0.200	-3.67	0.690	15.6	850	44,800	1,170
			QUL-PNF-4	113	4.47	10.9	84.5	114	7.57	76.5	1.44	-0.977	-1.42	12.9	533	38,100	1,070
			QUL-PNF-5	113	4.47	11.0	84.6	115	7.52	99.4	0.410	-4.47	-1.56	16.0	964	39,900	1,510
		QUL-PFF1	QUL-PFF1-1	93.0	4.39	11.4	88.0	120	7.49	97.1	0.160	0.597	5.18	14.5	450	27,300	1,110
			QUL-PFF1-2	85.0	4.38	11.5	88.5	119	7.52	99.9	0.107	1.98	6.80	10.0	406	18,700	603
			QUL-PFF1-3	92.0	4.38	11.5	88.8	118	7.53	99.9	0.138	-2.58	1.64	13.2	706	26,600	1,020
			QUL-PFF1-4	91.0	4.36	11.5	88.6	120	7.59	99.9	0.127	1.07	5.37	11.1	491	20,600	701
			QUL-PFF1-5	88.0	4.39	11.3	87.3	120	7.66	99.7	0.185	1.54	5.07	10.8	477	22,400	683
2019	Reference	QUL-PREF1	QUL-PREF1-1	115	3.74	11.2	84.8	112	7.61	89.9	2.07	6.17	-1.80	8.49	49.7	30,700	401
			QUL-PREF1-2	99.0	3.84	11.0	84.0	111	7.73	80.2	1.78	6.09	-1.66	8.18	50.2	30,700	413
			QUL-PREF1-3	117	3.77	11.0	83.7	112	7.75	88.5	1.56	6.39	-1.23	7.74	48.8	29,300	399
			QUL-PREF1-4	97.0	3.84	11.1	84.4	111	7.63	86.1	1.71	6.40	-1.28	7.86	49.4	30,600	408
			QUL-PREF1-5	97.0	3.82	11.1	84.6	111	7.66	88.2	1.88	6.58	-0.938	7.23	46.9	28,900	445
	Exposed	QUL-PNF	QUL-PNF-1	110	4.27	11.8	90.8	119	7.77	97.7	0.550	-6.11	-1.96	17.0	1,200	42,500	1,390
			QUL-PNF-2	108	4.26	11.8	90.6	120	7.71	98.7	0.600	-6.02	-2.41	17.3	1,140	42,500	1,460
			QUL-PNF-3	105	4.22	11.1	85.1	136	7.55	93.7	0.360	-2.21	1.80	14.7	706	38,300	1,030
			QUL-PNF-4	101	4.32	11.8	90.5	118	7.79	93.6	0.650	-6.26	-2.81	17.5	1,150	44,300	1,540
			QUL-PNF-5	110	4.30	11.8	90.7	119	7.71	99.6	0.430	-5.06	-1.63	15.9	1,100	38,500	1,370
2020	Exposed	QUL-PNF	QUL-PNF-1	112	4.51	11.2	86.2	122	7.20	96.9	0.0680	-1.34	2.37	14.6	700	32,100	1,110
			QUL-PNF-2	113	4.51	11.1	86.1	122	7.38	96.2	0.0890	-3.45	-1.28	15.6	854	38,400	1,250
			QUL-PNF-3	108	4.51	11.2	86.9	122	7.52	95.5	0.0610	-2.42	-0.764	14.3	735	39,400	1,400
			QUL-PNF-4	113	4.51	11.2	86.5	122	7.46	89.1	0.0780	-3.10	-1.50	14.8	743	49,800	1,430
			QUL-PNF-5	112	4.52	11.2	86.4	122	7.42	99.1	0.0750	-3.68	-1.77	15.3	888	36,600	1,530
2021	Reference	QUL-PREF1	QUL-PREF1-1	116	3.75	11.4	86.3	99.9	7.32	80.0	2.13	5.57	-1.66	8.00	50.0	30,400	416
			QUL-PREF1-2	107	3.85	11.2	85.4	100	7.28	77.2	2.07	6.27	-0.627	9.50	44.4	30,500	441
			QUL-PREF1-3	120	3.76	11.3	85.5	100	7.35	79.9	2.03	5.49	-1.66	9.66	46.3	31,000	485
			QUL-PREF1-4	100	3.88	10.7	81.5	102	7.31	82.1	2.08	6.37	-0.864	8.55	43.5	29,600	440
			QUL-PREF1-5	105	3.79	11.2	85.0	100	7.34	80.5	2.17	5.53	-1.12	9.38	42.4	30,800	572
	Exposed	QUL-PNF	QUL-PNF-1	110	4.63	11.6	90.3	115	7.41	96.4	0.599	-4.41	-1.81	16.3	906	43,300	1,880
			QUL-PNF-2	111	4.63	11.5	89.5	114	7.43	92.4	0.830	-3.66	-1.05	16.8	857	42,200	1,270
			QUL-PNF-3	106	4.63	11.5	89.2	114	7.42	98.0	0.309	-3.19	1.18	14.6	865	33,400	1,200
			QUL-PNF-4	96.0	4.64	11.5	89.4	114	7.44	93.9	0.562	-1.97	1.06	15.8	621	34,000	1,220
			QUL-PNF-5	105	4.63	11.5	89.1	115	7.40	92.5	0.534	-2.81	-0.938	15.1	780	41,000	1,420
		QUL-PFF1	QUL-PFF1-1	88.0	4.63	11.5	88.8	115	7.43	99.0	0.543	-4.32	-1.48	16.2	966	34,500	1,650
			QUL-PFF1-2	85.0	4.65	11.5	89.2	114	7.45	99.7	0.204	-2.59	1.71	13.6	803	27,800	1,150
			QUL-PFF1-3	91.0	4.64	11.5	89.2	115	7.44	99.5	0.309	-4.14	-0.883	15.2	925	33,100	1,580
			QUL-PFF1-4	92.0	4.64	11.5	89.3	115	7.39	95.5	0.381	-2.68	0.573	15.2	740	31,000	1,210
			QUL-PFF1-5	88.0	4.65	11.5	89.4	115	7.40	99.1	0.141	-2.09	2.89	13.6	733	27,600	1,100

Notes: "-" indicates no data, °C = degrees Celsius, mg/ L = milligrams per litre, % = percent, µS/cm = microSiemens per centimeter, TOC = Total Organic Carbon, PC Axis = Principal Components Axis, mg/kg = milligrams per kilogram (dry weight). QUL-PFF1 (exposed) and QUL-PREF1 (reference) were not sampled in 2020, 2022, or 2023. % Fines represents the sum of the silt and clay fraction of sediments.

Table C.5.6: Benthic Invertebrate Community Supporting Measures for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Type	Area	Station	Station Depth (m)	Bottom Water Quality					Sediment Parameters							
					Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductance (µS/cm)	pH	% Fines	% TOC	PC Axis 1 (65 %)	PC Axis 2 (22 %)	Arsenic (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)
2022	Exposed	QUL-PNF	QUL-PNF-1	113	4.54	11.2	86.9	103	7.69	87.2	0.622	-3.80	-1.14	15.8	925	46,100	1,190
			QUL-PNF-2	112	4.54	11.2	86.9	103	7.69	96.9	0.695	-2.91	-1.11	15.3	794	43,100	1,360
			QUL-PNF-3	110	4.70	11.2	86.9	106	7.68	77.0	0.456	-2.43	-0.373	15.1	745	50,600	1,220
			QUL-PNF-4	112	4.56	11.2	86.8	104	7.69	92.5	0.736	-3.17	-1.62	15.5	797	42,000	1,320
			QUL-PNF-5	110	4.55	11.2	86.7	103	7.70	95.3	0.559	-4.04	-1.49	16.3	915	43,700	1,370
2023	Exposed	QUL-PNF	QUL-PNF-1	110	4.27	10.9	83.5	116	7.39	93.9	0.862	-3.26	-0.971	16.2	847	45,300	1,250
			QUL-PNF-2	107	4.34	10.9	83.7	115	7.62	95.5	0.861	-2.96	-0.749	16.2	870	41,300	1,380
			QUL-PNF-3	106	4.41	10.9	84.1	116	7.57	92.1	0.518	-1.33	0.123	13.5	680	46,000	1,300
			QUL-PNF-4	107	4.20	10.9	83.6	113	7.73	91.6	0.768	-2.23	-1.25	14.9	695	40,400	1,490
			QUL-PNF-5	111	4.22	10.9	83.6	114	7.70	98.9	0.707	-2.63	-0.925	14.5	780	37,300	1,540
2024	Reference	QUL-PREF1	QUL-PREF1-1	115	3.89	11.3	85.9	112	7.71	78.8	1.73	4.58	-2.98	9.15	49.3	34,100	507
			QUL-PREF1-2	96.0	3.95	11.2	85.7	112	7.72	78.4	1.77	5.84	-2.04	8.21	45.2	32,000	456
			QUL-PREF1-3	118	3.88	11.2	85.5	111	7.78	78.7	1.78	4.74	-2.74	9.83	47.9	33,700	515
			QUL-PREF1-4	100	3.85	11.3	85.7	112	7.67	85.5	1.78	5.20	-2.36	8.89	45.9	33,800	496
			QUL-PREF1-5	100	3.93	11.2	85.5	112	7.78	82.9	1.67	4.53	-2.77	9.34	47.1	34,600	578
	Exposed	QUL-PNF	QUL-PNF-1	110	4.58	11.1	86.0	113	7.78	95.5	0.654	-3.22	-1.86	15.3	804	44,000	1,300
			QUL-PNF-2	110	4.56	11.1	85.6	113	7.75	95.3	0.702	-3.82	-2.25	15.6	927	43,500	1,340
			QUL-PNF-3	104	4.60	11.1	86.0	113	7.75	94.1	0.351	-3.41	-1.03	15.4	818	43,200	1,300
			QUL-PNF-4	100	4.53	11.1	86.0	113	7.75	91.6	0.719	-3.42	-2.84	15.7	730	41,700	1,510
			QUL-PNF-5	100	4.55	11.1	85.9	113	7.76	99.0	0.748	-3.54	-2.73	15.2	789	41,700	1,620
		QUL-PFF1	QUL-PFF1-1	92.0	4.56	11.2	86.4	113	7.54	99.8	0.697	-2.78	-0.558	15.4	682	32,100	1,230
			QUL-PFF1-2	85.0	4.60	11.1	86.1	112	7.66	99.6	0.340	-1.01	2.39	13.5	586	26,000	893
			QUL-PFF1-3	92.0	4.56	11.1	85.9	113	7.66	99.6	0.529	-2.53	-0.200	14.6	706	31,400	1,200
			QUL-PFF1-4	89.0	4.57	11.0	85.1	113	7.63	99.6	0.406	-2.88	-0.0120	18.1	747	31,900	1,530
			QUL-PFF1-5	89.0	4.62	11.1	86.2	112	7.67	100	0.151	-2.15	2.44	14.3	709	26,100	1,010

Notes: "-" indicates no data, °C = degrees Celsius, mg/ L = milligrams per litre, % = percent, µS/cm = microSiemens per centimeter, TOC = Total Organic Carbon, PC Axis = Principal Components Axis, mg/kg = milligrams per kilogram (dry weight). QUL-PFF1 (exposed) and QUL-PREF1 (reference) were not sampled in 2020, 2022, or 2023. % Fines represents the sum of the silt and clay fraction of sediments.

APPENDIX C.6
FISH CATCH AND
PHYSICAL MEASURES

Table C.6.1: Hoop Net Catch Data for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), Spring 2024

Area	Net ID	Net Size (hoop diam., ft)	UTM (NAD83, 10U)		Set Date	Lift Date	Set Time	Lift Time	Depth Range (m)		Effort (Fishing days)	Largescale Sucker					Longnose Sucker					Rainbow Trout					Redside Shiner				
			Easting	Northing								Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Bootjack Lake (Reference)	MP_BOL_HN-1_2024-04	2.5	591105	5821409	24-Apr-24	26-Apr-24	10:15	12:30	0	1.8	2.09	0	0	0	0	0	0	0	0	0	0	31	0	0	31	14.8	0	0	0	0	0
	MP_BOL_HN-2_2024-04	2.5	591177	5821314			10:39	12:00	0	1.5	2.06	0	0	0	0	0	0	0	0	0	0	133	0	2	131	64.7	0	0	0	0	0
	MP_BOL_HN-3_2024-04	2.5	589845	5823774			11:22	10:45	0	1.2	1.97	0	0	0	0	0	2	0	1	1	1.01	10	0	0	10	5.07	0	0	0	0	0
	MP_BOL_HN-4_2024-04	2.5	589847	5823896			11:45	9:10	0	1.0	1.89	0	0	0	0	0	0	0	0	0	0	483	8	0	475	255	0	0	0	0	0
	MP_BOL_HN-5_2024-04	2.5	591105	5821409	26-Apr-24	28-Apr-24	13:00	13:15	0	1.4	2.01	0	0	0	0	0	9	5	0	0	4.48	120	0	0	120	59.7	1	0	0	1	0
	MP_BOL_HN-6_2024-04	2.5	591017	5821471			13:35	14:15	0	1.1	2.03	0	0	0	0	0	0	0	0	0	0	171	0	0	171	84.3	0	0	0	0	0
	MP_BOL_HN-7_2024-04	2.5	589847	5823896			14:15	9:10	0	0.7	1.79	1	0	0	1	0.559	0	0	0	0	0	1,043	0	1	1,042	583	0	0	0	0	0
	MP_BOL_HN-8_2024-04	2.5	589845	5823774			14:35	11:15	0	0.9	1.86	0	0	0	0	0	1	0	0	1	0.5	22	0	0	22	11.8	0	0	0	0	0
	MP_BOL_HN-9_2024-04	2.5	591446	5821102	28-Apr-24	29-Apr-24	15:00	10:05	0	0.8	0.795	0	0	0	0	0	0	0	0	0	0	101	0	0	101	127	0	0	0	0	0
	MP_BOL_HN-10_2024-04	2.5	591105	5821409			15:30	10:15	0	1.4	0.781	0	0	0	0	0	1	1	0	0	1.28	173	0	0	173	221	0	0	0	0	0
	MP_BOL_HN-11_2024-04	2.5	591105	5821409	29-Apr-24	30-Apr-24	11:00	11:00	0	1.6	1.00	0	0	0	0	0	0	0	0	0	0	63	0	0	63	63.0	0	0	0	0	0
	MP_BOL_HN-12_2024-04	2.5	591446	5821102			11:30	10:45	0	1.6	0.969	0	0	0	0	0	3	0	0	3	3.10	236	0	0	236	244	0	0	0	0	0
	MP_BOL_HN-13_2024-04	2.5	589826	5823843			13:00	9:20	0	1.0	0.847	0	0	0	0	0	0	0	0	0	0	535	0	0	535	631	0	0	0	0	0
	MP_BOL_HN-14_2024-04	2.5	589857	5823680			13:30	10:10	0	1.3	0.861	0	0	0	0	0	0	0	0	0	0	16	0	0	16	18.6	0	0	0	0	0
	MP_BOL_HN-15_2024-04	2.5	591105	5821409	30-Apr-24	2-May-24	11:25	9:15	0	2.5	1.91	0	0	0	0	0	0	0	0	0	0	90	0	1	89	47.1	0	0	0	0	0
	MP_BOL_HN-16_2024-04	2.5	591446	5821102			12:00	10:05	0	2.7	1.92	0	0	0	0	0	23	3	0	20	12.0	32	0	0	32	16.7	0	0	0	0	0
	MP_BOL_HN-17_2024-04	2.5	589852	5823634			13:00	13:02	0	1.0	2.00	0	0	0	0	0	0	0	0	0	0	57	0	0	57	28.5	0	0	0	0	0
	MP_BOL_HN-18_2024-04	2.5	590326	5823970			13:30	12:18	0	0.9	1.95	0	0	0	0	0	10	0	1	9	5.13	421	0	0	421	216	0	0	0	0	0
	MP_BOL_HN-19_2024-04	2.5	591203	5821282			15:00	9:45	0	2.0	1.78	0	0	0	0	0	0	0	0	0	0	67	0	0	67	37.6	0	0	0	0	0
	MP_BOL_HN-20_2024-04	2.5	591337	5821197			15:35	13:40	0	1.2	1.92	0	0	0	0	0	0	0	0	0	0	4	0	0	4	2.08	0	0	0	0	0
										TOTAL	**32**	**1**	**0**	**0**	**1**	**0.0308**	**49**	**9**	**2**	**34**	**1.51**	**3,808**	**8**	**4**	**3,796**	**117**	**1**	**0**	**0**	**1**	**0.0308**
Polley Lake (Exposed)	MP_POL_HN-1_2024-04	2.5	595702	5821031	23-Apr-24	24-Apr-24	17:33	15:40	0	1.2	0.922	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3.26	1	0	0	1	1.09
	MP_POL_HN-2_2024-04	2.5	595690	5820987			18:05	15:10	0	0.5	0.878	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.14	0	0	0	0	0
	MP_POL_HN-3_2024-04	2.5	595376	5820931	24-Apr-24	25-Apr-24	14:15	11:45	0	0.8	0.896	0	0	0	0	0	0	0	0	0	0	10	0	0	10	11.2	0	0	0	0	0
	MP_POL_HN-4_2024-04	2.5	595857	5821176			14:45	8:45	0	1.5	0.750	0	0	0	0	0	9	2	0	7	12.0	78	8	27	43	104	10	0	1	9	13.3
	MP_POL_HN-5_2024-04	2.5	595690	5820987	25-Apr-24	27-Apr-24	12:10	12:28	0	0.5	2.01	0	0	0	0	0	3	0	0	3	1.49	54	0	0	54	26.8	0	0	0	0	0
	MP_POL_HN-6_2024-04	2.5	595762	5821107			13:00	11:54	0	1.5	1.95	0	0	0	0	0	0	0	0	0	0	68	0	0	68	34.8	1	0	0	1	0.512
	MP_POL_HN-7_2024-04	2.5	595881	5821197			13:35	9:35	0	1.5	1.83	0	0	0	0	0	28	6	2	20	15.3	47	0	1	46	25.6	2	0	0	2	1.09
										TOTAL	**9.25**	**0**	**0**	**0**	**0**	**0**	**40**	**8**	**2**	**30**	**4.33**	**261**	**8**	**28**	**225**	**28.2**	**14**	**0**	**1**	**13**	**1.51**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datum. CPUE = catch-per-unit-effort. HN = hoop net. All effort and CPUE values are displayed to three significant figures.

[a] CPUE = number of fish caught per day of fishing effort. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (total fishing effort [days]).

Table C.6.2: Hoop Net Catch Data from Polley Lake (POL; Exposed), September 2024

Area	Net ID	Net Size (hoop diameter, ft)	UTM (NAD83, Zone 10U)		Set Date	Lift Date	Set Time	Lift Time	Depth Range (m)		Effort (days)	Longnose Sucker				Rainbow Trout				Redside Shiner			
			Easting	Northing								Catch	Mortalities	Released	CPUE [a]	Catch	Mortalities	Released	CPUE [a]	Catch	Mortalities	Released	CPUE [a]
Polley Lake	MP_POL_HN-1_2024-09	2.5	594960	5823273	24-Sep-24	25-Sep-24	13:35	11:55	0	2.9	0.931	3.00	0	3.00	3.22	6	0	6	6.45	0	0	0	0
	MP_POL_HN-2_2024-09	2.5	594971	5823272			14:15	12:23	0	3.3	0.922	0	0	0	0	1	0	1	1.08	4	0	4	4.34
	MP_POL_HN-3_2024-09	2.0	593511	5825576			14:50	14:20	0	2.6	0.979	6.00	0	6.00	6.13	0	0	0	0	67	0	67	68.4
	MP_POL_HN-4_2024-09	2.0	593238	5824878			15:14	14:45	0	3.3	0.980	10.0	0	10.0	10.2	3	0	3	3.06	69	0	69	70.4
	MP_POL_HN-5_2024-09	2.5	595226	5821327			16:10	16:00	0	2.3	0.993	6.00	0	6.00	6.04	3	0	3	3.02	1	0	1	1.01
	MP_POL_HN-6_2024-09	2.0	595118	5821615			16:30	8:46	0	2.2	0.678	5.00	0	5.00	7.38	3	0	3	4.43	106	0	106	156
	MP_POL_HN-7_2024-09	2.5	595594	5822063			17:05	10:33	0	1.2	0.728	0	0	0	0	5	0	5	6.87	28	0	28	38.5
	MP_POL_HN-8_2024-09	2.0	595594	5822063	25-Sep-24	26-Sep-24	11:10	8:45	0	1.2	0.899	0	0	0	0	0	0	0	0	16	0	16	17.8
	MP_POL_HN-9_2024-09	2.5	595386	5822527			11:35	9:35	0	2.3	0.917	39.0	0	39.0	42.5	3	0	3	3.27	86	1	85	93.8
	MP_POL_HN-10_2024-09	2.5	594854	5823238			13:45	14:45	0	2.1	1.04	1.00	0	1.00	0.960	2	0	2	1.92	0	0	0	0
	MP_POL_HN-11_2024-09	2.5	593642	5825344			14:15	12:15	0	2.3	0.917	20.0	0	20.0	21.8	1	0	1	1.09	50	0	50	54.5
	MP_POL_HN-12_2024-09	2.0	595382	5820935			15:20	13:40	0	2.0	0.931	3.00	0	3.00	3.22	0	0	0	0	16	0	16	17.2
	MP_POL_HN-13_2024-09	2.0	593655	5824294			15:15	12:53	0	2.0	0.901	0	0	0	0	0	0	0	0	3	0	3	3.33
	MP_POL_HN-14_2024-09	2.5	595382	5820935			16:45	8:20	0	1.4	0.649	3.00	0	3.00	4.62	0	0	0	0	1	0	1	1.54
	MP_POL_HN-15_2024-09	2.0	595364	5820949	26-Sep-24	27-Sep-24	9:30	8:50	0	3.3	0.972	7.00	0	7.00	7.20	0	0	0	0	0	0	0	0
	MP_POL_HN-16_2024-09	2.5	592725	5825972			11:30	11:05	0	2.0	0.983	0	0	0	0	0	0	0	0	0	0	0	0
	MP_POL_HN-17_2024-09	2.5	592604	5826204			11:45	11:15	0	2.0	0.979	23.0	0	23.0	23.5	11	0	11	11.2	43	0	43	43.9
	MP_POL_HN-18_2024-09	2.0	593838	5824112			13:15	14:13	0	1.6	1.04	1.00	0	1.00	0.961	4	0	4	3.85	10	0	10	9.61
	MP_POL_HN-19_2024-09	2.5	594795	5823637			14:15	15:33	0	2.7	1.05	3.00	0	3.00	2.85	0	0	0	0	42	0	42	39.8
	MP_POL_HN-20_2024-09	2.5	594460	5822866			14:56	9:30	0	2.3	0.774	0	0	0	0	5	0	5	6.46	0	0	0	0
	MP_POL_HN-21_2024-09	2.0	595085	5821687			15:30	8:22	0	1.4	0.703	1.00	0	1.00	1.42	1	0	1	1.42	20	0	20	28.5
	MP_POL_HN-22_2024-09	2.0	595549	5822180	27-Sep-24	28-Sep-24	9:10	15:13	0	1.4	1.25	4.00	0	4.00	3.19	4	0	4	3.19	192	0	192	153
	MP_POL_HN-23_2024-09	2.5	593934	5823975			10:15	13:43	0	2.2	1.14	0	0	0	0	6	0	6	5.24	0	0	0	0
	MP_POL_HN-24_2024-09	2.0	593964	5824927			10:40	9:54	0	2.0	0.968	0	0	0	0	0	0	0	0	2	0	2	2.07
	MP_POL_HN-25_2024-09	2.5	593625	5824275			14:00	14:36	0	2.0	1.02	0	0	0	0	1	0	1	0.976	2	0	2	1.95
	MP_POL_HN-26_2024-09	2.0	593702	5825234			14:55	11:00	0	2.4	0.837	3.00	0	3.00	3.59	0	0	0	0	188	0	188	225
	MP_POL_HN-27_2024-09	2.5	593518	5825574			15:22	10:30	0	3.1	0.797	0	0	0	0	0	0	0	0	1	1	0	1.25
	MP_POL_HN-28_2024-09	2.5	595330	5822534			16:35	8:35	0	2.0	0.667	65.0	0	65.0	97.5	0	0	0	0	100	0	100	150
	MP_POL_HN-29_2024-09	2.5	595330	5822534	28-Sep-24	29-Sep-24	8:57	12:00	0	2.1	1.13	12.0	0	12.0	10.6	4	0	4	3.55	48	0	48	42.6
	MP_POL_HN-30_2024-09	2.0	592854	5825800			10:20	8:36	0	1.9	0.928	1.00	0	1.00	1.08	0	0	0	0	3	0	3	3.23
	MP_POL_HN-31_2024-09	2.0	593051	5825296			11:55	8:57	0	2.5	0.876	1.00	0	1.00	1.14	0	0	0	0	4	0	4	4.56
	MP_POL_HN-32_2024-09	2.5	594876	5822170			13:30	10:57	0	1.2	0.894	0	0	0	0	0	0	0	0	0	0	0	0
	MP_POL_HN-33_2024-09	2.5	593922	5824017			14:25	9:52	0	4.5	0.810	2.00	0	2.00	2.47	0	0	0	0	2	0	2	2.47
	MP_POL_HN-34_2024-09	2.5	594200	5823513			15:10	10:22	0	2.8	0.800	4.00	0	4.00	5.00	5	0	5	6.25	13	0	13	16.3
	MP_POL_HN-35_2024-09	2.0	595274	5821245			16:15	12:26	0	2.1	0.841	29.0	0	29.0	34.5	0	0	0	0	59	0	59	70.2
										Total	**31.9**	**252**	**0**	**252**	**7.89**	**68**	**0**	**68**	**2.13**	**1,176**	**2**	**1,174**	**36.8**

Notes: ID = identifier, UTM = Universal Transverse Mercator, NAD = North American Datum, CPUE = catch-per-unit-effort, HN = hoop net, ft = feet. All effort and CPUE values are displayed to three significant figures.

[a] CPUE = number of fish caught per day of fishing effort. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (total fishing effort [days]).

Table C.6.3: Physical Measurements of Rainbow Trout Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), Spring 2024[a]

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Sex	Fate	Abnormalities	Observations
25-Apr-24	MP_POL_RB-1_2024-04	30.5	28.5	240	Undetermined	R	-	-
	MP_POL_RB-2_2024-04	33.2	31.0	300	Male	R	-	Milt
	MP_POL_RB-3_2024-04	32.0	30.2	320	Undetermined	R	Gill lice	-
	MP_POL_RB-4_2024-04	34.2	32.5	320	Male	R	-	Milt
	MP_POL_RB-5_2024-04	30.6	29.4	240	Undetermined	R	-	-
	MP_POL_RB-7_2024-04	33.2	32.0	260	Undetermined	R	-	-
	MP_POL_RB-9_2024-04	22.4	21.0	92	Undetermined	R	-	Parr marks
	MP_POL_RB-10_2024-04	31.0	29.4	260	Undetermined	R	-	-
	MP_POL_RB-11_2024-04	32.9	31.4	280	Male	R	-	Milt
	MP_POL_RB-12_2024-04	29.8	28.1	220	Undetermined	R	Leech	-
	MP_POL_RB-13_2024-04	31.2	29.3	260	Male	R	-	Milt
	MP_POL_RB-14_2024-04	30.6	29.5	240	Male	R	-	Milt
	MP_POL_RB-15_2024-04	32.8	30.9	300	Undetermined	R	-	-
	MP_POL_RB-17_2024-04	33.7	32.0	320	Male	R	-	Milt
	MP_POL_RB-18_2024-04	29.6	28.1	240	Undetermined	R	-	-
	MP_POL_RB-19_2024-04	26.7	24.7	160	Male	R	-	Milt
	MP_POL_RB-20_2024-04	20.5	19.6	-	Male	R	-	Parr marks, milt; weight not recorded
	MP_POL_RB-21_2024-04	29.7	28.0	240	Undetermined	M	-	-
	MP_POL_RB-22_2024-04	33.5	31.6	280	Male	M	-	Milt
	MP_POL_RB-23_2024-04	30.5	29.0	240	Undetermined	M	Gill lice	-
	MP_POL_RB-24_2024-04	33.2	31.2	280	Male	R	-	Milt
	MP_POL_RB-25_2024-04	32.2	30.5	300	Male	R	-	Milt
	MP_POL_RB-26_2024-04	30.5	29.0	240	Male	R	-	Milt
	MP_POL_RB-27_2024-04	35.5	34.0	360	Male	R	-	Milt, hatchery-clipped adipose fin
	MP_POL_RB-28_2024-04	29.8	28.0	240	Undetermined	R	Gill lice	-
	MP_POL_RB-29_2024-04	31.0	28.9	260	Male	M	Gill lice	Milt
	MP_POL_RB-31_2024-04	30.0	28.8	240	Male	M	-	Milt
	MP_POL_RB-32_2024-04	29.9	27.9	240	Male	M	Gill lice	Milt
	MP_POL_RB-33_2024-04	31.9	30.0	300	Undetermined	M	Gill lice	-
	MP_POL_RB-34_2024-04	30.2	28.6	260	Undetermined	M	-	-
	MP_POL_RB-35_2024-04	31.6	29.8	280	Undetermined	R	-	-
	MP_POL_RB-36_2024-04	29.7	28.0	240	Male	M	Gill lice	Milt
	MP_POL_RB-37_2024-04	32.0	30.3	280	Undetermined	R	-	-
	MP_POL_RB-38_2024-04	31.7	29.3	240	Undetermined	R	-	-
	MP_POL_RB-39_2024-04	29.2	27.5	240	Undetermined	R	-	-
	MP_POL_RB-40_2024-04	30.3	28.9	220	Undetermined	M	-	-
	MP_POL_RB-42_2024-04	28.0	26.5	180	Undetermined	R	Gill lice	-
	MP_POL_RB-43_2024-04	30.0	28.2	240	Undetermined	R	-	-
	MP_POL_RB-45_2024-04	32.0	30.6	260	Undetermined	R	Gill lice	-
	MP_POL_RB-46_2024-04	30.5	29.2	280	Undetermined	R	Gill lice	-
	MP_POL_RB-48_2024-04	30.1	28.3	240	Undetermined	R	Gill lice	-
	MP_POL_RB-50_2024-04	30.5	29.0	240	Male	R	-	Milt
	MP_POL_RB-51_2024-04	29.5	28.0	220	Male	R	Gill lice	Milt
	MP_POL_RB-52_2024-04	32.3	30.9	280	Undetermined	M	-	-
	MP_POL_RB-53_2024-04	34.3	32.7	360	Female	M	-	Possibly spawned out
	MP_POL_RB-54_2024-04	31.6	30.1	240	Male	M	-	Milt
	MP_POL_RB-55_2024-04	32.2	30.8	300	Female	M	Gill lice	Possibly spawned out
	MP_POL_RB-56_2024-04	31.2	29.8	260	Undetermined	M	-	-
	MP_POL_RB-57_2024-04	35.7	33.6	360	Female	M	Gill lice	Eggs
	MP_POL_RB-58_2024-04	30.0	28.5	240	Female	M	Gill lice	-
	MP_POL_RB-59_2024-04	29.2	27.5	220	Undetermined	M	Gill lice	-
	MP_POL_RB-60_2024-04	34.0	32.2	320	Female	R	-	Hatchery-clipped adipose fin
	MP_POL_RB-61_2024-04	32.0	30.7	280	Male	M	-	Milt
	MP_POL_RB-62_2024-04	33.5	31.7	260	Female	M	-	Eggs
	MP_POL_RB-63_2024-04	31.1	29.7	240	Male	M	-	Milt
	MP_POL_RB-64_2024-04	35.2	33.1	340	Male	M	-	Milt
	MP_POL_RB-65_2024-04	30.4	29.0	260	Male	R	Gill lice	Milt
	MP_POL_RB-66_2024-04	32.5	30.7	300	Male	R	Gill lice	Milt
	MP_POL_RB-67_2024-04	32.0	30.1	280	Male	R	Leech	Milt
	MP_POL_RB-68_2024-04	29.0	27.7	220	Undetermined	R	Gill lice	-
	MP_POL_RB-69_2024-04	35.0	32.8	-	Male	R	-	Milt, weight not recorded
	MP_POL_RB-70_2024-04	33.5	31.6	320	Male	M	-	Milt
	MP_POL_RB-71_2024-04	32.6	30.6	300	Male	M	-	Milt
	MP_POL_RB-72_2024-04	32.5	30.7	280	Undetermined	R	Gill lice	-
	MP_POL_RB-73_2024-04	23.7	22.0	122	Undetermined	R	-	Parr marks
	MP_POL_RB-74_2024-04	30.5	28.8	260	Female	M	Gill lice	Eggs
	MP_POL_RB-75_2024-04	30.5	29.0	240	Male	M	-	Milt
	MP_POL_RB-76_2024-04	35.0	33.0	360	Male	R	-	-
	MP_POL_RB-77_2024-04	31.2	29.7	300	Undetermined	M	Gill lice	-
	MP_POL_RB-78_2024-04	30.8	29.5	240	Male	R	Gill lice	Milt
27-Apr-24	MP_POL_RB-79_2024-04	23.0	22.4	110	Undetermined	R	-	Faded parr marks
	MP_POL_RB-80_2024-04	24.6	23.3	126	Undetermined	R	-	Parr marks
	MP_POL_RB-81_2024-04	19.7	18.4	62	Undetermined	R	-	Parr marks
	MP_POL_RB-82_2024-04	19.9	18.4	56	Undetermined	R	-	Parr marks
	MP_POL_RB-83_2024-04	22.0	21.0	100	Male	R	-	Faded parr marks, milt
	MP_POL_RB-84_2024-04	26.6	25.0	80	Undetermined	R	-	Parr marks
	MP_POL_RB-85_2024-04	27.5	26.2	208	Undetermined	R	-	Faded parr marks
	MP_POL_RB-86_2024-04	27.7	26.0	182	Male	R	-	Faded parr marks, milt
	MP_POL_RB-87_2024-04	27.2	25.5	160	Male	R	Gill lice	Faded parr marks, milt
Sample Size (n)		**79**	**79**	**77**				
Average		**30.3**	**28.7**	**246**				
Median		**30.6**	**29.3**	**240**				
Standard Deviation		**3.5**	**3.3**	**67**				
Minimum		**19.7**	**18.4**	**56**				
Maximum		**35.7**	**34.0**	**360**				

Notes: "-" = data not available or no comment, R = released, M = mortality. Fish sex determined by expression of milt or eggs.

[a] Fish measurements exclude those for fish sampled lethally for tissue quality analysis (see Table C.6.11 for these measurements).

Table C.6.4: Physical Measurements of Longnose Sucker Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), Spring 2024[a]

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Sex	Fate	Abnormalities	Observations
25-Apr-24	MP_POL_LSU-2_2024-04	25.0	23.3	158	Undetermined	R	Black spot	-
	MP_POL_LSU-3_2024-04	29.0	27.2	254	Male	R	Black spot	Tubercles
	MP_POL_LSU-4_2024-04	23.1	21.4	120	Male	R	Black spot	Tubercles
	MP_POL_LSU-5_2024-04	23.6	22.1	140	Male	R	Black spot	-
	MP_POL_LSU-6_2024-04	29.3	27.2	232	Male	R	-	-
	MP_POL_LSU-7_2024-04	26.5	23.9	182	Male	R	-	-
	MP_POL_LSU-8_2024-04	14.4	13.9	34	Undetermined	R	Shortened gill cover	-
27-Apr-24	MP_POL_LSU-11_2024-04	25.0	23.5	150	Female	R	-	-
	MP_POL_LSU-12_2024-04	24.2	22.5	95	Female	R	Black spot	-
	MP_POL_LSU-13_2024-04	25.8	24.3	145	Male	R	-	Tubercles
	MP_POL_LSU-14_2024-04	27.9	25.7	170	Male	R	-	Tubercles
	MP_POL_LSU-15_2024-04	25.9	24.0	115	Male	R	Black spot	-
	MP_POL_LSU-16_2024-04	26.0	24.1	120	Male	R	-	-
	MP_POL_LSU-17_2024-04	25.0	23.2	120	Male	R	-	Tubercles
	MP_POL_LSU-18_2024-04	25.5	23.8	110	Male	R	Black spot	Tubercles
	MP_POL_LSU-19_2024-04	25.0	23.2	110	Male	R	-	Tubercles
	MP_POL_LSU-23_2024-04	49.0	46.0	1,300	Female	R	-	-
	MP_POL_LSU-26_2024-04	31.2	29.4	300	Female	R	-	-
	MP_POL_LSU-27_2024-04	32.5	30.9	350	Male	R	-	-
	MP_POL_LSU-28_2024-04	26.8	25.3	185	Male	R	-	-
	MP_POL_LSU-29_2024-04	32.1	29.9	280	Male	R	-	-
	MP_POL_LSU-30_2024-04	30.5	29.7	225	Male	R	-	-
	MP_POL_LSU-31_2024-04	25.5	24.2	125	Male	R	-	-
	MP_POL_LSU-32_2024-04	24.6	23.3	115	Female	R	-	-
	MP_POL_LSU-33_2024-04	36.2	33.2	355	Male	R	-	-
	MP_POL_LSU-34_2024-04	24.2	22.5	105	Male	R	-	-
	MP_POL_LSU-35_2024-04	24.0	22.5	95	Male	R	-	-
	MP_POL_LSU-36_2024-04	23.5	21.5	85	Male	R	-	-
	MP_POL_LSU-37_2024-04	21.5	20.1	70	Male	R	-	-
Sample Size (n)		**29**	**29**	**29**				
Average		**27.0**	**25.2**	**202**				
Median		**25.5**	**23.9**	**140**				
Standard Deviation		**5.8**	**5.5**	**226**				
Minimum		**14.4**	**13.9**	**34**				
Maximum		**49.0**	**46.0**	**1,300**				

Notes: "-" = data not available or no comment, R = released, M = mortality. Fish sex determined by presence of tubercles (male) or absence (female) in larger individuals (i.e., not obviously juvenile).

[a] Fish measurements exclude those for fish sampled lethally for tissue quality analysis (see Table C.6.10 for these measurements).

Table C.6.5: Physical Measurements of Rainbow Trout Caught for Non-Destructive Sampling from Bootjack Lake (BOL; Reference), Spring 2024[a]

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Sex	Fate	Abnormalities	Observations
26-Apr-24	MP_BOL_RB-1_2024-04	32.4	31.6	290	Male	R	-	Milt
	MP_BOL_RB-2_2024-04	31.8	30.5	280	Male	R	-	Milt
	MP_BOL_RB-3_2024-04	27.1	26.8	170	Male	R	-	Milt
	MP_BOL_RB-4_2024-04	34.8	32.5	350	Male	R	-	Milt
	MP_BOL_RB-5_2024-04	29.7	28.0	180	Undetermined	R	Gill lice	Could not express
	MP_BOL_RB-6_2024-04	23.6	22.6	115	Male	R	-	Faded parr marks, milt
	MP_BOL_RB-7_2024-04	21.3	20.0	93	Undetermined	R	-	Faded parr marks
	MP_BOL_RB-8_2024-04	22.7	21.4	101	Male	R	-	Parr marks, milt
	MP_BOL_RB-9_2024-04	23.5	22.5	130	Undetermined	R	-	Parr marks
	MP_BOL_RB-10_2024-04	18.3	17.4	64	Male	R	-	Parr marks, milt
28-Apr-24	MP_BOL_RB-11_2024-04	33.0	31.3	280	Female	R	Gill lice	Eggs
	MP_BOL_RB-12_2024-04	32.0	32.4	245	Female	R	-	-
	MP_BOL_RB-13_2024-04	34.5	32.9	335	Female	R	Gill lice	-
	MP_BOL_RB-14_2024-04	29.6	27.9	200	Male	R	-	Milt
	MP_BOL_RB-15_2024-04	32.8	31.4	290	Female	R	-	-
	MP_BOL_RB-16_2024-04	36.9	35.0	400	Undetermined	R	Gill lice	-
	MP_BOL_RB-17_2024-04	33.2	31.5	270	Male	R	-	Milt
	MP_BOL_RB-18_2024-04	33.1	31.4	290	Male	R	-	Milt (trace)
	MP_BOL_RB-19_2024-04	30.6	28.8	220	Male	R	-	-
	MP_BOL_RB-20_2024-04	31.8	30.0	235	Undetermined	R	-	-
	MP_BOL_RB-21_2024-04	32.0	30.5	245	Male	R	-	Milt
	MP_BOL_RB-22_2024-04	29.3	27.7	315	Female	R	-	Very faded parr marks
	MP_BOL_RB-23_2024-04	26.1	24.8	125	Male	R	-	Faded parr marks, milt
	MP_BOL_RB-24_2024-04	30.0	28.8	180	Male	R	-	Milt
	MP_BOL_RB-25_2024-04	28.7	27.2	150	Undetermined	R	-	Faded parr marks
	MP_BOL_RB-26_2024-04	23.7	22.4	130	Male	R	-	Parr marks, milt
	MP_BOL_RB-27_2024-04	24.3	22.9	134	Male	R	-	Faded parr marks, milt
	MP_BOL_RB-28_2024-04	22.1	21.0	104	Male	R	-	Parr marks, milt
	MP_BOL_RB-29_2024-04	23.6	22.3	134	Male	R	-	Parr marks, milt
	MP_BOL_RB-30_2024-04	18.2	17.1	62	Undetermined	R	-	Parr marks
	MP_BOL_RB-31_2024-04	19.0	18.5	64	Male	R	-	Parr marks, milt
	MP_BOL_RB-32_2024-04	16.0	15.1	50	Undetermined	R	-	-
Sample Size (n)		**32**	**32**	**32**				
Average		**27.7**	**26.4**	**195**				
Median		**29.5**	**27.8**	**180**				
Standard Deviation		**5.6**	**5.4**	**96**				
Minimum		**16.0**	**15.1**	**50**				
Maximum		**36.9**	**35.0**	**400**				

Notes: "-" = data not available or no comment, R = released, M = mortality. Fish sex determined by expression of milt or eggs.

[a] Fish measurements exclude those for fish sampled lethally for tissue quality analysis (see Table C.6.11 for these measurements).

Table C.6.6: Physical Measurements of Longnose Sucker Caught for Non-Destructive Sampling from Bootjack Lake (BOL; Exposed), Spring 2024[a]

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Sex	Fate	Abnormalities	Observations
26-Apr-24	MP_BOL_LSU-1_2024-04	13.7	12.5	30.3	Undetermined	M	-	Caught in wing; eviscerated
	MP_BOL_LSU-2_2024-04	13.6	12.3	31	Undetermined	R	Shortened gill cover	-
28-Apr-24	MP_BOL_LSU-3_2024-04	28.5	26.8	220	Male	R	Shortened gill cover	Tubercles
	MP_BOL_LSU-4_2024-04	34.5	32.6	420	Male	R	-	Tubercles
	MP_BOL_LSU-5_2024-04	42.5	40.4	720	Male	R	-	Tubercles
	MP_BOL_LSU-10_2024-04	42.3	39.4	840	Male	R	-	Tubercles
	MP_BOL_LSU-12_2024-04	32.0	30.0	340	Male	R	-	Tubercles
29-Apr-24	MP_BOL_LSU-13_2024-04	27.5	26.0	235	Undetermined	M	-	-
30-Apr-24	MP_BOL_LSU-14_2024-04	31.5	29.9	340	Male	R	-	Tubercles
	MP_BOL_LSU-15_2024-04	26.2	24.9	180	Male	R	-	Tubercles
	MP_BOL_LSU-16_2024-04	30.0	28.0	265	Male	R	-	Tubercles
2-May-24	MP_BOL_LSU-17_2024-05	30.1	28.0	260	Male	R	-	Tubercles
	MP_BOL_LSU-18_2024-05	27.5	25.6	195	Male	R	-	Tubercles
	MP_BOL_LSU-19_2024-05	32.0	30.1	295	Female	R	-	-
	MP_BOL_LSU-22_2024-05	42.9	40.1	910	Male	R	-	Tubercles
	MP_BOL_LSU-23_2024-05	41.5	38.7	780	Male	R	-	Tubercles
	MP_BOL_LSU-25_2024-05	44.4	42.1	1,080	Female	R	-	-
	MP_BOL_LSU-26_2024-05	29.5	27.9	235	Male	R	-	Tubercles
	MP_BOL_LSU-27_2024-05	47.2	44.2	1,260	Female	R	-	-
	MP_BOL_LSU-28_2024-05	48.0	44.2	1,280	Female	R	-	-
	MP_BOL_LSU-29_2024-05	47.7	44.4	1,340	Female	R	-	-
	MP_BOL_LSU-30_2024-05	33.1	31.2	340	Male	R	-	Tubercles
	MP_BOL_LSU-31_2024-05	27.1	25.6	230	Male	R	-	Tubercles
	MP_BOL_LSU-32_2024-05	25.0	23.3	168	Male	R	-	Tubercles
	MP_BOL_LSU-33_2024-05	29.0	27.5	244	Male	R	Shortened gill cover	Tubercles
	MP_BOL_LSU-34_2024-05	28.4	26.5	200	Female	R	-	-
	MP_BOL_LSU-35_2024-05	27.1	25.7	208	Male	R	-	Tubercles
	MP_BOL_LSU-36_2024-05	27.0	25.2	206	Male	R	-	Tubercles
	MP_BOL_LSU-37_2024-05	30.5	28.9	285	Male	R	-	Tubercles
	MP_BOL_LSU-38_2024-05	29.6	28.5	270	Male	R	-	Tubercles
	MP_BOL_LSU-39_2024-05	28.1	26.8	225	Male	R	-	Tubercles
Sample Size (n)		**31**	**31**	**31**				
Average		**32.2**	**30.2**	**440**				
Median		**30.0**	**28.0**	**265**				
Standard Deviation		**8.7**	**8.1**	**379**				
Minimum		**13.6**	**12.3**	**30**				
Maximum		**48.0**	**44.4**	**1,340**				

Notes: "-" = data not available or no comment, R = released, M = mortality. Fish sex determined by presence of tubercles (male) or absence (female) in larger individuals (i.e., not obviously juvenile).

[a] Fish measurements exclude those for fish sampled lethally for tissue quality analysis (see Table C.6.10 for these measurements).

Table C.6.7: Physical Measurements of Rainbow Trout Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), September 2024

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Fate	Abnormalities	Observations
25-Sep-24	MP_POL_RB-1_2024-09	19.8	19.5	69	R	-	-
	MP_POL_RB-2_2024-09	18.5	17.6	49	R	-	Faded parr marks
	MP_POL_RB-3_2024-09	17.5	16.8	41	R	-	Faded parr marks, ripped caudal fin
	MP_POL_RB-4_2024-09	23.6	22.5	109	R	-	-
	MP_POL_RB-5_2024-09	31.2	29.8	263	R	-	-
	MP_POL_RB-6_2024-09	28.6	26.5	192	R	-	Faded parr marks
	MP_POL_RB-7_2024-09	20.1	18.7	76	R	-	-
	MP_POL_RB-8_2024-09	16.0	14.5	33	R	-	Faded parr marks
	MP_POL_RB-9_2024-09	34.0	32.1	300	R	-	-
	MP_POL_RB-10_2024-09	31.6	29.8	280	R	-	-
	MP_POL_RB-11_2024-09	34.0	32.2	275	R	-	-
	MP_POL_RB-12_2024-09	30.1	28.8	195	R	-	-
	MP_POL_RB-13_2024-09	15.7	14.8	32	R	-	Parr marks
	MP_POL_RB-4_2024-09	9.3	8.9	6.8	R	-	Parr marks
	MP_POL_RB-15_2024-09	38.4	36.6	470	R	Gill lice	-
	MP_POL_RB-16_2024-09	34.3	32.3	310	R	Gill lice	-
	MP_POL_RB-17_2024-09	37.8	35.9	460	R	Gill lice	Hatchery-clipped adipose fin
26-Sep-24	MP_POL_RB-18_2024-09	31.1	29.4	228	R	Tumour (right gill)	-
	MP_POL_RB-19_2024-09	16.9	15.7	35	R	-	Faded parr marks
	MP_POL_RB-20_2024-09	32.8	30.9	254	R	Gill lice	-
	MP_POL_RB-21_2024-09	36.9	35.7	440	R	Gill lice	-
	MP_POL_RB-22_2024-09	32.1	30.5	250	R	-	-
	MP_POL_RB-23_2024-09	32.6	31.5	280	R	Gill lice in mouth	-
27-Sep-24	MP_POL_RB-24_2024-09	14.7	13.9	28	R	-	Faded parr marks
	MP_POL_RB-25_2024-09	21.2	19.5	79	R	-	Very faded parr marks, ripped caudal fin
	MP_POL_RB-26_2024-09	32.5	30.5	230	R	-	-
	MP_POL_RB-27_2024-09	35.1	33.0	330	R	Ripped caudal fin	Ripped caudal fin
	MP_POL_RB-28_2024-09	34.0	32.0	320	R	Gill lice under pelvic fin	-
	MP_POL_RB-29_2024-09	33.1	31.1	290	R	Gill lice on tail	-
	MP_POL_RB-30_2024-09	30.1	28.5	180	R	Gill lice in gills	-
	MP_POL_RB-31_2024-09	15.2	14.7	28	R	-	Parr marks
	MP_POL_RB-32_2024-09	17.8	16.5	43	R	-	Faded parr marks
	MP_POL_RB-33_2024-09	32.2	30.6	260	R	-	-
	MP_POL_RB-4_2024-09	32.0	30.5	240	R	-	-
	MP_POL_RB-35_2024-09	30.0	28.9	240	R	Gill lice on anal fin	-
	MP_POL_RB-36_2024-09	36.9	35.5	410	R	Gill lice on tail	-
	MP_POL_RB-37_2024-09	33.6	32.1	300	R	-	-
	MP_POL_RB-38_2024-09	36.0	34.9	360	R	Abundant gill lice	-
	MP_POL_RB-39_2024-09	34.0	31.6	310	R	Gill lice	-
	MP_POL_RB-40_2024-09	13.0	12.1	18	R	-	Parr marks
	MP_POL_RB-41_2024-09	19.8	18.5	63	R	-	Parr marks
	MP_POL_RB-42_2024-09	15.9	15.2	34	R	-	Parr marks
	MP_POL_RB-43_2024-09	29.9	28.6	190	R	Gill lice	Very faded parr marks
	MP_POL_RB-44_2024-09	34.2	32.1	325	R	-	-
28-Sep-24	MP_POL_RB-45_2024-09	33.9	32.4	310	R	-	Ripped caudal fin
	MP_POL_RB-46_2024-09	33.7	31.9	295	R	Small yellow growth on tongue	Ripped caudal and dorsal fins
	MP_POL_RB-47_2024-09	22.7	21.4	91	R	Ripped caudal fin	Very faded parr marks, ripped caudal fin
	MP_POL_RB-48_2024-09	34.1	32.2	260	R	Large amount of gill lice	-
	MP_POL_RB-49_2024-09	32.4	30.7	280	R	Small yellow growth roof of mouth (possibly gill lice)	-
	MP_POL_RB-50_2024-09	31.3	29.5	250	R	Gill lice on body	Ripped dorsal fin, some scarring
	MP_POL_RB-51_2024-09	33.2	31.6	260	R	Gill lice	-
	MP_POL_RB-52_2024-09	8.5	8.0	4.7	R	-	Parr marks
	MP_POL_RB-53_2024-09	9.2	8.8	7.0	R	-	Parr marks
	MP_POL_RB-54_2024-09	8.6	8.2	5.4	R	-	Parr marks
	MP_POL_RB-55_2024-09	8.7	8.3	5.0	R	-	Parr marks
29-Sep-24	MP_POL_RB-56_2024-09	16.8	16.3	49	R	-	Faded parr marks
	MP_POL_RB-57_2024-09	17.5	16.9	51	R	-	Faded parr marks
	MP_POL_RB-58_2024-09	30.9	29.1	250	R	-	-
	MP_POL_RB-59_2024-09	30.9	29.5	230	R	Slight gill lice in mouth	Ripped dorsal fin
	MP_POL_RB-60_2024-09	33.0	31.5	300	R	-	-
	MP_POL_RB-61_2024-09	21.7	20.0	90	R	Gill lice	Very faded parr marks
	MP_POL_RB-62_2024-09	32.1	31.5	270	R	Gill lice	-
	MP_POL_RB-63_2024-09	33.5	31.5	300	R	Gill lice	-
	MP_POL_RB-64_2024-09	34.7	32.9	310	R	Small yellow spot on body, gill lice	-
Sample Size (n)		**64**	**64**	**64**			
Average		**26.7**	**25.4**	**196**			
Median		**31.2**	**29.5**	**240**			
Standard Deviation		**8.9**	**8.5**	**131**			
Minimum		**8.5**	**8.0**	**4.7**			
Maximum		**38.4**	**36.6**	**470**			

Notes: "-" = no comment, RB = rainbow trout, R = released, M = mortality.

Table C.6.8: Physical Measurements of Longnose Sucker Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), September 2024

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Fate	Abnormalities	Observations
25-Sep-24	MP_POL_LSU-1_2024-09	25.5	23.5	156	R	Black spot	Tubercles
	MP_POL_LSU-2_2024-09	21.9	20.0	104	R	Black spot	-
	MP_POL_LSU-3_2024-09	24.1	22.3	127	R	-	-
	MP_POL_LSU-4_2024-09	24.5	23.0	140	R	Black spot	Tubercles
	MP_POL_LSU-5_2024-09	19.6	18.4	68	R	-	-
	MP_POL_LSU-6_2024-09	39.0	36.5	670	R	-	-
	MP_POL_LSU-7_2024-09	25.8	23.9	156	R	Black spot	Tubercles
	MP_POL_LSU-8_2024-09	24.7	23.2	144	R	Black spot	-
26-Sep-24	MP_POL_LSU-9_2024-09	16.0	15.3	39	R	-	Abrasions from net
	MP_POL_LSU-10_2024-09	23.9	23.5	101	R	-	Ripped caudal fin
	MP_POL_LSU-11_2024-09	25.1	24.0	150	R	Black spot	-
	MP_POL_LSU-12_2024-09	21.5	20.2	116	R	-	-
	MP_POL_LSU-13_2024-09	25.1	24.0	120	R	Black spot	-
	MP_POL_LSU-4_2024-09	21.3	19.5	86	R	-	Shortened gill cover
	MP_POL_LSU-15_2024-09	23.3	21.9	116	R	-	-
	MP_POL_LSU-16_2024-09	20.2	18.7	67	R	Black spot	Shortened gill cover
	MP_POL_LSU-17_2024-09	27.3	25.5	78	R	-	-
	MP_POL_LSU-18_2024-09	28.7	26.7	220	R	-	-
	MP_POL_LSU-19_2024-09	27.3	25.4	188	R	Black spot	-
	MP_POL_LSU-20_2024-09	22.0	20.4	106	R	-	Shortened gill cover
	MP_POL_LSU-21_2024-09	31.0	28.7	252	R	Black spot	-
	MP_POL_LSU-22_2024-09	29.1	27.3	234	R	Black spot	-
	MP_POL_LSU-23_2024-09	18.7	17.4	56	R	-	Shortened gill cover
	MP_POL_LSU-24_2024-09	22.0	20.4	90	R	Black spot	-
	MP_POL_LSU-25_2024-09	23.9	22.3	140	R	-	Shortened gill cover
	MP_POL_LSU-26_2024-09	24.1	22.5	134	R	-	-
	MP_POL_LSU-27_2024-09	26.7	24.4	170	R	-	-
	MP_POL_LSU-28_2024-09	24.5	22.6	138	R	-	-
	MP_POL_LSU-29_2024-09	26.2	24.3	172	R	-	-
	MP_POL_LSU-30_2024-09	27.3	25.2	200	R	Black spot	-
	MP_POL_LSU-31_2024-09	30.2	28.2	246	R	Black spot	-
	MP_POL_LSU-32_2024-09	27.1	25.2	194	R	Black spot	-
	MP_POL_LSU-33_2024-09	29.0	26.9	224	R	-	-
	MP_POL_LSU-4_2024-09	28.0	26.2	204	R	-	-
	MP_POL_LSU-35_2024-09	24.3	23.5	118	R	Black spot	Shortened gill cover
	MP_POL_LSU-36_2024-09	23.6	21.8	108	R	Black spot	-
	MP_POL_LSU-37_2024-09	31.5	29.5	292	R	Black spot	-
	MP_POL_LSU-38_2024-09	26.4	24.1	176	R	Black spot	-
	MP_POL_LSU-39_2024-09	27.8	25.5	84	R	-	-
	MP_POL_LSU-40_2024-09	27.1	25.0	176	R	Black spot	-
	MP_POL_LSU-41_2024-09	21.2	19.7	92	R	-	-
	MP_POL_LSU-42_2024-09	20.7	19.2	70	R	-	-
	MP_POL_LSU-43_2024-09	33.0	30.6	330	R	Black spot	-
	MP_POL_LSU-44_2024-09	28.4	26.3	206	R	-	-
	MP_POL_LSU-45_2024-09	21.1	19.5	88	R	-	-
	MP_POL_LSU-46_2024-09	20.5	19.3	83	R	-	-
	MP_POL_LSU-47_2024-09	22.0	20.6	102	R	-	-
	MP_POL_LSU-48_2024-09	19.2	17.9	60	R	-	-
	MP_POL_LSU-49_2024-09	20.6	19.3	78	R	-	-
	MP_POL_LSU-50_2024-09	16.1	15.0	42	R	-	-
	MP_POL_LSU-51_2024-09	20.9	19.7	98	R	Black spot	-

Notes: "-" = no comment, LSU = Longnose Sucker, R = released, M = mortality.

Table C.6.8: Physical Measurements of Longnose Sucker Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), September 2024

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Fate	Abnormalities	Observations
27-Sep-24	MP_POL_LSU-52_2024-09	7.3	7.1	3	R	Black spot	-
	MP_POL_LSU-53_2024-09	13.6	13.2	23	R	-	Shortened gill cover
	MP_POL_LSU-54_2024-09	28.1	27.9	210	R	Black spot	Tubercles
	MP_POL_LSU-55_2024-09	21.9	19.9	85	R	Black spot	-
	MP_POL_LSU-56_2024-09	28.1	26.9	215	R	-	-
	MP_POL_LSU-57_2024-09	21.0	20.4	80	R	-	-
	MP_POL_LSU-58_2024-09	16.0	15.2	48	R	Black spot	-
	MP_POL_LSU-59_2024-09	26.9	25.2	162	R	-	-
	MP_POL_LSU-60_2024-09	31.0	29.2	260	R	-	-
	MP_POL_LSU-61_2024-09	21.9	20.1	80	R	Black spot	-
	MP_POL_LSU-62_2024-09	29.9	28.5	240	R	Black spot	-
	MP_POL_LSU-63_2024-09	13.8	13.0	26	R	-	Shortened gill cover
	MP_POL_LSU-64_2024-09	26.5	25.9	149	R	Black spot	-
	MP_POL_LSU-65_2024-09	26.0	24.5	200	R	Black spot	-
	MP_POL_LSU-66_2024-09	29.0	27.5	230	R	-	-
	MP_POL_LSU-67_2024-09	24.5	23.1	170	R	Black spot	Ripped caudal fin
	MP_POL_LSU-68_2024-09	20.1	19.6	80	R	Black spot	Ripped caudal fin
	MP_POL_LSU-69_2024-09	20.9	19.8	78	R	Black spot	-
	MP_POL_LSU-70_2024-09	30.6	28.4	320	R	Black spot	-
	MP_POL_LSU-71_2024-09	31.5	29.0	270	R	Black spot	Ripped caudal fin
	MP_POL_LSU-72_2024-09	24.1	22.5	150	R	-	-
	MP_POL_LSU-73_2024-09	34.1	32.5	410	R	-	Scars from net, tapeworm
	MP_POL_LSU-74_2024-09	19.8	18.9	70	R	Black spot	-
	MP_POL_LSU-75_2024-09	47.9	44.0	1,080	R	Black spot	-
	MP_POL_LSU-76_2024-09	17.2	16.8	49	R	Black spot	-
	MP_POL_LSU-77_2024-09	14.2	13.7	24	R	Black spot	-
	MP_POL_LSU-78_2024-09	21.5	20.4	75	R	Black spot	-
	MP_POL_LSU-79_2024-09	27.0	25.6	168	R	Black spot	Tubercles
28-Sep-24	MP_POL_LSU-80_2024-09	26.5	24.9	170	R	Black spot	-
	MP_POL_LSU-81_2024-09	27.0	25.6	210	R	Black spot	Tubercles
	MP_POL_LSU-82_2024-09	26.1	25.1	149	R	Black spot	-
	MP_POL_LSU-83_2024-09	5.5	5.2	2	R	Black spot	-
	MP_POL_LSU-84_2024-09	16.5	15.4	30	R	Black spot	Shortened gill cover
	MP_POL_LSU-85_2024-09	19.1	17.7	68	R	Black spot	-
	MP_POL_LSU-86_2024-09	20.9	19.5	70	R	Black spot	-
29-Sep-24	MP_POL_LSU-87_2024-09	17.9	11.3	53	R	Black spot	-
	MP_POL_LSU-88_2024-09	7.0	6.7	5	R	-	-
	MP_POL_LSU-89_2024-09	20.4	19.9	77	R	Black spot	-
	MP_POL_LSU-90_2024-09	28.6	26.5	237	R	Black spot	-
	MP_POL_LSU-91_2024-09	19.1	17.9	65	R	Black spot	Shortened gill cover
	MP_POL_LSU-92_2024-09	25.1	23.9	170	R	Black spot	-
	MP_POL_LSU-93_2024-09	24.4	23.2	130	R	Black spot	-
	MP_POL_LSU-94_2024-09	29.1	27.3	220	R	-	-
Sample Size (n)		**94**	**94**	**94**			
Average		**23.9**	**22.4**	**151**			
Median		**24.4**	**23.1**	**128**			
Standard Deviation		**6.2**	**5.8**	**137**			
Minimum		**5.5**	**5.2**	**2**			
Maximum		**47.9**	**44.0**	**1,080**			

Notes: "-" = no comment, LSU = Longnose Sucker, R = released, M = mortality.

Table C.6.9: Physical Measurements of Redside Shiner Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), September 2024

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Fate	Abnormalities	Observations
25-Sep-24	MP_POL_RSC-1_2024-09	10.1	9.2	7.6	R	-	-
	MP_POL_RSC-2_2024-09	7.5	6.7	3.0	R	-	-
	MP_POL_RSC-3_2024-09	11.9	10.7	14.0	R	Black spot	-
	MP_POL_RSC-4_2024-09	6.3	5.5	1.5	R	-	-
	MP_POL_RSC-5_2024-09	10.7	9.8	8.0	R	-	-
	MP_POL_RSC-6_2024-09	11.6	10.5	14.3	R	Black spot	-
	MP_POL_RSC-7_2024-09	11.1	10.0	10.3	R	-	-
	MP_POL_RSC-8_2024-09	8.2	7.4	4.0	R	-	-
	MP_POL_RSC-9_2024-09	11.0	9.9	12.3	R	Black spot	-
	MP_POL_RSC-10_2024-09	11.3	10.4	9.5	R	Black spot	White tongue growth
	MP_POL_RSC-11_2024-09	10.1	9.3	8.3	R	Black spot	-
	MP_POL_RSC-12_2024-09	7.5	6.8	3.0	R	-	-
	MP_POL_RSC-13_2024-09	9.8	8.7	6.0	R	Black spot	-
	MP_POL_RSC-4_2024-09	11.5	10.5	12.3	R	-	-
	MP_POL_RSC-15_2024-09	9.0	8.3	5.0	R	-	-
	MP_POL_RSC-16_2024-09	11.4	10.3	14.3	R	-	-
	MP_POL_RSC-17_2024-09	10.9	9.7	9.5	R	-	-
	MP_POL_RSC-18_2024-09	12.4	11.2	19.3	R	-	-
	MP_POL_RSC-19_2024-09	9.5	8.4	6.5	R	-	-
	MP_POL_RSC-20_2024-09	10.3	9.3	8.3	R	Black spot	-
	MP_POL_RSC-21_2024-09	11.2	10.2	11.0	R	-	-
	MP_POL_RSC-22_2024-09	10.2	9.1	7.5	R	Black spot	-
	MP_POL_RSC-23_2024-09	13.1	11.8	19.0	R	-	-
	MP_POL_RSC-24_2024-09	8.1	7.4	3.5	R	-	-
	MP_POL_RSC-25_2024-09	12.0	10.9	12.8	R	Black spot	-
	MP_POL_RSC-26_2024-09	12.6	11.4	16.0	R	-	-
	MP_POL_RSC-27_2024-09	10.2	9.3	7.8	R	-	-
	MP_POL_RSC-28_2024-09	8.9	7.9	4.3	R	-	-
	MP_POL_RSC-29_2024-09	11.8	10.6	13.8	R	-	-
	MP_POL_RSC-30_2024-09	10.2	9.4	8.3	R	Black spot	-
	MP_POL_RSC-31_2024-09	10.3	9.4	8.8	R	-	-
	MP_POL_RSC-32_2024-09	12.1	10.8	15.0	R	-	-
	MP_POL_RSC-33_2024-09	8.3	7.5	4.5	R	-	-
	MP_POL_RSC-4_2024-09	12.0	11.7	13.5	R	Black spot	-
	MP_POL_RSC-35_2024-09	10.9	9.8	10.0	R	Black spot	-
	MP_POL_RSC-36_2024-09	12.7	11.6	19.0	R	Black spot	-
	MP_POL_RSC-37_2024-09	11.0	9.9	12.0	R	-	-
	MP_POL_RSC-38_2024-09	11.1	10.0	11.0	R	-	-
	MP_POL_RSC-39_2024-09	8.1	7.5	4.3	R	-	-
	MP_POL_RSC-40_2024-09	7.5	6.3	3.0	R	-	-
	MP_POL_RSC-41_2024-09	10.7	9.7	9.3	R	-	-
	MP_POL_RSC-42_2024-09	10.5	9.5	9.5	R	-	-
	MP_POL_RSC-43_2024-09	7.0	6.4	2.5	R	-	-
	MP_POL_RSC-44_2024-09	10.5	9.3	9.5	R	Black spot	-
	MP_POL_RSC-45_2024-09	13.2	11.9	18.0	R	-	-
	MP_POL_RSC-46_2024-09	12.0	11.4	16.3	R	Black spot	-
	MP_POL_RSC-47_2024-09	12.7	11.4	16.5	R	-	-
	MP_POL_RSC-48_2024-09	11.1	10.0	10.8	R	-	-
	MP_POL_RSC-49_2024-09	11.3	10.1	10.5	R	-	-
	MP_POL_RSC-50_2024-09	10.1	8.9	7.5	R	-	-
	MP_POL_RSC-51_2024-09	10.2	9.3	8.0	R	-	-
	MP_POL_RSC-52_2024-09	11.1	9.9	10.0	R	-	-
	MP_POL_RSC-53_2024-09	5.7	5.2	1.3	R	-	-
	MP_POL_RSC-54_2024-09	8.1	7.1	3.8	R	-	-
	MP_POL_RSC-55_2024-09	8.5	5.0	4.5	R	Black spot	-
	MP_POL_RSC-56_2024-09	12.0	10.8	12.5	R	Black spot	-
	MP_POL_RSC-57_2024-09	10.0	8.9	8.3	R	-	-
	MP_POL_RSC-58_2024-09	11.0	9.8	10.8	R	-	-
	MP_POL_RSC-59_2024-09	12.4	11.3	16.3	R	-	-
	MP_POL_RSC-60_2024-09	10.5	9.4	8.8	R	Black spot	-
	MP_POL_RSC-61_2024-09	7.9	7.2	4.0	R	Black spot	-
	MP_POL_RSC-62_2024-09	9.0	8.2	5.5	R	Black spot	-
	MP_POL_RSC-63_2024-09	10.0	9.0	6.3	R	-	-
	MP_POL_RSC-64_2024-09	8.2	7.4	4.8	R	Black spot	Ripped caudal fin
	MP_POL_RSC-65_2024-09	12.0	10.7	13.5	R	Black spot	-
	MP_POL_RSC-66_2024-09	10.5	9.6	8.0	R	-	-
	MP_POL_RSC-67_2024-09	9.7	8.6	6.8	R	Black spot	-
	MP_POL_RSC-68_2024-09	9.0	8.2	5.3	R	Black spot	-
	MP_POL_RSC-69_2024-09	11.3	10.1	10.5	R	-	-
	MP_POL_RSC-70_2024-09	8.4	7.6	4.5	R	-	-

Notes: "-" = no comment, RSC = Redside Shiner, R = released, M = mortality.

Table C.6.9: Physical Measurements of Redside Shiner Caught for Non-Destructive Sampling from Polley Lake (POL; Exposed), September 2024

Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Fate	Abnormalities	Observations
25-Sep-24	MP_POL_RSC-71_2024-09	11.0	10.2	11.3	R	Black spot	-
	MP_POL_RSC-72_2024-09	11.7	10.3	12.5	R	Black spot, yellow tongue growth (possibly gill lice)	-
	MP_POL_RSC-73_2024-09	7.5	6.7	3.3	R	-	-
	MP_POL_RSC-74_2024-09	11.5	10.4	13.5	R	-	-
	MP_POL_RSC-75_2024-09	12.5	11.3	16.0	R	-	-
	MP_POL_RSC-76_2024-09	6.9	6.2	2.8	R	-	-
	MP_POL_RSC-77_2024-09	9.6	8.5	6.5	R	Black spot	-
	MP_POL_RSC-78_2024-09	9.3	8.3	5.0	R	Black spot	-
	MP_POL_RSC-79_2024-09	10.5	9.4	9.5	R	-	-
	MP_POL_RSC-80_2024-09	12.1	10.8	12.5	R	Black spot	-
	MP_POL_RSC-81_2024-09	9.9	8.7	8.3	R	Black spot	-
	MP_POL_RSC-82_2024-09	10.3	9.3	9.8	R	Black spot	-
	MP_POL_RSC-83_2024-09	10.5	9.3	7.5	R	Black spot	-
	MP_POL_RSC-84_2024-09	9.0	8.3	6.0	R	Black spot	-
	MP_POL_RSC-85_2024-09	11.0	9.9	9.8	R	Black spot	-
	MP_POL_RSC-86_2024-09	9.1	8.3	5.8	R	-	-
	MP_POL_RSC-87_2024-09	11.0	10.1	10.8	R	-	-
	MP_POL_RSC-88_2024-09	8.6	7.5	4.8	R	-	-
	MP_POL_RSC-89_2024-09	9.6	8.7	7.0	R	-	-
	MP_POL_RSC-90_2024-09	12.0	10.8	15.0	R	Black spot	-
	MP_POL_RSC-91_2024-09	9.0	8.0	7.0	R	-	-
	MP_POL_RSC-92_2024-09	8.0	7.0	3.8	R	-	-
	MP_POL_RSC-93_2024-09	12.6	11.4	22.0	R	Yellow tongue growth (possibly gill lice)	-
	MP_POL_RSC-94_2024-09	7.5	6.6	3.0	R	Black spot	-
	MP_POL_RSC-95_2024-09	9.6	8.6	7.3	R	-	-
	MP_POL_RSC-96_2024-09	10.5	9.2	10.0	R	-	-
	MP_POL_RSC-97_2024-09	10.0	9.2	6.3	R	-	-
	MP_POL_RSC-98_2024-09	10.5	9.7	8.5	R	-	-
	MP_POL_RSC-99_2024-09	8.7	8.0	5.3	R	-	-
	MP_POL_RSC-100_2024-09	8.3	7.4	4.3	R	-	-
	MP_POL_RSC-101_2024-09	12.2	11.0	14.3	R	-	-
	MP_POL_RSC-102_2024-09	9.0	8.1	5.0	R	-	-
	MP_POL_RSC-103_2024-09	7.8	7.0	3.8	R	-	-
	MP_POL_RSC-104_2024-09	9	8.2	5.0	R	-	-
	MP_POL_RSC-105_2024-09	9.6	8.7	7.0	R	Black spot	-
	MP_POL_RSC-106_2024-09	8.1	7.2	4.0	R	-	-
Sample Size (n)		**106**	**106**	**106**			
Average		**10.1**	**9.1**	**8.9**			
Median		**10.3**	**9.3**	**8**			
Standard Deviation		**1.6**	**1.6**	**4.5**			
Minimum		**5.7**	**5.0**	**1.3**			
Maximum		**13.2**	**11.9**	**22.0**			

Notes: "-" = no comment, RSC = Redside Shiner, R = released, M = mortality.

Table C.6.10: Physical Measurements of Longnose Sucker Retained for Tissue Quality Sampling from Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), Spring 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Age Structure Collected[a]	Age (years)	Sex[b]	Liver Weight (g)	Gonad Weight (g)	Kidney Weight (g)	Tissue Collected[c]	Abnormalities
Bootjack Lake (Reference)	28-Apr-24	MP_BOL_LSU-1_2024-04	47.8	44.6	1,240	PF, SC	12	F	27.657	197.919	7.132	M, O, L, K	None
		MP_BOL_LSU-2_2024-04	48.5	45.7	1,240	PF, SC	10	F	22.458	151.371	8.838	M, O, L, K	None
		MP_BOL_LSU-3_2024-04	45.2	42.7	1,100	PF, SC	8	F	16.919	153.900	4.199	M, O, L, K	Blood clot, worms
		MP_BOL_LSU-4_2024-04	47.5	44.7	1,300	PF, SC	10	F	26.934	144.060	7.947	M, O, L, K	None
		MP_BOL_LSU-5_2024-04	47.3	44.7	1,310	PF, SC	10	F	20.642	230.678	10.687	M, O, L, K	None
	2-May-24	MP_BOL_LSU-6_2024-05	39.1	37.4	740	PF, SC	6	F	23.481	7.963	4.348	M, O, L, K	Ovary tissue undifferentiated
		MP_BOL_LSU-7_2024-05	45.5	42.9	1,200	PF, SC	10	F	27.222	196.538	8.168	M, O, L, K	None
		MP_BOL_LSU-8_2024-05	49.7	48.2	1,520	PF, SC	10	F	22.842	240.958	19.281	M, O, L, K	None
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**8**	**8**		
		Average	**46.3**	**43.9**	**1,206**		**10**		**23.519**	**165.423**	**8.825**		
		Median	**47.4**	**44.7**	**1,240**		**10**		**23.162**	**175.219**	**8.058**		
		Standard Deviation	**3.3**	**3.1**	**223**		**2**		**3.70**	**73.3**	**4.76**		
		Minimum	**39.1**	**37.4**	**740**		**6**		**16.919**	**7.963**	**4.199**		
		Maximum	**49.7**	**48.2**	**1,520**		**12**		**27.657**	**240.958**	**19.281**		
Polley Lake (Exposed)	25-Apr-24	MP_POL_LSU-1_2024-04	33.6	31.8	360	PF, SC	5	F	6.243	37.358	1.681	M, O, L, K	Black spot
		MP_POL_LSU-2_2024-04	39.0	36.5	600	PF, SC	6	F	10.405	144.604	2.546	M, O, L, K	Black spot
	27-Apr-24	MP_POL_LSU-3_2024-04	30.2	28.3	260	PF, SC	5	F	7.599	38.762	1.639	M, O, L, K	Worms, black spot
		MP_POL_LSU-4_2024-04	32.0	30.0	290	PF, SC	5	F	7.057	38.618	1.768	M, O, L, K	None
		MP_POL_LSU-5_2024-04	37.1	34.4	445	PF, SC	6	F	10.362	58.900	2.325	M, O, L, K	Black spot
		MP_POL_LSU-6_2024-04	35.0	32.5	410	PF, SC	6	F	12.018	51.120	2.567	M, O, L, K	None
		MP_POL_LSU-7_2024-04	49.1	46.1	1,200	PF, SC	11	F	20.176	201.211	3.714	M, O, L, K	None
		MP_POL_LSU-8_2024-04	30.8	28.9	285	PF, SC	3	F	7.446	35.194	2.982	M, O, L, K	Worms
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**8**	**8**		
		Average	**35.9**	**33.6**	**481**		**6**		**10.163**	**75.721**	**2.403**		
		Median	**34.3**	**32.2**	**385**		**6**		**8.981**	**44.941**	**2.436**		
		Standard Deviation	**6.2**	**5.8**	**311**		**2**		**4.52**	**62.38**	**0.72**		
		Minimum	**30.2**	**28.3**	**260**		**3**		**6.243**	**35.194**	**1.639**		
		Maximum	**49.1**	**46.1**	**1200**		**11**		**20.176**	**201.211**	**3.714**		

Notes: LSU = longnose sucker, cm = centimeters, g = grams.

[a] PF = pectoral fin, SC = scales.

[b] F = female.

[c] M = muscle, O = ovary, L = liver, K = kidney.

Table C.6.11: Physical Measurements of Rainbow Trout Retained for Tissue Quality Sampling from Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), Spring 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Weight (g)	Age Structure Collected[a]	Age (Years)	Sex[b]	Liver Weight (g)	Gonad Weight (g)	Kidney Weight (g)	Tissue Collected[c]	Abnormalities
Bootjack Lake (Reference)	26-Apr-24	MP_BOL_RB-1_2024-04	33.5	32.1	300	OTO, SC	5	F	4.550	18.666	2.655	M, O, L, K	Worms
		MP_BOL_RB-2_2024-04	33.8	32.5	440	OTO, SC	6	F	6.497	44.524	8.591	M, O, L, K	None
		MP_BOL_RB-3_2024-04	32.6	31.4	320	OTO, SC	5	F	2.817	45.497	1.600	M, O, L, K	Only 1 otolith collected
		MP_BOL_RB-4_2024-04	35.6	33.9	400	OTO, SC	5	F	3.688	62.591	3.171	M, O, L, K	Worms
		MP_BOL_RB-5_2024-04	30.0	28.2	260	OTO, SC	4	F	2.018	37.997	1.819	M, O, L, K	Worms
		MP_BOL_RB-6_2024-04	34.9	33.3	390	OTO, SC	5	F	3.792	53.325	2.173	M, O, L, K	Worms
		MP_BOL_RB-7_2024-04	33.0	28.8	270	OTO, SC	4	F	5.655	29.527	3.158	M, O, L, K	Gill lice
		MP_BOL_RB-8_2024-04	30.4	28.5	275	OTO, SC	4	F	6.674	31.149	3.442	M, O, L, K	Worms
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**8**	**8**		
		Average	**33.0**	**31.1**	**332**		**5**		**4.461**	**40.410**	**3.326**		
		Median	**33.3**	**31.8**	**310**		**5**		**4.171**	**41.261**	**2.907**		
		Standard Deviation	**2.0**	**2.3**	**69**		**1**		**1.70**	**14.06**	**2.23**		
		Minimum	**30.0**	**28.2**	**260**		**4**		**2.018**	**18.666**	**1.600**		
		Maximum	**35.6**	**33.9**	**440**		**6**		**6.674**	**62.591**	**8.591**		
Polley Lake (Exposed)	25-Apr-24	MP_POL_RB-1_2024-04	37.2	35.0	380	OTO, SC	6	F	3.825	39.147	2.823	M, O, L, K	None
		MP_POL_RB-2_2024-04	31.1	29.9	300	OTO, SC	4	F	3.143	48.051	2.327	M, O, L, K	Worms
		MP_POL_RB-3_2024-04	32.5	31.2	300	OTO, SC	4	F	2.524	39.610	2.818	M, O, L, K	None
		MP_POL_RB-4_2024-04	32.9	31.2	340	OTO, SC	5	F	4.015	33.685	2.540	M, O, L, K	Only 1 otolith collected; worms
		MP_POL_RB-5_2024-04	31.2	29.5	260	OTO, SC	6	F	2.746	24.121	2.490	M, O, L, K	Worms
		MP_POL_RB-6_2024-04	32.0	30.1	260	OTO, SC	5	F	4.422	33.494	2.712	M, O, L, K	Tapeworms, cysts
		MP_POL_RB-7_2024-04	28.4	26.6	200	OTO, SC	4	F	2.163	34.326	1.668	M, O, L, K	Worms
		MP_POL_RB-8_2024-04	28.1	26.5	200	OTO, SC	4	F	1.859	27.002	2.046	M, O, L, K	Worms
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**8**	**8**		
		Average	**31.7**	**30.0**	**280**		**5**		**3.087**	**34.930**	**2.428**		
		Median	**31.6**	**30.0**	**280**		**5**		**2.945**	**34.006**	**2.515**		
		Standard Deviation	**2.9**	**2.7**	**63**		**1**		**0.92**	**7.52**	**0.40**		
		Minimum	**28.1**	**26.5**	**200**		**4**		**1.859**	**24.121**	**1.668**		
		Maximum	**37.2**	**35.0**	**380**		**6**		**4.422**	**48.051**	**2.823**		

Notes: RB = rainbow trout, cm = centimeters, g = grams.

[a] OTO = otoliths, SC = scales.

[b] F = female.

[c] M = muscle, O = ovary, L = liver, K = kidney.

Table C.6.12: Hoop Net Catch Data from the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, October 2024

Area		Net ID	UTM (NAD83, Zone 10U)		Set Date	Lift Date	Set Time	Lift Time	Depth Range (m)		Effort (days)	Net Diameter (ft)	Bull Trout					Burbot					Kokanee					Largescale Sucker					Longnose Sucker					Mountain Whitefish				
			Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
near Grain Creek (Reference)		MP_QUL-NGC_HN-1_2024-10	633284	5828877	17-Oct-24	19-Oct-24	12:45	10:00	1	1.5	1.89	2.5	0	0	0	0	0	0	0	0	0	0	4	0	0	4	2.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-2_2024-10	633246	5828890	17-Oct-24	19-Oct-24	12:05	10:21	1	1.5	1.93	2.5	0	0	0	0	0	2	0	0	2	1.04	1	0	0	1	0.519	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-3_2024-10	633218	5828886	17-Oct-24	19-Oct-24	13:30	10:45	0	1.8	1.89	2.5	1	0	0	1	0.530	0	0	0	0	0	66	0	7	59	35.0	3	0	0	3	1.59	0	0	0	0	0	1	0	1	0	0.530
		MP_QUL-NGC_HN-4_2024-10	633284	5828877	19-Oct-24	20-Oct-24	10:15	9:19	1	1.5	0.96	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-5_2024-10	633246	5828890	19-Oct-24	20-Oct-24	10:40	9:25	1	1.5	0.95	2.5	0	0	0	0	0	0	0	0	0	0	3	0	2	1	3.16	0	0	0	0	0	3	0	0	3	3.16	1	0	0	1	1.05
		MP_QUL-NGC_HN-6_2024-10	633218	5828886	19-Oct-24	20-Oct-24	11:15	9:45	0.5	1.8	0.94	2.5	0	0	0	0	0	1	0	0	1	1.07	24	0	0	24	25.6	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3.20
		MP_QUL-NGC_HN-7_2024-10	633284	5828877	20-Oct-24	22-Oct-24	9:23	9:05	0	2.0	1.99	2.5	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-8_2024-10	633246	5828890	20-Oct-24	22-Oct-24	10:28	9:22	0	1.8	1.95	2.5	0	0	0	0	0	0	0	0	0	0	12	0	0	12	6.14	2	0	0	2	1.02	0	0	0	0	0	1	0	0	1	0.512
		MP_QUL-NGC_HN-9_2024-10	633402	5828868	20-Oct-24	22-Oct-24	10:21	9:40	0	1.8	1.97	2.5	1	0	0	1	0.507	0	0	0	0	0	18	0	0	18	9.13	3	0	0	3	1.52	0	0	0	0	0	1	0	0	1	0.507
		MP_QUL-NGC_HN-10_2024-10	633284	5828877	22-Oct-24	23-Oct-24	9:15	9:52	0	2.0	1.03	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.975	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-11_2024-10	633246	5828890	22-Oct-24	23-Oct-24	9:32	9:55	0	1.8	1.02	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-12_2024-10	633402	5828868	22-Oct-24	23-Oct-24	10:05	10:00	0	1.8	1.00	2.5	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4.01	0	0	0	0	0	1	0	0	1	1.00	1	0	0	1	1.00
		MP_QUL-NGC_HN-13_2024-10	633284	5828877	23-Oct-24	24-Oct-24	11:01	10:01	0	1.8	0.96	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-14_2024-10	633246	5828890	23-Oct-24	24-Oct-24	10:58	9:32	0	1.8	0.94	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-15_2024-10	633402	5828868	23-Oct-24	24-Oct-24	10:52	9:45	0	1.8	0.95	2.5	0	0	0	0	0	1	0	0	1	1.05	5	0	0	5	5.24	3	0	0	3	3.15	1	0	0	1	1.05	2	0	0	2	2.10
		MP_QUL-NGC_HN-16_2024-10	633358	5828866	23-Oct-24	24-Oct-24	10:45	9:35	0	1.6	0.95	2.0	0	0	0	0	0	1	0	0	1	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-17_2024-10	633284	5828877	24-Oct-24	27-Oct-24	10:05	9:21	0	1.8	2.97	2.5	0	0	0	0	0	1	0	0	1	0.337	1	0	0	1	0.337	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-18_2024-10	633246	5828890	24-Oct-24	27-Oct-24	10:09	9:32	0	1.8	2.97	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NGC_HN-19_2024-10	633402	5828868	24-Oct-24	27-Oct-24	10:17	10:00	0	1.9	2.99	2.5	0	0	0	0	0	0	0	0	0	0	14	0	0	14	4.69	1	0	0	1	0.335	0	0	0	0	0	3	0	0	3	1.00
		MP_QUL-NGC_HN-20_2024-10	633358	5828866	24-Oct-24	27-Oct-24	10:19	9:48	0	1.6	2.98	2.0	0	0	0	0	0	1	0	0	1	0.336	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.336	0	0	0	0	0
										Total	**33.2**	-	**2**	**0**	**0**	**2**	**0.0602**	**7**	**0**	**0**	**7**	**0.211**	**157**	**0**	**9**	**148**	**4.73**	**12**	**0**	**0**	**12**	**0.361**	**6**	**0**	**0**	**6**	**0.181**	**13**	**0**	**1**	**12**	**0.391**
Quesnel Lake	near Hazeltine Creek (Exposed)	MP_QUL-NHC_HN-1_2024-10	602376	5817480	16-Oct-24	17-Oct-24	17:05	15:45	1	9.1	0.94	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2.12	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-2_2024-10	602304	5817468	16-Oct-24	19-Oct-24	17:40	10:58	0	2.8	2.72	2.5	0	0	0	0	0	2	0	0	2	0.735	0	0	0	0	0	1	0	0	1	0.368	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-3_2024-10	602410	5817397	16-Oct-24	19-Oct-24	17:55	11:20	0	2.7	2.73	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-4_2024-10	602383	5817428	17-Oct-24	19-Oct-24	16:05	11:41	0	1.9	1.82	2.5	0	0	0	0	0	2	0	2	0	1.10	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1.65	1	0	1	0	0.550
		MP_QUL-NHC_HN-5_2024-10	602255	5817493	19-Oct-24	20-Oct-24	12:25	11:55	0	1.8	0.98	2.5	0	0	0	0	0	1	0	0	1	1.02	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.02	0	0	0	0	0
		MP_QUL-NHC_HN-6_2024-10	602162	5817516	19-Oct-24	20-Oct-24	12:40	12:07	0	1.8	0.98	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-7_2024-10	602304	5817468	19-Oct-24	20-Oct-24	11:11	11:47	0	1.8	1.03	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	10.7	0	0	0	0	0
		MP_QUL-NHC_HN-8_2024-10	602304	5817468	20-Oct-24	22-Oct-24	11:50	11:45	0	1.8	2.00	2.5	0	0	0	0	0	1	0	0	1	0.501	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-9_2024-10	602255	5817493	20-Oct-24	22-Oct-24	12:05	11:55	0	3.0	1.99	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	14	7.02	0	0	0	0	0
		MP_QUL-NHC_HN-10_2024-10	602162	5817516	20-Oct-24	22-Oct-24	12:10	12:05	0	2.0	2.00	2.5	0	0	0	0	0	1	0	0	1	0.501	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.501	0	0	0	0	0
		MP_QUL-NHC_HN-11_2024-10	602304	5817468	22-Oct-24	23-Oct-24	11:49	12:02	0	1.8	1.01	2.5	0	0	0	0	0	1	0	0	1	0.991	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1.98	0	0	0	0	0
		MP_QUL-NHC_HN-12_2024-10	602255	5817493	22-Oct-24	23-Oct-24	12:00	12:06	0	1.8	1.00	2.5	0	0	0	0	0	1	0	0	1	0.996	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.996	0	0	0	0	0
		MP_QUL-NHC_HN-13_2024-10	602162	5817516	22-Oct-24	23-Oct-24	12:08	12:04	0	1.7	1.00	2.5	0	0	0	0	0	1	0	0	1	1.00	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.00	0	0	0	0	0
		MP_QUL-NHC_HN-14_2024-10	602104	5817507	22-Oct-24	23-Oct-24	12:35	12:18	1	1.6	0.99	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-15_2024-10	602304	5817468	23-Oct-24	24-Oct-24	13:10	11:35	0	1.8	0.93	2.5	0	0	0	0	0	1	0	0	1	1.07	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.07	0	0	0	0	0
		MP_QUL-NHC_HN-16_2024-10	602255	5817493	23-Oct-24	24-Oct-24	13:06	11:38	0	1.8	0.94	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-17_2024-10	602162	5817516	23-Oct-24	24-Oct-24	13:03	11:49	0	1.7	0.95	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.05	0	0	0	0	0
		MP_QUL-NHC_HN-18_2024-10	602104	5817507	23-Oct-24	24-Oct-24	12:35	12:00	0	1.6	0.98	2.0	0	0	0	0	0	2	0	0	2	2.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-19_2024-10	602287	5817470	23-Oct-24	24-Oct-24	13:43	11:34	0	1.5	0.91	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-20_2024-10	602304	5817468	24-Oct-24	25-Oct-24	12:20	9:54	0	1.8	0.90	2.5	0	0	0	0	0	1	0	0	1	1.11	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2.23	0	0	0	0	0
		MP_QUL-NHC_HN-21_2024-10	602255	5817493	24-Oct-24	25-Oct-24	12:03	10:10	0	1.8	0.92	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	31	33.6	0	0	0	0	0
		MP_QUL-NHC_HN-22_2024-10	602162	5817516	24-Oct-24	25-Oct-24	12:30	10:15	0	3.5	0.91	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-23_2024-10	602104	5817507	24-Oct-24	25-Oct-24	11:36	10:25	0	1.6	0.95	2.0	0	0	0	0	0	1	0	0	1	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-24_2024-10	602287	5817470	24-Oct-24	25-Oct-24	12:03	10:01	0	1.6	0.92	2.0	0	0	0	0	0	1	0	0	1	1.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-25_2024-10	602304	5817468	25-Oct-24	26-Oct-24	10:41	9:00	0	3.0	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.08	0	0	0	0	0
		MP_QUL-NHC_HN-26_2024-10	602287	5817470	25-Oct-24	26-Oct-24	10:48	9:10	0	2.0	0.93	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-27_2024-10	602255	5817493	25-Oct-24	26-Oct-24	10:52	9:14	0	4.0	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-28_2024-10	602162	5817516	25-Oct-24	26-Oct-24	10:56	9:20	0	3.5	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NHC_HN-29_2024-10	602104	5817507	25-Oct-24	26-Oct-24	11:01	9:25	0	2.4	0.93	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2.14	0	0	0	0	0
										Total	**35.1**	-	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**2**	**14**	**0.455**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**0.0854**	**72**	**0**	**3**	**69**	**2.05**	**1**	**0**	**1**	**0**	**0.0285**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datu. CPUE = catch-per-unit-effort. YOY = Young-of-the-year.

[a] CPUE = number of fish caught per day of fishing effort. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (total fishing effort [days]).

[b] Several YOY fish were captured and could not be identified to species. These YOY fish from MP_QUL-NGC_HN-16_2024-10 were identified as subfamily Leuciscinae (i.e., peamouth chub or redside shiner). The YOY fish from other nets were too small to classify.

Table C.6.12: Hoop Net Catch Data from the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, October 2024

Area	Net ID	UTM (NAD83, Zone 10U)		Set Date	Lift Date	Set Time	Lift Time	Depth Range (m)		Effort (days)	Net Diameter (ft)	Northern Pikeminnow					Peamouth Chub					Rainbow Trout					Redside Shiner					Sockeye Salmon					Unknown YOY[b]				
		Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
near Grain Creek (Reference)	MP_QUL-NGC_HN-1_2024-10	633284	5828877	17-Oct-24	19-Oct-24	12:45	10:00	1	1.5	1.89	2.5	1	1	0	0	0.530	6	6	0	0	3.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-2_2024-10	633246	5828890	17-Oct-24	19-Oct-24	12:05	10:21	1	1.5	1.93	2.5	1	1	0	0	0.519	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-3_2024-10	633218	5828886	17-Oct-24	19-Oct-24	13:30	10:45	0	1.8	1.89	2.5	1	1	0	0	0.530	0	0	0	0	0	2	0	2	0	1.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-4_2024-10	633284	5828877	19-Oct-24	20-Oct-24	10:15	9:19	1	1.5	0.96	2.5	2	2	0	0	2.08	1	1	0	0	1.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-5_2024-10	633246	5828890	19-Oct-24	20-Oct-24	10:40	9:25	1	1.5	0.95	2.5	2	2	0	0	2.11	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.05	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-6_2024-10	633218	5828886	19-Oct-24	20-Oct-24	11:15	9:45	0.5	1.8	0.94	2.5	1	1	0	0	1.07	1	0	1	0	1.07	1	0	0	1	1.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-7_2024-10	633284	5828877	20-Oct-24	22-Oct-24	9:23	9:05	0	2.0	1.99	2.5	1	0	0	1	0.503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-8_2024-10	633246	5828890	20-Oct-24	22-Oct-24	10:28	9:22	0	1.8	1.95	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.512	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-9_2024-10	633402	5828868	20-Oct-24	22-Oct-24	10:21	9:40	0	1.8	1.97	2.5	1	0	0	1	0.507	1	1	0	0	0.507	3	0	0	3	1.52	0	0	0	0	0	1	0	0	1	0.507	0	0	0	0
	MP_QUL-NGC_HN-10_2024-10	633284	5828877	22-Oct-24	23-Oct-24	9:15	9:52	0	2.0	1.03	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-11_2024-10	633246	5828890	22-Oct-24	23-Oct-24	9:32	9:55	0	1.8	1.02	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-12_2024-10	633402	5828868	22-Oct-24	23-Oct-24	10:05	10:00	0	1.8	1.00	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-13_2024-10	633284	5828877	23-Oct-24	24-Oct-24	11:01	10:01	0	1.8	0.96	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-14_2024-10	633246	5828890	23-Oct-24	24-Oct-24	10:58	9:32	0	1.8	0.94	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-15_2024-10	633402	5828868	23-Oct-24	24-Oct-24	10:52	9:45	0	1.8	0.95	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-16_2024-10	633358	5828866	23-Oct-24	24-Oct-24	10:45	9:35	0	1.6	0.95	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3.15	0	0	0	0	0	1	0	0	1	1.05
	MP_QUL-NGC_HN-17_2024-10	633284	5828877	24-Oct-24	27-Oct-24	10:05	9:21	0	1.8	2.97	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-18_2024-10	633246	5828890	24-Oct-24	27-Oct-24	10:09	9:32	0	1.8	2.97	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-19_2024-10	633402	5828868	24-Oct-24	27-Oct-24	10:17	10:00	0	1.9	2.99	2.5	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.335	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_HN-20_2024-10	633358	5828866	24-Oct-24	27-Oct-24	10:19	9:48	0	1.6	2.98	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.336	0	0	0	0	0	0	0	0	0	0
									Total	**33.2**	-	**10**	**8**	**0**	**2**	**0.301**	**9**	**8**	**1**	**0**	**0.271**	**10**	**0**	**2**	**8**	**0.301**	**5**	**0**	**0**	**5**	**0.151**	**1**	**0**	**0**	**1**	**0.0301**	**1**	**0**	**0**	**1**	**0.0301**
Quesnel Lake near Hazeltine Creek (Exposed)	MP_QUL-NHC_HN-1_2024-10	602376	5817480	16-Oct-24	17-Oct-24	17:05	15:45	1	9.1	0.94	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-2_2024-10	602304	5817468	16-Oct-24	19-Oct-24	17:40	10:58	0	2.8	2.72	2.5	3	3	0	0	1.10	2	2	0	0	0.735	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-3_2024-10	602410	5817397	16-Oct-24	19-Oct-24	17:55	11:20	0	2.7	2.73	2.5	1	0	1	0	0.367	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-4_2024-10	602383	5817428	17-Oct-24	19-Oct-24	16:05	11:41	0	1.9	1.82	2.5	12	0	12	0	6.61	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1.65	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-5_2024-10	602255	5817493	19-Oct-24	20-Oct-24	12:25	11:55	0	1.8	0.98	2.5	0	0	0	0	0	1	1	0	0	1.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-6_2024-10	602162	5817516	19-Oct-24	20-Oct-24	12:40	12:07	0	1.8	0.98	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-7_2024-10	602304	5817468	19-Oct-24	20-Oct-24	11:11	11:47	0	1.8	1.03	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-8_2024-10	602304	5817468	20-Oct-24	22-Oct-24	11:50	11:45	0	1.8	2.00	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-9_2024-10	602255	5817493	20-Oct-24	22-Oct-24	12:05	11:55	0	3.0	1.99	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-10_2024-10	602162	5817516	20-Oct-24	22-Oct-24	12:10	12:05	0	2.0	2.00	2.5	2	2	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-11_2024-10	602304	5817468	22-Oct-24	23-Oct-24	11:49	12:02	0	1.8	1.01	2.5	0	0	0	0	0	1	1	0	0	0.991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-12_2024-10	602255	5817493	22-Oct-24	23-Oct-24	12:00	12:06	0	1.8	1.00	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-13_2024-10	602162	5817516	22-Oct-24	23-Oct-24	12:08	12:04	0	1.7	1.00	2.5	3	3	0	0	3.01	1	1	0	0	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-14_2024-10	602104	5817507	22-Oct-24	23-Oct-24	12:35	12:18	1	1.6	0.99	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-15_2024-10	602304	5817468	23-Oct-24	24-Oct-24	13:10	11:35	0	1.8	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-16_2024-10	602255	5817493	23-Oct-24	24-Oct-24	13:06	11:38	0	1.8	0.94	2.5	1	0	0	1	1.07	1	1	0	0	1.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-17_2024-10	602162	5817516	23-Oct-24	24-Oct-24	13:03	11:49	0	1.7	0.95	2.5	1	0	0	1	1.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-18_2024-10	602104	5817507	23-Oct-24	24-Oct-24	12:35	12:00	0	1.6	0.98	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-19_2024-10	602287	5817470	23-Oct-24	24-Oct-24	13:43	11:34	0	1.5	0.91	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-20_2024-10	602304	5817468	24-Oct-24	25-Oct-24	12:20	9:54	0	1.8	0.90	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-21_2024-10	602255	5817493	24-Oct-24	25-Oct-24	12:03	10:10	0	1.8	0.92	2.5	1	0	0	1	1.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-22_2024-10	602162	5817516	24-Oct-24	25-Oct-24	12:30	10:15	0	3.5	0.91	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-23_2024-10	602104	5817507	24-Oct-24	25-Oct-24	11:36	10:25	0	1.6	0.95	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1.05
	MP_QUL-NHC_HN-24_2024-10	602287	5817470	24-Oct-24	25-Oct-24	12:03	10:01	0	1.6	0.92	2.0	1	0	0	1	1.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1.09
	MP_QUL-NHC_HN-25_2024-10	602304	5817468	25-Oct-24	26-Oct-24	10:41	9:00	0	3.0	0.93	2.5	1	0	0	1	1.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-26_2024-10	602287	5817470	25-Oct-24	26-Oct-24	10:48	9:10	0	2.0	0.93	2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-27_2024-10	602255	5817493	25-Oct-24	26-Oct-24	10:52	9:14	0	4.0	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-28_2024-10	602162	5817516	25-Oct-24	26-Oct-24	10:56	9:20	0	3.5	0.93	2.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_HN-29_2024-10	602104	5817507	25-Oct-24	26-Oct-24	11:01	9:25	0	2.4	0.93	2.0	3	0	0	3	3.21	7	7	0	0	7.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
									Total	**35.1**	-	**29**	**8**	**13**	**8**	**0.825**	**13**	**13**	**0**	**0**	**0.370**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**0**	**0.0854**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0.0569**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datu. CPUE = catch-per-unit-effort. YOY = Young-of-the-year.

[a] CPUE = number of fish caught per day of fishing effort. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (total fishing effort [days]).

[b] Several YOY fish were captured and could not be identified to species. These YOY fish from MP_QUL-NGC_HN-16_2024-10 were identified as subfamily Leuciscinae (i.e., peamouth chub or redside shiner). The YOY fish from other nets were too small to classify.

Table C.6.13: Gill Net Catch Data from the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, October 2024

Area		Net ID	UTM (NAD83, Zone 10U)		Depth Range (m)		Set Date	Lift Date	Set Time	Lift Time	Effort (Hrs)	Mesh (inches)	Lake Trout					Largescale Sucker					Longnose Sucker					Kokanee				
			Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Quesnel Lake	East Arm (Reference)	MP_QUL-EAA_GN-1_2024-10	677555	5832657	14.33	15.85	21-Oct-24	21-Oct-24	9:40	10:49	1.15	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	2	2	0	0	0.0624	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-2_2024-10	677085	5832524	15.24	21.34	21-Oct-24	21-Oct-24	9:57	11:02	1.08	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.0331	0	0	0	0	0
												5	5	5	0	0	0.166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-3_2024-10	676349	5832370	14.94	23.47	21-Oct-24	21-Oct-24	10:20	11:18	0.967	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-4_2024-10	676213	5832300	12.5	18.29	21-Oct-24	21-Oct-24	10:30	11:29	0.983	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-5_2024-10	677534	5832671	13.11	15.85	21-Oct-24	21-Oct-24	11:35	12:21	0.767	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-6_2024-10	676976	5832519	14.02	21.33	21-Oct-24	21-Oct-24	11:45	12:40	0.917	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	3	1	0	2	0.117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-7_2024-10	677527	5832619	11.58	35.05	21-Oct-24	21-Oct-24	12:20	12:50	0.500	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										Total	6.37	-	**10**	**8**	**0**	**2**	**0.00268**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0.000268**	**0**	**0**	**0**	**0**	**0**
	near Cedar Point (Exposed)	MP_QUL-NCP_GN-1_2024-10	598868	5827191	8	23	16-Oct-24	16-Oct-24	16:58	17:56	0.967	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-2_2024-10	598888	5827067	17	21	16-Oct-24	16-Oct-24	17:27	18:20	0.883	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-3_2024-10	598702	5827452	17	29	17-Oct-24	17-Oct-24	9:22	10:32	1.17	3	1	1	0	0	0.0406	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-4_2024-10	598667	5827991	11	22	17-Oct-24	17-Oct-24	9:31	10:45	1.23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-5_2024-10	598810	5827141	18	22	17-Oct-24	17-Oct-24	10:00	11:00	1.00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-6_2024-10	598735	5827428	17	29	17-Oct-24	17-Oct-24	10:33	11:25	0.867	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-7_2024-10	598603	5827541	9	23	17-Oct-24	17-Oct-24	12:00	13:16	1.27	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-8_2024-10	598657	5827711	9	28	17-Oct-24	17-Oct-24	12:15	13:30	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-9_2024-10	598543	5827867	8	12	17-Oct-24	17-Oct-24	12:20	13:46	1.43	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-10_2024-10	598571	5827647	9	13	17-Oct-24	17-Oct-24	13:25	14:40	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-11_2024-10[b]	598549	5827815	8	13	17-Oct-24	17-Oct-24	13:41	17:10	3.48	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: UTM = Universal Transverse Mercator, NAD = North American Datum, CPUE = catch-per-unit-effort, QUL = Quesnel, GN = gill net.

[a] CPUE = number of fish per m^2 per hour (# fish/[m^2 x hour]).

[b] Gill net set duration exceeded 1.5 h stipulated in the Department of Fisheries and Oceans (DFO) permit XR 145 2024 due to field crew safety concerns. DFO was notified of the situation and permitted the crew to leave nets in the water until conditions were considered safe for gill net retrieval.

Table C.6.13: Gill Net Catch Data from the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, October 2024

Area		Net ID	UTM (NAD83, Zone 10U)		Depth Range (m)		Set Date	Lift Date	Set Time	Lift Time	Effort (Hrs)	Mesh (inches)	Lake Trout					Largescale Sucker					Longnose Sucker					Kokanee				
			Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Quesnel Lake	near Cedar Point (Exposed)	MP_QUL-NCP_GN-12_2024-10[b]	598538	5828018	9	16	17-Oct-24	17-Oct-24	13:53	17:20	3.45	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-13_2024-10[b]	598687	5827506	11	24	17-Oct-24	17-Oct-24	14:05	17:25	3.33	3	1	1	0	0	0.0108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-14_2024-10	599273	5822632	13	15	18-Oct-24	18-Oct-24	8:50	9:50	1.00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-15_2024-10	599333	5822155	17	22	18-Oct-24	18-Oct-24	9:10	10:20	1.17	3	1	1	0	0	0.0308	0	0	0	0	0	0	0	0	0	0	2	0	1	1	0.0615
												4	2	2	0	0	0.0615	1	0	0	1	0.0308	0	0	0	0	0	0	0	0	0	0
												5	1	1	0	0	0.0308	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-16_2024-10	599390	5821848	13	28	18-Oct-24	18-Oct-24	9:20	10:35	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	1	1	0	0	0.0287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-17_2024-10	599324	5823093	16	21	18-Oct-24	18-Oct-24	8:56	9:57	1.02	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-18_2024-10	599296	5823198	14	35	18-Oct-24	18-Oct-24	9:00	10:05	1.08	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	1	1	0	0	0.0331	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-19_2024-10	599230	5823381	16	31	18-Oct-24	18-Oct-24	9:06	10:13	1.12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										Total	28.2	-	8	0	0	0	0.000178	1	0	0	0	0.0000223	0	0	0	0	0	2	1	0	0	0.0000446

Notes: UTM = Universal Transverse Mercator, NAD = North American Datum, CPUE = catch-per-unit-effort, QUL = Quesnel, GN = gill net.

[a] CPUE = number of fish per m^2 per hour (# fish/[m^2 x hour]). CPUE is calculated for each fish species separately.

[b] Gill net set duration exceeded 1.5 h stipulated in the Department of Fisheries and Oceans (DFO) permit XR 145 2024 due to field crew safety concerns. DFO was notified of the situation and permitted the crew to leave nets in the water until conditions were considered safe for gill net retrieval.

Table C.6.13: Gill Net Catch Data from the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, October 2024

Area		Net ID	UTM (NAD83, Zone 10U)		Depth Range (m)		Set Date	Lift Date	Set Time	Lift Time	Effort (Hrs)	Mesh (inches)	Mountain Whitefish					Rainbow Trout					Sockeye Salmon				
			Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Quesnel Lake	East Arm (Reference)	MP_QUL-EAA_GN-1_2024-10	677555	5832657	14.33	15.85	21-Oct-24	21-Oct-24	9:40	10:49	1.15	3	1	0	0	1	0.0312	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-2_2024-10	677085	5832524	15.24	21.34	21-Oct-24	21-Oct-24	9:57	11:02	1.08	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-3_2024-10	676349	5832370	14.94	23.47	21-Oct-24	21-Oct-24	10:20	11:18	0.967	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-4_2024-10	676213	5832300	12.5	18.29	21-Oct-24	21-Oct-24	10:30	11:29	0.983	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-5_2024-10	677534	5832671	13.11	15.85	21-Oct-24	21-Oct-24	11:35	12:21	0.767	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-6_2024-10	676976	5832519	14.02	21.33	21-Oct-24	21-Oct-24	11:45	12:40	0.917	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-EAA_GN-7_2024-10	677527	5832619	11.58	35.05	21-Oct-24	21-Oct-24	12:20	12:50	0.500	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										Total	**6.37**	-	**1**	**0**	**0**	**1**	**0.000268**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	near Cedar Point (Exposed)	MP_QUL-NCP_GN-1_2024-10	598868	5827191	8	23	16-Oct-24	16-Oct-24	16:58	17:56	0.967	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-2_2024-10	598888	5827067	17	21	16-Oct-24	16-Oct-24	17:27	18:20	0.883	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-3_2024-10	598702	5827452	17	29	17-Oct-24	17-Oct-24	9:22	10:32	1.17	3	0	0	0	0	0	2	0	1	1	0.0812	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-4_2024-10	598667	5827991	11	22	17-Oct-24	17-Oct-24	9:31	10:45	1.23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-5_2024-10	598810	5827141	18	22	17-Oct-24	17-Oct-24	10:00	11:00	1.00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-6_2024-10	598735	5827428	17	29	17-Oct-24	17-Oct-24	10:33	11:25	0.867	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-7_2024-10	598603	5827541	9	23	17-Oct-24	17-Oct-24	12:00	13:16	1.27	3	0	0	0	0	0	2	0	0	2	0.0567	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-8_2024-10	598657	5827711	9	28	17-Oct-24	17-Oct-24	12:15	13:30	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	1	0	0	1	0.0287	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-9_2024-10	598543	5827867	8	12	17-Oct-24	17-Oct-24	12:20	13:46	1.43	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-10_2024-10	598571	5827647	9	13	17-Oct-24	17-Oct-24	13:25	14:40	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.0287
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-11_2024-10[b]	598549	5827815	8	13	17-Oct-24	17-Oct-24	13:41	17:10	3.48	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: UTM = Universal Transverse Mercator, NAD = North American Datum, CPUE = catch-per-unit-effort, QUL = Quesnel, GN = gill net.

[a] CPUE = number of fish per m^2 per hour (# fish/[m^2 x hour]).

[b] Gill net set duration exceeded 1.5 h stipulated in the Department of Fisheries and Oceans (DFO) permit XR 145 2024 due to field crew safety concerns. DFO was notified of the situation and permitted the crew to leave nets in the water until conditions were considered safe for gill net retrieval.

Table C.6.13: Gill Net Catch Data from the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, October 2024

Area		Net ID	UTM (NAD83, Zone 10U)		Depth Range (m)		Set Date	Lift Date	Set Time	Lift Time	Effort (Hrs)	Mesh (inches)	Mountain Whitefish					Rainbow Trout					Sockeye Salmon				
			Easting	Northing									Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Quesnel Lake	near Cedar Point (Exposed)	MP_QUL-NCP_GN-12_2024-10[b]	598538	5828018	9	16	17-Oct-24	17-Oct-24	13:53	17:20	3.45	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-13_2024-10[b]	598687	5827506	11	24	17-Oct-24	17-Oct-24	14:05	17:25	3.33	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-14_2024-10	599273	5822632	13	15	18-Oct-24	18-Oct-24	8:50	9:50	1.00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-15_2024-10	599333	5822155	17	22	18-Oct-24	18-Oct-24	9:10	10:20	1.17	3	0	0	0	0	0	1	0	1	0	0.0308	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-16_2024-10	599390	5821848	13	28	18-Oct-24	18-Oct-24	9:20	10:35	1.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-17_2024-10	599324	5823093	16	21	18-Oct-24	18-Oct-24	8:56	9:57	1.02	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-18_2024-10	599296	5823198	14	35	18-Oct-24	18-Oct-24	9:00	10:05	1.08	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MP_QUL-NCP_GN-19_2024-10	599230	5823381	16	31	18-Oct-24	18-Oct-24	9:06	10:13	1.12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
												5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
										Total	28.2	-	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**0**	**0**	**0.000134**	**1**	**1**	**0**	**0**	**0.0000223**

Notes: UTM = Universal Transverse Mercator, NAD = North American Datum, CPUE = catch-per-unit-effort, QUL = Quesnel, GN = gill net.

[a] CPUE = number of fish per m^2 per hour (# fish/[m^2 x hour]). CPUE is calculated for each fish species separately.

[b] Gill net set duration exceeded 1.5 h stipulated in the Department of Fisheries and Oceans (DFO) permit XR 145 2024 due to field crew safety concerns. DFO was notified of the situation and permitted the crew to leave nets in the water until conditions were considered safe for gill net retrieval.

Table C.6.14: Minnow Trap Catch Data from the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, October 2024

Area	Trap ID	UTM (NAD83, Zone 10U)		Depth Range (m)		Set Date	Lift Date	Set Time	Lift Time	Trap Hours (hrs)	# of Traps	Effort (trap*d)	Longnose Sucker					Northern Pikeminnow					Redside Shiner				
		Easting	Northing										Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]	Catch	Sacrificed	Mortalities	Released	CPUE[a]
Reference (near Grain Creek)	MP_QUL-NGC_MT-1_2024-10	633451	5828879	0.3	0.5	23-Oct-24	24-Oct-24	10:10	9:55	119	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NGC_MT-2_2024-10	633460	5828887	0.4	0.5	24-Oct-24	27-Oct-24	9:56	10:15	362	5	15	0	0	0	0	0	1	0	0	0	0.0664	0	0	0	0	0
	Total									**480**	**10**	**20**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0.0500**	**0**	**0**	**0**	**0**	**0**
Exposed (near Hazeltine Creek)	MP_QUL-NHC_MT-1_2024-10	602080	5817502	0.4	0.5	23-Oct-24	24-Oct-24	12:41	12:05	47	2	2	5	0	0	0	2.56	3	0	0	0	1.54	2	0	0	0	1.03
	MP_QUL-NHC_MT-2_2024-10	602124	5817508	0.4	0.6	23-Oct-24	24-Oct-24	12:58	11:51	69	3	3	1	0	0	0	0.350	7	0	0	0	2.45	5	0	0	0	1.75
	MP_QUL-NHC_MT-3_2024-10	602325	5817459	0.4	0.6	23-Oct-24	24-Oct-24	13:15	11:28	111	5	5	0	0	0	0	0	9	0	0	0	1.94	0	0	0	0	0
	MP_QUL-NHC_MT-4_2024-10	602127	5817507	0.6	0.7	24-Oct-24	25-Oct-24	12:40	10:18	108	5	5	1	0	0	0	0.222	4	0	0	0	0.888	0	0	0	0	0
	MP_QUL-NHC_MT-5_2024-10	602325	5817459	0.4	0.7	24-Oct-24	25-Oct-24	11:33	9:48	111	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_QUL-NHC_MT-6_2024-10	602325	5817459	0.5	1.8	25-Oct-24	26-Oct-24	9:52	9:00	46	2	2	0	0	0	0	0	1	0	0	0	0.519	0	0	0	0	0
	MP_QUL-NHC_MT-7_2024-10	602127	5817507	0.6	1.0	25-Oct-24	26-Oct-24	10:21	9:21	46	2	2	0	0	0	0	0	4	0	0	0	2.09	0	0	0	0	0
	Total									**538**	**24**	**22**	**7**	**0**	**0**	**0**	**0.312**	**28**	**0**	**0**	**0**	**1.25**	**7**	**0**	**0**	**0**	**0.312**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datu. CPUE = catch-per-unit-effort.
[a] CPUE = number of fish caught per trap day. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (trap*days).

Table C.6.15: Angling Catch Data from the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024

Area	Station ID	UTM (NAD83, Zone 10U)				Date	Start Time	End Time	Angling Hours (hrs)	# of Lines	Effort (angler days)	No Fish Captured				
		Start Coordinates		End Coordinates												
		Easting	Northing	Easting	Northing							Catch	Sacrificed	Mortalities	Released	CPUE [a]
Reference (near Grain Creek)	MP_QUL-NGC_AG-1_2024-10	633412	5828891	633464	5828908	27-Oct-24	10:45	11:55	1.17	2	0.0972	0	0	0	0	0
	MP_QUL-NGC_AG-2_2024-10	633389	5828839	633287	5828674	27-Oct-24	12:05	12:25	0.333	2	0.0278	0	0	0	0	0
										Total	**0.125**	**0**	**0**	**0**	**0**	**0**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datum. CPUE = catch-per-unit-effort.

[a] CPUE is calculated as the number of fish captured per angler day. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (angler days).

Table C.6.16: Angling Catch Data for Quesnel River (QUR; Exposed), October 2024

Area	Station ID	UTM (NAD83, Zone 10U)		Date	Start Time	End Time	Angling Hours (hrs)	# of Lines	Effort (angler days)	Bull Trout					Rainbow Trout				
		Easting	Northing							Catch	Sacrificed	Mortalities	Released	CPUE [a]	Catch	Sacrificed	Mortalities	Released	CPUE [a]
Quesnel River	MP_QUR_AG-1_2024-10	596532	5830518	19-Oct-24	15:29	17:10	1.68	2	0.140	0	0	0	0	0	3	3	0	0.0	21.4
	MP_QUR_AG-2_2024-10	596537	5830518	20-Oct-24	8:00	8:40	0.67	1	0.0278	1	0	0	0	36.0	6	5	0	1	216
								Total	**0.168**	**1**	**0**	**0**	**0**	**5.95**	**9**	**8**	**0**	**1**	**53.6**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datum. CPUE = catch-per-unit-effort.

[a] CPUE is calculated as the number of fish captured per angler day. CPUE is calculated for each fish species separately. Total CPUE for each fish species is calculated for each area as: (total number of fish caught [#]) / (angler days).

Table C.6.17: Physical Measurements of Lake Trout Retained for Tissue Quality Sampling from the Quesnel Lake near Cedar Point Park (QUL-NCP; Exposed) and the East Arm (QUL-EAA; Reference) Monitoring Areas, October 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected[a]	Age (years)	Sex[b]	Liver Weight (g)	Gonad Weight (g)	Kidney Weight (g)	Tissue Collected[c]	Abnormalities
East Arm (Reference)	21-Oct-24	MP_QUL-EAA_LT-1_2024-10	68.9	63.0	2,600	OTO, SC	24	M	23.754	-	28.110	M, L, K	None
		MP_QUL-EAA_LT-2_2024-10	65.0	58.9	2,400	OTO, SC	12	M	19.451	-	19.547	M, L, K	None
		MP_QUL-EAA_LT-3_2024-10	71.5	56.0	2,950	OTO, SC	24	F	28.033	77.104	24.996	M, O, L, K	None
		MP_QUL-EAA_LT-4_2024-10	67.8	62.5	2,650	OTO, SC	22	M	23.475	-	21.956	M, L, K	None
		MP_QUL-EAA_LT-5_2024-10	69.3	64.0	2,650	OTO, SC	13	M	38.237	-	12.956	M, L, K	None
		MP_QUL-EAA_LT-6_2024-10	69.3	63.5	3,050	OTO, SC	10	M	39.358	-	25.736	M, L, K	None
		MP_QUL-EAA_LT-7_2024-10	72.2	66.6	3,450	OTO, SC	18	M	34.983	-	23.947	M, L, K	None
		MP_QUL-EAA_LT-8_2024-10	76.5	70.5	3,500	OTO, SC	22	M	29.431	-	30.097	M, L, K	None
		Sample Size (n)	**8**	**8**	**8**		**8**	-	**8**		**8**		
		Average	**70.1**	**63.1**	**2,906**		**18**		**29.590**		**23.418**		
		Median	**69.3**	**63.3**	**2,800**		**20**		**28.732**		**24.472**		
		Standard Deviation	**3.4**	**4.4**	**410**		**6**		**7.33**		**5.36**		
		Minimum	**65.0**	**56.0**	**2,400**		**10**		**19.451**		**12.956**		
		Maximum	**76.5**	**70.5**	**3,500**		**24**		**39.358**		**30.097**		
near Cedar Point (Exposed)	17-Oct-24	MP_QUL-NCP_LT-1_2024-10	70.1	63.4	3,250	SC	7	F	57.502	470.161	12.759	M, O, L, K	None
		MP_QUL-NCP_LT-2_2024-10	19.7	17.5	980	OTO, SC	6	M	14.634	-	6.027	M, L, K	None
	18-Oct-24	MP_QUL-NCP_LT-3_2024-10	65.2	59.9	2,350	SC	6	M	28.579	-	10.343	M, L, K	None
		MP_QUL-NCP_LT-4_2024-10	51.7	47.0	1,000	OTO, SC	6	M	7.896	-	6.391	M, L, K	None
		MP_QUL-NCP_LT-5_2024-10	56.2	50.4	1,500	SC	10	M	14.895	-	10.251	M, L, K	None
		MP_QUL-NCP_LT-6_2024-10	60.1	54.5	1,540	OTO, SC	10	M	14.232	-	11.108	M, L, K	None
		MP_QUL-NCP_LT-7_2024-10	75.3	72.9	5,100	OTO, SC	24	M	49.145	-	30.109	M, L, K	None
		MP_QUL-NCP_LT-8_2024-10	60.8	55.7	1,810	OTO, SC	9	F	23.913	237.983	11.633	M, O, L, K	None
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**2**	**8**		
		Average	**57.4**	**52.7**	**2,191**		**10**		**26.350**	**354.072**	**12.328**		
		Median	**60.5**	**55.1**	**1,675**		**8**		**19.404**	**354.072**	**10.726**		
		Standard Deviation	**17.0**	**16.3**	**1,390**		**6**		**17.96**	**-**	**7.57**		
		Minimum	**19.7**	**17.5**	**980**		**6**		**7.896**	**237.983**	**6.027**		
		Maximum	**75.3**	**72.9**	**5,100**		**24**		**57.502**	**470.161**	**30.109**		

Notes: "-" = data not available.

[a] OTO = otoliths. SC = scales.

[b] F = female. M = male.

[c] M = muscle. O = ovary. L = liver. K = kidney.

Table C.6.18: Physical Measurements of Northern Pikeminnow Retained for Tissue Quality Sampling from the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, October 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected[a]	Age (years)	Tissue Collected[b]	Abnormalities
near Grain Creek (Reference)	19-Oct-24	MP_QUL-NGC_NSC-1_2024-10	12.3	12.0	17.5	SC	4	WB	None
		MP_QUL-NGC_NSC-2_2024-10	16.3	15.6	31.0	SC	4	WB	None
		MP_QUL-NGC_NSC-3_2024-10	14.9	13.6	22.5	SC	4	WB	None
	20-Oct-24	MP_QUL-NGC_NSC-4_2024-10	14.4	13.2	24.0	SC	4	WB	None
		MP_QUL-NGC_NSC-5_2024-10	14.9	13.6	28.0	SC	3	WB	None
		MP_QUL-NGC_NSC-6_2024-10	14.9	13.9	31.0	SC	3	WB	None
		MP_QUL-NGC_NSC-7_2024-10	13.1	12.2	16.0	SC	3	WB	None
		MP_QUL-NGC_NSC-8_2024-10	15.5	14.0	21.3	SC	4	WB	None
		Sample Size (n)	**8**	**8**	**8**	-	**8**	-	-
		Average	**14.5**	**13.5**	**23.9**		**4**		
		Median	**14.9**	**13.6**	**23.3**		**4**		
		Standard Deviation	**1**	**1**	**6**		**1**		
		Minimum	**12.3**	**12.0**	**16.0**		**3**		
		Maximum	**16.3**	**15.6**	**31.0**		**4**		
near Hazeltine Creek (Exposed)	19-Oct-24	MP_QUL-NHC_NSC-1_2024-10	13.7	12.9	18.5	SC	3	WB	None
		MP_QUL-NHC_NSC-2_2024-10	15.2	13.7	24.5	SC	4	WB	None
		MP_QUL-NHC_NSC-3_2024-10	16.8	15.2	30.0	SC	4	WB	None
	22-Oct-24	MP_QUL-NHC_NSC-4_2024-10	15.3	14.3	26.8	SC	5	WB	None
		MP_QUL-NHC_NSC-5_2024-10	12.8	11.6	14.5	SC	2	WB	None
	23-Oct-24	MP_QUL-NHC_NSC-6_2024-10	12.9	11.5	15.8	SC	2	WB	None
		MP_QUL-NHC_NSC-7_2024-10	11.7	10.6	12.3	SC	3	WB	None
		MP_QUL-NHC_NSC-8_2024-10	12.8	11.8	16.7	SC	2	WB	None
		Sample Size (n)	**8**	**8**	**8**	-	**8**	-	-
		Average	**13.9**	**12.7**	**19.9**		**3**		
		Median	**13.3**	**12.4**	**17.6**		**3**		
		Standard Deviation	**1.7**	**1.6**	**6.4**		**1**		
		Minimum	**11.7**	**10.6**	**12.3**		**2**		
		Maximum	**16.8**	**15.2**	**30**		**5**		

Notes: "-" = data not available. Fish sex not determined as fish were collected as whole body samples.

[a] SC = scales.

[b] WB = whole body.

Table C.6.19: Physical Measurements of Peamouth Chub Caught Retained for Tissue Quality Sampling from the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, October 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected[a]	Age (years)	Sex[b]	Liver Weight (g)	Gonad Weight (g)	Kidney Weight (g)	Tissue Collected[c]	Abnormalities
near Grain Creek (Reference)	19-Oct-24	MP_QUL-NGC_PCC-1_2024-10	23.6	21.4	106	OTO, SC	13	F	1.366	4.426	0.761	M, O, L, K	None
		MP_QUL-NGC_PCC-2_2024-10	21.9	18.8	85	OTO, SC	7	F	0.645	3.528	0.720	M, O, L, K	None
		MP_QUL-NGC_PCC-3_2024-10	21.3	19.5	77	OTO, SC	6	F	0.792	3.606	0.820	M, O, L, K	None
		MP_QUL-NGC_PCC-4_2024-10	27.0	24.0	175	OTO, SC	11	F	2.431	8.031	2.130	M, O, L, K	None
	22-Oct-24	MP_QUL-NGC_PCC-5_2024-10	21.2	19.0	72	OTO, SC	7	F	0.776	2.073	0.983	M, O, L, K	None
		Sample Size (n)	**5**	**5**	**5**		**5**		**5**	**5**	**5**		
		Average	**23.0**	**20.5**	**103**		**9**		**1.202**	**4.333**	**1.083**		
		Median	**21.9**	**19.5**	**85**		**7**		**0.792**	**3.606**	**0.820**		
		Standard Deviation	**2.4**	**2.2**	**42**		**3**		**0.741**	**2.234**	**0.594**		
		Minimum	**21.2**	**18.8**	**72**		**6**		**0.645**	**2.073**	**0.720**		
		Maximum	**27.0**	**24.0**	**175**		**13**		**2.431**	**8.031**	**2.130**		
near Hazeltine Creek (Exposed)	26-Oct-24	MP_QUL-NHC_PCC-1_2024-10	21.5	19.6	100	OTO, SC	11	F	2.628	8.346	0.786	M, O, L, K	None
	23-Oct-24	MP_QUL-NHC_PCC-2_2024-10	22.5	20.8	89	OTO, SC	9	M	0.961	-	1.113	M, L, K	None
	24-Oct-24	MP_QUL-NHC_PCC-3_2024-10	21.0	19.0	70	OTO, SC	7	M	0.855	-	0.532	M, L, K	None
	26-Oct-24	MP_QUL-NHC_PCC-4_2024-10	26.8	24.1	132	OTO, SC	12	M	1.901	-	1.395	M, L, K	None
		MP_QUL-NHC_PCC-5_2024-10	23.7	21.9	112	OTO, SC	10	M	1.872	-	0.958	M, L, K	None
		MP_QUL-NHC_PCC-6_2024-10	22.2	21.0	107	OTO, SC	9	M	1.613	-	0.935	M, L, K	None
		MP_QUL-NHC_PCC-7_2024-10	23.4	20.9	106	OTO, SC	8	F	2.056	6.255	0.980	M, O, L, K	None
		MP_QUL-NHC_PCC-8_2024-10	21.4	20.0	88	OTO, SC	10	M	1.609	-	1.020	M, L, K	None
		Sample Size (n)	**8**	**8**	**8**		**8**		**8**	**2**	**8**		
		Average	**22.8**	**20.9**	**101**		**10**		**1.687**	**7.301**	**0.965**		
		Median	**22.4**	**20.9**	**103**		**10**		**1.743**	**7.301**	**0.969**		
		Standard Deviation	**1.9**	**1.6**	**19**		**2**		**0.577**	**-**	**0.248**		
		Minimum	**21.0**	**19.0**	**70**		**7**		**0.855**	**6.255**	**0.532**		
		Maximum	**26.8**	**24.1**	**132**		**12**		**2.628**	**8.346**	**1.395**		

Notes: "-" = data not available. QUL = Quesnel Lake. PCC = Peamouth chub.

[a] OTO = otoliths. SC = scales.

[b] F = female. M = male.

[c] M = muscle. O = ovary. L = liver. K = kidney.

Table C.6.20: Physical Measurements of Rainbow Trout Retained for Tissue Quality Sampling from Quesnel River (QUR; Exposed), October 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected[a]	Age (years)	Sex[b]	Liver Weight (g)	Gonad Weight (g)	Kidney Weight (g)	Tissue Collected[c]	Abnormalities/ Observations
Quesnel River	19-Oct-24	MP_QUR_RB-1_2024-10	36.3	34.5	470	OTO, SC	4	F	2.618	0.518	3.174	M, O, L, K	Undeveloped ovary
		MP_QUR_RB-2_2024-10	28.1	26.9	200	OTO, SC	2	M	1.831	-	1.509	M, L, K	None
		MP_QUR_RB-3_2024-10	40.3	39.1	605	OTO, SC	5	M	4.018	-	5.812	M, L, K	None
	20-Oct-24	MP_QUR_RB-4_2024-10	37.6	36.1	385	OTO, SC	5	M	2.730	-	4.705	M, L, K	None
		MP_QUR_RB-5_2024-10	33.4	31.9	330	OTO, SC	4	F	1.785	0.498	2.560	M, O, L, K	Undeveloped ovary
		MP_QUR_RB-6_2024-10	30.4	28.2	250	OTO, SC	3	F	1.493	0.091	1.789	M, O, L, K	Undeveloped ovary
		MP_QUR_RB-7_2024-10	37.2	36.0	435	OTO, SC	5	F	3.720	20.085	2.653	M, O, L, K	None
		MP_QUR_RB-8_2024-10	33.8	32.4	300	OTO, SC	4	F	2.410	10.575	1.860	M, O, L, K	Eggs partially differentiated
Sample Size (n)			**8**	**8**	**8**	-	**8**	-	**8**	**5**	**8**	-	-
Average			**34.6**	**33.1**	**372**		**4**		**2.576**	**6.353**	**3.008**		
Median			**35.1**	**33.5**	**358**		**4**		**2.514**	**0.518**	**2.607**		
Standard Deviation			**4.0**	**4.1**	**130**		**1.1**		**0.91**	**8.9**	**1.52**		
Minimum			**28.1**	**26.9**	**200**		**2**		**1.493**	**0.091**	**1.509**		
Maximum			**40.3**	**39.1**	**605**		**5**		**4.018**	**20.085**	**5.812**		

Notes: "-" = data not available or no comment. QUR = Quesnel River, RB = Rainbow trout.

[a] OTO = otoliths, SC = scales.

[b] F = female, M = male.

[c] M = muscle, O = ovary, L = liver, K = kidney.

APPENDIX C.7
FISH TISSUE QUALITY

Table C.7.1: Rainbow Trout Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Muscle														
		POL_RB-MU-1	POL_RB-MU-2	POL_RB-MU-3	POL_RB-MU-4	POL_RB-MU-5	POL_RB-MU-6	POL_RB-MU-7	POL_RB-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	80.1	77.6	77.7	77.8	78.6	80.2	78.4	78.3	8	0	78.6	78.6	77.6	78.3	80.2
Aluminum	mg/kg dw	2.40	4.10	<2	<2	<2	<2	2.00	<2	8	62	2.31	2.31	<2	<2	4.10
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0320	0.0750	0.0740	0.0850	0.0610	0.119	0.119	0.100	8	0	0.0831	0.0831	0.0320	0.0800	0.119
Barium	mg/kg dw	0.109	0.119	0.0670	<0.05	0.0860	0.280	0.125	<0.05	8	25	0.111	0.111	<0.05	0.0975	0.280
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	1,410	683	733	715	604	646	2,870	611	8	0	1,034	1,034	604	699	2,870
Cesium	mg/kg dw	0.120	0.0447	0.0525	0.0481	0.0981	0.0707	0.0441	0.0520	8	0	0.0663	0.0663	0.0441	0.0522	0.120
Chromium	mg/kg dw	0.110	0.0770	0.148	0.0650	0.0960	<0.05	0.0710	0.0690	8	12	0.0858	0.0858	<0.05	0.0740	0.148
Cobalt	mg/kg dw	0.0310	<0.02	0.0240	0.0200	0.0240	0.0310	<0.02	0.0210	8	25	0.0239	0.0239	<0.02	0.0225	0.0310
Copper	mg/kg dw	1.77	2.30	2.49	2.38	2.69	2.06	1.83	2.52	8	0	2.26	2.26	1.77	2.34	2.69
Iron	mg/kg dw	35.6	32.0	41.3	29.9	32.9	50.8	28.2	27.5	8	0	34.8	34.8	27.5	32.4	50.8
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,360	1,360	1,300	1,290	1,230	1,380	1,380	1,280	8	0	1,322	1,322	1,230	1,330	1,380
Manganese	mg/kg dw	0.660	0.588	0.623	0.472	0.449	0.503	1.04	0.535	8	0	0.609	0.609	0.449	0.562	1.04
Mercury	mg/kg dw	1.54	0.365	0.367	0.519	0.517	0.757	0.395	0.302	8	0	0.595	0.595	0.302	0.456	1.54
	mg/kg ww	0.306	0.0817	0.0818	0.115	0.110	0.150	0.0852	0.0655	8	0	0.124	0.124	0.0655	0.0976	0.306
Molybdenum	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	14,000	12,800	13,000	12,300	11,900	13,500	14,300	13,000	8	0	13,100	13,100	11,900	13,000	14,300
Potassium	mg/kg dw	24,000	22,000	21,800	19,900	20,200	22,600	21,900	22,400	8	0	21,850	21,850	19,900	21,950	24,000
Rubidium	mg/kg dw	17.5	8.38	9.25	8.65	14.0	13.3	9.02	11.0	8	0	11.4	11.4	8.38	10.1	17.5
Selenium	mg/kg dw	6.20	3.40	3.86	3.11	5.48	4.17	3.85	3.73	8	0	4.22	4.22	3.11	3.86	6.20
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,970	1,560	2,020	1,930	2,520	2,400	2,060	1,920	8	0	2,048	2,048	1,560	1,995	2,520
Strontium	mg/kg dw	1.66	0.622	0.797	0.621	0.748	0.666	4.07	0.599	8	0	1.22	1.22	0.599	0.707	4.07
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00580	0.00740	0.00900	0.00820	0.00850	0.00840	0.00510	0.00660	8	0	0.00738	0.00738	0.00510	0.00780	0.00900
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.300	0.360	0.270	<0.25	<0.25	<0.25	<0.25	<0.25	8	62	0.272	0.272	<0.25	<0.26	0.360
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	16.5	15.2	15.6	17.5	19.3	22.4	19.9	19.2	8	0	18.2	18.2	15.2	18.4	22.4
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.1: Rainbow Trout Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Ovary														
		POL_RB-OV-1	POL_RB-OV-2	POL_RB-OV-3	POL_RB-OV-4	POL_RB-OV-5	POL_RB-OV-6	POL_RB-OV-7	POL_RB-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	61.7	62.7	62.2	60.9	62.3	63.8	64.5	60.9	8	0	62.4	62.4	60.9	62.2	64.5
Aluminum	mg/kg dw	<2	<2	<2	<2	<2	<2	<2	<2	8	100	<2	<2	<2	<2	<2
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0350	0.0600	0.0440	0.0690	0.0390	0.0710	0.0520	0.0540	8	0	0.0530	0.0530	0.0350	0.0530	0.0710
Barium	mg/kg dw	0.196	0.161	0.202	0.218	0.403	0.217	0.151	0.153	8	0	0.213	0.213	0.151	0.199	0.403
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	1,270	1,190	1,280	1,360	1,130	1,180	1,350	1,240	8	0	1,250	1,250	1,130	1,255	1,360
Cesium	mg/kg dw	0.0358	0.0118	0.0141	0.0112	0.0226	0.0145	0.0150	0.0142	8	0	0.0174	0.0174	0.0112	0.0144	0.0358
Chromium	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	mg/kg dw	0.122	0.0700	0.0560	0.0800	0.0830	0.0990	0.0900	0.0740	8	0	0.0842	0.0842	0.0560	0.0815	0.122
Copper	mg/kg dw	8.52	6.40	7.94	8.82	9.15	6.95	8.32	8.27	8	0	8.05	8.05	6.40	8.30	9.15
Iron	mg/kg dw	45.3	45.2	52.1	45.2	44.7	63.2	52.0	40.2	8	0	48.5	48.5	40.2	45.2	63.2
Lead	mg/kg dw	0.0230	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0204	0.0204	<0.02	<0.0215	0.0230
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,680	1,550	1,650	1,500	1,570	1,350	1,570	1,510	8	0	1,548	1,548	1,350	1,560	1,680
Manganese	mg/kg dw	3.04	4.76	4.48	3.91	2.02	4.18	3.99	4.28	8	0	3.83	3.83	2.02	4.08	4.76
Mercury	mg/kg dw	0.0208	<0.005	<0.005	0.00660	0.00510	0.0232	0.00940	<0.005	8	38	0.0100	0.0100	<0.005	0.00585	0.0232
	mg/kg ww	0.00800	0.00170	0.00160	0.00260	0.00190	0.00840	0.00330	0.00100	8	0	0.00356	0.00356	0.00100	0.00225	0.00840
Molybdenum	mg/kg dw	0.0310	0.0580	0.0500	0.0560	0.0600	0.0460	0.0380	0.0400	8	0	0.0474	0.0474	0.0310	0.0480	0.0600
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	12,100	12,200	12,700	11,800	11,900	11,200	12,100	12,300	8	0	12,038	12,038	11,200	12,100	12,700
Potassium	mg/kg dw	7,620	7,840	7,980	7,400	7,360	5,980	7,190	7,470	8	0	7,355	7,355	5,980	7,435	7,980
Rubidium	mg/kg dw	7.07	3.72	3.87	3.63	6.00	4.01	3.66	4.84	8	0	4.60	4.60	3.63	3.94	7.07
Selenium	mg/kg dw	14.4	8.42	8.66	8.54	11.0	8.51	7.14	8.56	8	0	9.40	9.40	7.14	8.55	14.4
Silver	mg/kg dw	<0.005	<0.005	<0.005	0.00820	<0.005	0.00600	<0.005	<0.005	8	75	0.00552	0.00552	<0.005	<0.0055	0.00820
Sodium	mg/kg dw	2,170	2,280	2,080	1,980	1,970	2,920	2,710	1,730	8	0	2,230	2,230	1,730	2,125	2,920
Strontium	mg/kg dw	2.99	3.02	3.78	3.23	4.62	3.22	3.41	3.03	8	0	3.41	3.41	2.99	3.22	4.62
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	0.100	<0.1	0.120	<0.1	8	75	0.102	0.102	<0.1	<0.1	0.120
Titanium	mg/kg dw	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	8	100	<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	63.1	64.3	58.9	57.4	50.9	58.2	66.3	57.2	8	0	59.5	59.5	50.9	58.5	66.3
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.1: Rainbow Trout Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Liver														
		POL_RB-LI-1	POL_RB-LI-2	POL_RB-LI-3	POL_RB-LI-4	POL_RB-LI-5	POL_RB-LI-6	POL_RB-LI-7	POL_RB-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	80.3	77.0	76.1	75.3	75.8	77.0	74.8	76.6	8	0	76.6	76.6	74.8	76.3	80.3
Aluminum	mg/kg dw	10.7	23.3	<5	7.40	10.3	<2	<5	<5	8	50	7.46	7.46	<2	4.70	23.3
Antimony	mg/kg dw	<0.01	0.0110	0.0200	0.0170	<0.01	<0.01	<0.01	<0.01	8	62	0.0122	0.0122	<0.01	<0.0105	0.0200
Arsenic	mg/kg dw	0.0650	0.0800	0.0690	0.122	0.0820	0.190	0.142	0.0780	8	0	0.104	0.104	0.0650	0.0810	0.190
Barium	mg/kg dw	0.246	0.233	0.139	0.0870	0.0720	<0.05	0.113	<0.05	8	25	0.124	0.124	<0.05	0.100	0.246
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.245	0.0930	0.251	0.0600	0.234	0.0764	0.116	0.208	8	0	0.160	0.160	0.0600	0.162	0.251
Calcium	mg/kg dw	428	339	417	240	343	527	403	416	8	0	389	389	240	410	527
Cesium	mg/kg dw	0.118	0.0334	0.0430	0.0315	0.0663	0.0498	0.0379	0.0345	8	0	0.0518	0.0518	0.0315	0.0404	0.118
Chromium	mg/kg dw	0.259	0.495	0.250	<0.2	0.431	0.127	<0.2	<0.2	8	38	0.243	0.243	0.127	0.188	0.495
Cobalt	mg/kg dw	0.202	0.110	0.119	0.0760	0.127	0.0740	0.113	0.0950	8	0	0.114	0.114	0.0740	0.112	0.202
Copper	mg/kg dw	53.0	13.2	146	11.1	37.6	17.4	31.0	20.3	8	0	41.2	41.2	11.1	25.6	146
Iron	mg/kg dw	2,860	1,290	2,350	762	2,510	1,090	770	990	8	0	1,578	1,578	762	1,190	2,860
Lead	mg/kg dw	<0.02	0.152	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	8	88	0.0365	0.0365	<0.02	<0.086	0.152
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	834	793	691	700	876	1,050	670	708	8	0	790	790	670	750	1,050
Manganese	mg/kg dw	6.15	5.77	5.33	4.90	7.32	6.75	5.13	5.00	8	0	5.79	5.79	4.90	5.55	7.32
Mercury	mg/kg dw	1.51	0.361	0.221	0.496	0.285	0.333	0.319	0.246	8	0	0.471	0.471	0.221	0.326	1.51
	mg/kg ww	0.298	0.0830	0.0527	0.122	0.0689	0.0766	0.0805	0.0576	8	0	0.105	0.105	0.0527	0.0786	0.298
Molybdenum	mg/kg dw	1.35	0.583	1.28	0.686	1.17	0.894	0.808	0.915	8	0	0.961	0.961	0.583	0.904	1.35
Nickel	mg/kg dw	<0.2	0.310	0.230	<0.2	0.210	<0.2	<0.2	0.250	8	50	0.225	0.225	<0.2	0.205	0.310
Phosphorus	mg/kg dw	14,700	14,300	13,700	13,600	14,800	16,800	13,300	13,000	8	0	14,275	14,275	13,000	14,000	16,800
Potassium	mg/kg dw	13,700	14,000	12,500	12,200	13,500	15,600	11,100	12,700	8	0	13,162	13,162	11,100	13,100	15,600
Rubidium	mg/kg dw	14.8	7.03	7.36	7.15	12.8	13.7	6.12	8.40	8	0	9.67	9.67	6.12	7.88	14.8
Selenium	mg/kg dw	26.3	9.61	54.6	10.6	21.8	13.6	16.1	15.3	8	0	21.0	21.0	9.61	15.7	54.6
Silver	mg/kg dw	0.126	0.0549	0.477	0.107	0.204	0.141	0.172	0.232	8	0	0.189	0.189	0.0549	0.156	0.477
Sodium	mg/kg dw	9,460	7,010	6,370	5,480	7,020	6,350	5,880	6,350	8	0	6,740	6,740	5,480	6,360	9,460
Strontium	mg/kg dw	0.652	0.540	0.800	0.410	0.627	0.858	0.670	0.540	8	0	0.637	0.637	0.410	0.640	0.858
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.135	0.112	0.150	0.209	0.169	0.175	0.0978	0.0845	8	0	0.142	0.142	0.0845	0.142	0.209
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.350	1.42	<0.5	0.540	0.290	<0.25	<0.5	<0.5	8	50	0.468	0.468	<0.25	0.320	1.42
Uranium	mg/kg dw	0.0136	0.00640	0.00510	0.00400	0.00870	0.00290	0.00270	0.00270	8	0	0.00576	0.00576	0.00270	0.00455	0.0136
Vanadium	mg/kg dw	1.20	0.390	0.550	0.280	0.810	0.300	0.320	0.420	8	0	0.534	0.534	0.280	0.405	1.20
Zinc	mg/kg dw	167	147	175	118	214	145	163	153	8	0	160	160	118	158	214
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.1: Rainbow Trout Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Kidney														
		POL_RB-KI-1	POL_RB-KI-2	POL_RB-KI-3	POL_RB-KI-4	POL_RB-KI-5	POL_RB-KI-6	POL_RB-KI-7	POL_RB-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	80.7	78.4	80.9	76.9	82.0	79.3	77.4	79.4	8	0	79.4	79.4	76.9	79.3	82.0
Aluminum	mg/kg dw	22.6	6.40	11.6	6.50	10.4	9.20	<5	6.20	8	12	9.74	9.74	<5	7.85	22.6
Antimony	mg/kg dw	0.0120	<0.01	<0.01	<0.02	0.0110	<0.02	<0.01	<0.01	8	75	0.0105	0.0105	<0.01	<0.0105	0.0120
Arsenic	mg/kg dw	0.303	0.189	0.239	0.458	0.344	0.461	0.339	0.141	8	0	0.309	0.309	0.141	0.321	0.461
Barium	mg/kg dw	0.574	0.184	0.384	0.267	0.318	0.290	0.184	0.497	8	0	0.337	0.337	0.184	0.304	0.574
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.658	0.511	0.518	0.801	0.848	0.711	0.544	0.478	8	0	0.634	0.634	0.478	0.601	0.848
Calcium	mg/kg dw	660	529	463	978	940	736	489	648	8	0	680	680	463	654	978
Cesium	mg/kg dw	0.103	0.0292	0.0444	0.0239	0.0675	0.0413	0.0360	0.0380	8	0	0.0479	0.0479	0.0239	0.0396	0.103
Chromium	mg/kg dw	0.637	0.230	<0.2	<0.2	0.472	0.260	<0.2	<0.2	8	50	0.300	0.300	<0.2	0.215	0.637
Cobalt	mg/kg dw	3.35	1.07	1.07	1.24	1.43	1.01	0.703	0.581	8	0	1.31	1.31	0.581	1.07	3.35
Copper	mg/kg dw	6.48	4.98	5.42	5.80	4.99	4.38	4.81	6.14	8	0	5.38	5.38	4.38	5.20	6.48
Iron	mg/kg dw	1,000	975	1,070	896	791	967	758	859	8	0	914	914	758	932	1,070
Lead	mg/kg dw	0.180	0.112	0.123	<0.05	0.0310	0.0940	<0.05	0.130	8	25	0.0915	0.0915	0.0310	0.103	0.180
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	633	549	687	567	755	654	578	599	8	0	628	628	549	616	755
Manganese	mg/kg dw	3.93	2.11	2.98	3.09	2.66	3.12	2.22	2.67	8	0	2.85	2.85	2.11	2.82	3.93
Mercury	mg/kg dw	2.61	0.322	0.349	0.582	0.451	0.520	0.373	0.248	8	0	0.682	0.682	0.248	0.412	2.61
	mg/kg ww	0.505	0.0694	0.0668	0.134	0.0810	0.108	0.0841	0.0511	8	0	0.137	0.137	0.0511	0.0826	0.505
Molybdenum	mg/kg dw	0.432	0.206	0.281	0.390	0.428	0.336	0.377	0.349	8	0	0.350	0.350	0.206	0.363	0.432
Nickel	mg/kg dw	0.700	0.280	0.540	0.300	0.510	0.340	0.230	<0.2	8	12	0.388	0.388	<0.2	0.320	0.700
Phosphorus	mg/kg dw	11,300	10,700	13,100	9,060	13,500	11,300	10,800	11,700	8	0	11,432	11,432	9,060	11,300	13,500
Potassium	mg/kg dw	11,500	10,600	13,100	9,340	14,100	11,600	10,800	12,300	8	0	11,668	11,668	9,340	11,550	14,100
Rubidium	mg/kg dw	10.5	5.45	7.09	5.18	11.7	9.43	5.88	7.93	8	0	7.90	7.90	5.18	7.51	11.7
Selenium	mg/kg dw	17.7	8.88	10.6	12.6	14.2	11.8	11.2	11.0	8	0	12.2	12.2	8.88	11.5	17.7
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0715	8	88	0.0133	0.0133	<0.005	<0.0382	0.0715
Sodium	mg/kg dw	9,390	8,720	9,720	8,680	11,100	8,930	7,120	8,620	8	0	9,035	9,035	7,120	8,825	11,100
Strontium	mg/kg dw	1.30	0.920	1.24	1.53	3.01	2.17	1.29	1.04	8	0	1.56	1.56	0.920	1.30	3.01
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0529	0.0371	0.0511	0.0589	0.0339	0.0385	0.0462	0.0385	8	0	0.0446	0.0446	0.0339	0.0424	0.0589
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.57	<0.5	0.920	0.540	0.760	0.630	<0.5	<0.5	8	38	0.740	0.740	<0.5	0.585	1.57
Uranium	mg/kg dw	0.0255	0.0132	0.0146	0.00970	0.0187	0.0117	0.00420	0.0116	8	0	0.0136	0.0136	0.00420	0.0124	0.0255
Vanadium	mg/kg dw	1.22	0.360	0.480	0.520	0.750	0.550	0.380	0.370	8	0	0.579	0.579	0.360	0.500	1.22
Zinc	mg/kg dw	103	132	176	240	240	128	223	175	8	0	177	177	103	176	240
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.2: Rainbow Trout Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Muscle														
		BOL_RB-MU-1	BOL_RB-MU-2	BOL_RB-MU-3	BOL_RB-MU-4	BOL_RB-MU-5	BOL_RB-MU-6	BOL_RB-MU-7	BOL_RB-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	80.0	83.7	79.3	78.7	78.4	77.6	79.0	80.2	8	0	79.6	79.6	77.6	79.2	83.7
Aluminum	mg/kg dw	2.10	3.70	<2	10.0	3.10	<2	<2	<2	8	50	3.36	3.36	<2	2.05	10.0
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0480	0.0470	0.0230	0.0500	0.0370	0.0430	0.0350	0.0460	8	0	0.0411	0.0411	0.0230	0.0445	0.0500
Barium	mg/kg dw	0.205	0.154	0.0830	0.439	0.211	<0.05	0.126	<0.05	8	25	0.165	0.165	<0.05	0.140	0.439
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	2,370	539	512	1,210	2,810	495	1,820	558	8	0	1,289	1,289	495	884	2,810
Cesium	mg/kg dw	0.0611	0.0547	0.0448	0.0659	0.0442	0.0482	0.0416	0.0559	8	0	0.0520	0.0520	0.0416	0.0514	0.0659
Chromium	mg/kg dw	0.0790	0.0790	0.0830	0.0890	0.0560	<0.05	0.0920	0.0680	8	12	0.0745	0.0745	<0.05	0.0790	0.0920
Cobalt	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	mg/kg dw	1.80	2.84	2.19	2.74	2.52	2.06	1.46	1.99	8	0	2.20	2.20	1.46	2.12	2.84
Iron	mg/kg dw	39.7	36.2	32.0	51.9	44.3	30.7	17.7	20.8	8	0	34.2	34.2	17.7	34.1	51.9
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,230	1,080	1,170	1,270	1,180	1,160	1,150	1,270	8	0	1,189	1,189	1,080	1,175	1,270
Manganese	mg/kg dw	0.991	0.800	0.557	1.00	1.10	0.505	0.709	0.704	8	0	0.796	0.796	0.505	0.754	1.10
Mercury	mg/kg dw	0.597	0.569	0.462	0.440	0.288	0.424	0.434	0.345	8	0	0.445	0.445	0.288	0.437	0.597
	mg/kg ww	0.120	0.0926	0.0957	0.0936	0.0621	0.0948	0.0913	0.0683	8	0	0.0898	0.0898	0.0621	0.0931	0.120
Molybdenum	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	13,800	11,300	12,000	12,700	12,300	11,100	11,800	13,000	8	0	12,250	12,250	11,100	12,150	13,800
Potassium	mg/kg dw	21,800	18,600	20,600	20,500	18,400	18,900	18,900	22,600	8	0	20,038	20,038	18,400	19,700	22,600
Rubidium	mg/kg dw	11.3	8.95	9.45	9.34	9.50	8.15	10.4	12.8	8	0	9.99	9.99	8.15	9.48	12.8
Selenium	mg/kg dw	2.76	1.95	3.01	2.16	2.62	2.02	2.13	3.02	8	0	2.46	2.46	1.95	2.39	3.02
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	2,050	5,160	1,220	1,890	1,220	1,600	1,590	1,480	8	0	2,026	2,026	1,220	1,595	5,160
Strontium	mg/kg dw	3.71	0.826	0.612	1.75	4.14	0.585	2.75	0.550	8	0	1.87	1.87	0.550	1.29	4.14
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0144	0.00780	0.00850	0.00840	0.00840	0.00980	0.00660	0.00730	8	0	0.00890	0.00890	0.00660	0.00840	0.0144
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	0.390	<0.25	0.930	0.340	<0.25	<0.25	<0.25	8	62	0.364	0.364	<0.25	<0.295	0.930
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	18.1	17.9	13.7	15.7	24.8	15.6	13.7	14.3	8	0	16.7	16.7	13.7	15.6	24.8
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.2: Rainbow Trout Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Ovary														
		BOL_RB-OV-1	BOL_RB-OV-2	BOL_RB-OV-3	BOL_RB-OV-4	BOL_RB-OV-5	BOL_RB-OV-6	BOL_RB-OV-7	BOL_RB-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	64.6	71.1	66.7	64.0	65.4	64.2	70.8	64.9	8	0	66.5	66.5	64.0	65.2	71.1
Aluminum	mg/kg dw	<2	<2	<2	<2	<2	<2	<2	<2	8	100	<2	<2	<2	<2	<2
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0420	0.0250	<0.02	0.0320	0.0220	0.0500	0.0260	<0.02	8	25	0.0296	0.0296	<0.02	0.0255	0.0500
Barium	mg/kg dw	0.632	0.436	0.602	0.528	0.408	0.594	0.386	0.525	8	0	0.514	0.514	0.386	0.526	0.632
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	1,320	1,230	1,190	1,230	1,240	1,260	1,480	1,520	8	0	1,309	1,309	1,190	1,250	1,520
Cesium	mg/kg dw	0.0168	0.0141	0.0114	0.0138	0.0137	0.0148	0.0204	0.0126	8	0	0.0147	0.0147	0.0114	0.0140	0.0204
Chromium	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	mg/kg dw	0.0620	0.0540	0.0620	0.0470	0.0470	0.0810	0.120	0.0600	8	0	0.0666	0.0666	0.0470	0.0610	0.120
Copper	mg/kg dw	8.32	8.27	7.90	9.41	9.05	12.6	8.90	8.07	8	0	9.06	9.06	7.90	8.61	12.6
Iron	mg/kg dw	43.2	52.9	60.8	72.2	48.9	80.3	64.6	32.2	8	0	56.9	56.9	32.2	56.9	80.3
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,530	1,360	1,590	1,560	1,510	1,510	1,560	1,420	8	0	1,505	1,505	1,360	1,520	1,590
Manganese	mg/kg dw	7.62	3.99	4.45	6.16	3.97	7.60	5.63	7.96	8	0	5.92	5.92	3.97	5.90	7.96
Mercury	mg/kg dw	0.0129	0.0168	0.0220	0.0197	0.0133	0.0186	0.0169	0.0105	8	0	0.0163	0.0163	0.0105	0.0168	0.0220
	mg/kg ww	0.00460	0.00490	0.00730	0.00710	0.00460	0.00660	0.00490	0.00370	8	0	0.00546	0.00546	0.00370	0.00490	0.00730
Molybdenum	mg/kg dw	0.0470	0.0250	0.0340	0.0350	0.0340	0.0420	0.0460	0.0260	8	0	0.0361	0.0361	0.0250	0.0345	0.0470
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	11,600	10,300	11,600	11,300	10,700	11,000	12,000	10,900	8	0	11,175	11,175	10,300	11,150	12,000
Potassium	mg/kg dw	8,160	6,990	7,260	7,260	7,030	7,560	7,990	6,580	8	0	7,354	7,354	6,580	7,260	8,160
Rubidium	mg/kg dw	4.57	3.93	3.78	3.86	4.22	3.71	5.26	4.41	8	0	4.22	4.22	3.71	4.08	5.26
Selenium	mg/kg dw	6.67	3.63	5.59	4.92	5.11	5.98	4.78	4.79	8	0	5.18	5.18	3.63	5.01	6.67
Silver	mg/kg dw	<0.005	0.0108	0.00630	0.00820	0.00700	0.0111	0.0291	<0.005	8	25	0.0103	0.0103	<0.005	0.00760	0.0291
Sodium	mg/kg dw	2,380	3,650	2,920	2,610	2,180	2,750	4,330	2,640	8	0	2,932	2,932	2,180	2,695	4,330
Strontium	mg/kg dw	4.00	3.81	3.71	3.81	4.28	4.06	4.01	4.19	8	0	3.98	3.98	3.71	4.00	4.28
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Tin	mg/kg dw	0.160	<0.1	<0.1	0.160	<0.1	<0.1	<0.1	<0.1	8	75	0.115	0.115	<0.1	<0.13	0.160
Titanium	mg/kg dw	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	8	100	<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	74.6	68.4	82.5	72.8	65.8	76.2	85.0	70.6	8	0	74.5	74.5	65.8	73.7	85.0
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.2: Rainbow Trout Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Liver														
		BOL_RB-LI-1	BOL_RB-LI-2	BOL_RB-LI-3	BOL_RB-LI-4	BOL_RB-LI-5	BOL_RB-LI-6	BOL_RB-LI-7	BOL_RB-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	78.9	82.7	79.8	74.7	75.6	79.8	78.6	77.7	8	0	78.5	78.5	74.7	78.8	82.7
Aluminum	mg/kg dw	2.70	2.20	4.30	<5	6.60	2.10	<2	<2	8	38	3.06	3.06	<2	2.20	6.60
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.02
Arsenic	mg/kg dw	0.128	0.0340	0.0370	0.122	0.0420	0.0910	<0.02	<0.02	8	25	0.0618	0.0618	<0.02	0.0395	0.128
Barium	mg/kg dw	0.0800	0.139	0.112	0.146	0.147	0.0810	<0.05	<0.05	8	25	0.101	0.101	<0.05	0.0965	0.147
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.175	0.155	0.129	0.134	0.118	0.177	0.0564	0.0560	8	0	0.125	0.125	0.0560	0.132	0.177
Calcium	mg/kg dw	329	488	337	342	296	390	328	302	8	0	352	352	296	333	488
Cesium	mg/kg dw	0.0491	0.0511	0.0315	0.0332	0.0377	0.0346	0.0378	0.0382	8	0	0.0392	0.0392	0.0315	0.0378	0.0511
Chromium	mg/kg dw	0.195	0.109	0.287	0.320	<0.2	0.122	0.0690	<0.05	8	25	0.158	0.158	<0.05	0.122	0.320
Cobalt	mg/kg dw	0.0860	0.0860	0.0880	0.0960	0.0920	0.119	0.0580	0.0520	8	0	0.0846	0.0846	0.0520	0.0870	0.119
Copper	mg/kg dw	252	141	110	178	59.3	269	14.7	44.6	8	0	134	134	14.7	126	269
Iron	mg/kg dw	2,700	2,120	1,870	2,860	1,300	3,710	647	647	8	0	1,982	1,982	647	1,995	3,710
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	746	1,110	769	629	712	748	910	846	8	0	809	809	629	758	1,110
Manganese	mg/kg dw	6.12	9.72	6.19	6.16	6.56	6.66	8.47	5.57	8	0	6.93	6.93	5.57	6.38	9.72
Mercury	mg/kg dw	0.444	0.563	0.630	0.393	0.372	0.629	0.275	0.264	8	0	0.446	0.446	0.264	0.418	0.630
	mg/kg ww	0.0934	0.0972	0.127	0.0996	0.0908	0.127	0.0589	0.0588	8	0	0.0941	0.0941	0.0588	0.0953	0.127
Molybdenum	mg/kg dw	1.53	0.900	1.02	1.38	0.948	2.04	0.453	0.451	8	0	1.09	1.09	0.451	0.984	2.04
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	13,700	18,600	14,500	12,600	13,800	14,200	16,300	14,300	8	0	14,750	14,750	12,600	14,250	18,600
Potassium	mg/kg dw	12,700	14,800	13,200	11,000	12,200	13,200	17,200	14,200	8	0	13,562	13,562	11,000	13,200	17,200
Rubidium	mg/kg dw	8.48	9.30	9.16	6.90	9.36	6.92	11.4	10.8	8	0	9.04	9.04	6.90	9.23	11.4
Selenium	mg/kg dw	18.8	19.3	19.2	43.4	14.8	46.0	6.02	7.09	8	0	21.8	21.8	6.02	19.0	46.0
Silver	mg/kg dw	1.82	1.89	1.80	2.58	0.864	2.84	0.406	0.305	8	0	1.56	1.56	0.305	1.81	2.84
Sodium	mg/kg dw	8,560	8,830	7,270	6,100	4,440	7,860	6,120	5,730	8	0	6,864	6,864	4,440	6,695	8,830
Strontium	mg/kg dw	0.612	0.817	0.671	0.800	0.680	0.884	0.430	0.441	8	0	0.667	0.667	0.430	0.676	0.884
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.217	0.144	0.189	0.204	0.157	0.261	0.104	0.0927	8	0	0.171	0.171	0.0927	0.173	0.261
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.310	<0.25	0.350	<0.5	<0.5	0.260	<0.25	<0.25	8	62	0.278	0.278	<0.25	0.255	0.350
Uranium	mg/kg dw	0.00540	0.00330	0.00450	0.00970	0.00260	0.00490	<0.002	<0.002	8	25	0.00430	0.00430	<0.002	0.00390	0.00970
Vanadium	mg/kg dw	0.380	0.170	0.300	0.340	0.200	0.390	<0.1	<0.1	8	25	0.248	0.248	<0.1	0.250	0.390
Zinc	mg/kg dw	176	208	180	172	216	162	92.5	131	8	0	167	167	92.5	174	216
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.2: Rainbow Trout Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Kidney														
		BOL_RB-KI-1	BOL_RB-KI-2	BOL_RB-KI-3	BOL_RB-KI-4	BOL_RB-KI-5	BOL_RB-KI-6	BOL_RB-KI-7	BOL_RB-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	80.0	85.8	83.9	75.1	73.6	79.7	82.1	77.9	8	0	79.8	79.8	73.6	79.8	85.8
Aluminum	mg/kg dw	4.30	3.30	5.80	10.3	6.60	5.00	<2	3.50	8	12	5.10	5.10	<2	4.65	10.3
Antimony	mg/kg dw	<0.01	<0.01	0.0110	<0.02	<0.02	<0.01	<0.01	<0.01	8	88	0.0102	0.0102	<0.01	<0.0105	0.0110
Arsenic	mg/kg dw	0.167	0.102	0.225	0.541	0.149	0.0920	0.100	0.0310	8	0	0.176	0.176	0.0310	0.126	0.541
Barium	mg/kg dw	0.365	0.300	0.891	1.08	0.421	0.316	0.218	0.242	8	0	0.479	0.479	0.218	0.340	1.08
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	1.00	<1	<1	<1	<1	8	88	1.00	1.00	<1	<1	1.00
Cadmium	mg/kg dw	0.212	0.227	0.726	0.480	0.422	0.224	0.302	0.237	8	0	0.354	0.354	0.212	0.270	0.726
Calcium	mg/kg dw	470	1,200	667	672	598	350	685	396	8	0	630	630	350	632	1,200
Cesium	mg/kg dw	0.0380	0.0576	0.0396	0.0297	0.0362	0.0260	0.0454	0.0440	8	0	0.0396	0.0396	0.0260	0.0388	0.0576
Chromium	mg/kg dw	0.322	0.136	0.390	0.380	<0.2	0.177	0.282	0.111	8	12	0.242	0.242	0.111	0.230	0.390
Cobalt	mg/kg dw	0.588	0.249	1.04	0.425	0.663	0.799	0.536	0.224	8	0	0.566	0.566	0.224	0.562	1.04
Copper	mg/kg dw	4.10	4.63	6.65	5.44	5.70	3.67	4.99	3.95	8	0	4.89	4.89	3.67	4.81	6.65
Iron	mg/kg dw	590	704	996	1,050	869	923	732	405	8	0	784	784	405	800	1,050
Lead	mg/kg dw	0.0340	<0.02	0.0580	<0.05	0.0940	0.0460	<0.02	<0.02	8	50	0.0400	0.0400	<0.02	0.0340	0.0940
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	547	850	665	661	664	488	762	742	8	0	672	672	488	664	850
Manganese	mg/kg dw	1.88	2.67	3.30	2.82	3.06	1.79	2.58	4.12	8	0	2.78	2.78	1.79	2.74	4.12
Mercury	mg/kg dw	0.439	0.489	0.608	0.488	0.379	0.651	0.300	0.223	8	0	0.447	0.447	0.223	0.464	0.651
	mg/kg ww	0.0878	0.0695	0.0980	0.122	0.100	0.132	0.0537	0.0494	8	0	0.0890	0.0890	0.0494	0.0929	0.132
Molybdenum	mg/kg dw	0.264	0.264	0.417	0.600	0.391	0.186	0.278	0.208	8	0	0.326	0.326	0.186	0.271	0.600
Nickel	mg/kg dw	0.350	<0.2	0.370	0.450	0.310	0.220	<0.2	<0.2	8	38	0.288	0.288	<0.2	0.265	0.450
Phosphorus	mg/kg dw	9,720	14,500	12,800	10,300	10,200	9,130	13,500	12,400	8	0	11,569	11,569	9,130	11,350	14,500
Potassium	mg/kg dw	10,300	14,100	12,600	9,740	10,300	10,100	15,500	12,800	8	0	11,930	11,930	9,740	11,450	15,500
Rubidium	mg/kg dw	6.69	9.17	8.00	5.73	7.24	5.43	10.9	9.74	8	0	7.86	7.86	5.43	7.62	10.9
Selenium	mg/kg dw	6.30	5.54	9.42	10.5	10.1	4.80	6.60	5.65	8	0	7.36	7.36	4.80	6.45	10.5
Silver	mg/kg dw	<0.005	0.0116	0.0198	0.00580	0.0110	<0.005	0.0184	<0.005	8	38	0.0102	0.0102	<0.005	0.00840	0.0198
Sodium	mg/kg dw	12,100	11,300	11,500	8,030	4,750	9,830	10,200	7,220	8	0	9,366	9,366	4,750	10,015	12,100
Strontium	mg/kg dw	1.20	2.83	2.19	2.30	1.78	1.10	1.54	0.826	8	0	1.72	1.72	0.826	1.66	2.83
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0172	0.0284	0.0448	0.0501	0.0607	0.0189	0.0274	0.0195	8	0	0.0334	0.0334	0.0172	0.0279	0.0607
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.380	0.340	0.550	0.970	0.530	0.450	<0.25	<0.25	8	25	0.465	0.465	<0.25	0.415	0.970
Uranium	mg/kg dw	0.00570	0.00240	0.0104	0.0127	0.00760	0.00560	0.00450	0.00240	8	0	0.00641	0.00641	0.00240	0.00565	0.0127
Vanadium	mg/kg dw	0.180	<0.1	0.340	0.510	0.170	0.120	0.130	<0.1	8	25	0.206	0.206	<0.1	0.150	0.510
Zinc	mg/kg dw	51.6	96.1	216	250	294	73.2	129	114	8	0	153	153	51.6	122	294
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.3: Longnose Sucker Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Muscle														
		POL_LSU-MU-1	POL_LSU-MU-2	POL_LSU-MU-3	POL_LSU-MU-4	POL_LSU-MU-5	POL_LSU-MU-6	POL_LSU-MU-7	POL_LSU-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	78.6	77.5	75.2	77.8	77.0	78.0	79.2	76.3	8	0	77.5	77.5	75.2	77.7	79.2
Aluminum	mg/kg dw	15.9	4.40	5.50	3.20	<2	3.40	<2	8.00	8	25	5.55	5.55	<2	3.90	15.9
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.197	0.0830	0.178	0.216	0.249	0.228	0.169	0.220	8	0	0.192	0.192	0.0830	0.206	0.249
Barium	mg/kg dw	0.667	0.411	0.255	0.621	0.283	0.753	0.159	0.322	8	0	0.434	0.434	0.159	0.366	0.753
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	1,030	471	757	1,430	2,030	926	1,290	638	8	0	1,072	1,072	471	978	2,030
Cesium	mg/kg dw	0.100	0.0802	0.0734	0.0948	0.103	0.129	0.136	0.0792	8	0	0.0994	0.0994	0.0734	0.0974	0.136
Chromium	mg/kg dw	0.127	0.0630	0.216	<0.05	0.112	<0.05	<0.05	0.0790	8	38	0.0934	0.0934	<0.05	0.0710	0.216
Cobalt	mg/kg dw	0.0250	<0.02	0.0240	<0.02	<0.02	<0.02	<0.02	0.0320	8	62	0.0226	0.0226	<0.02	<0.022	0.0320
Copper	mg/kg dw	2.23	2.87	4.00	2.41	1.79	1.76	1.24	2.41	8	0	2.34	2.34	1.24	2.32	4.00
Iron	mg/kg dw	56.8	34.2	31.4	27.9	18.3	19.0	14.4	30.6	8	0	29.1	29.1	14.4	29.2	56.8
Lead	mg/kg dw	0.0290	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0211	0.0211	<0.02	<0.0245	0.0290
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,440	1,220	1,260	1,450	1,340	1,360	1,310	1,420	8	0	1,350	1,350	1,220	1,350	1,450
Manganese	mg/kg dw	2.11	1.30	1.12	2.27	1.78	2.16	1.26	1.35	8	0	1.67	1.67	1.12	1.56	2.27
Mercury	mg/kg dw	0.203	0.195	0.163	0.229	0.421	0.219	0.687	0.106	8	0	0.278	0.278	0.106	0.211	0.687
	mg/kg ww	0.0434	0.0439	0.0405	0.0510	0.0969	0.0481	0.143	0.0252	8	0	0.0615	0.0615	0.0252	0.0460	0.143
Molybdenum	mg/kg dw	0.0230	0.0230	0.0230	0.0210	<0.02	<0.02	<0.02	0.0200	8	38	0.0213	0.0213	<0.02	0.0205	0.0230
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	12,000	10,600	10,400	13,000	12,300	11,700	12,600	11,200	8	0	11,725	11,725	10,400	11,850	13,000
Potassium	mg/kg dw	20,400	18,200	16,500	21,400	19,400	19,900	22,800	18,400	8	0	19,625	19,625	16,500	19,650	22,800
Rubidium	mg/kg dw	12.4	7.80	5.57	10.7	10.1	10.6	13.4	6.63	8	0	9.65	9.65	5.57	10.4	13.4
Selenium	mg/kg dw	7.24	5.16	5.65	5.97	6.04	6.66	5.97	6.47	8	0	6.14	6.14	5.16	6.00	7.24
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,980	1,800	1,250	1,630	1,890	1,680	1,640	1,170	8	0	1,630	1,630	1,170	1,660	1,980
Strontium	mg/kg dw	1.45	0.489	0.861	2.18	3.25	1.41	1.81	0.768	8	0	1.53	1.53	0.489	1.43	3.25
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	0.00260	0.00590	<0.002	0.00330	<0.002	0.00220	8	50	0.00275	0.00275	<0.002	0.00210	0.00590
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.440	8	88	0.142	0.142	<0.1	<0.27	0.440
Titanium	mg/kg dw	1.37	0.440	0.460	0.270	<0.25	0.320	<0.25	0.610	8	25	0.496	0.496	<0.25	0.380	1.37
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	0.140	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	88	0.105	0.105	<0.1	<0.12	0.140
Zinc	mg/kg dw	24.3	46.1	38.0	52.6	36.8	40.1	19.4	36.2	8	0	36.7	36.7	19.4	37.4	52.6
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.3: Longnose Sucker Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Ovary														
		POL_LSU-OV-1	POL_LSU-OV-2	POL_LSU-OV-3	POL_LSU-OV-4	POL_LSU-OV-5	POL_LSU-OV-6	POL_LSU-OV-7	POL_LSU-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	63.3	62.8	61.2	63.0	63.8	62.6	63.6	62.3	8	0	62.8	62.8	61.2	62.9	63.8
Aluminum	mg/kg dw	16.4	<2	<2	<2	13.9	<2	<2	2.20	8	62	5.31	5.31	<2	<2.1	16.4
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0770	0.0480	0.0590	0.112	0.127	0.0760	0.112	0.132	8	0	0.0929	0.0929	0.0480	0.0945	0.132
Barium	mg/kg dw	0.471	0.191	0.0810	0.152	0.332	0.204	0.146	0.162	8	0	0.217	0.217	0.0810	0.176	0.471
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.00710	<0.005	<0.005	<0.005	<0.005	<0.005	0.00810	<0.005	8	75	0.00565	0.00565	<0.005	<0.00605	0.00810
Calcium	mg/kg dw	512	494	461	502	551	494	581	495	8	0	511	511	461	498	581
Cesium	mg/kg dw	0.0132	0.0108	0.0100	0.0143	0.0178	0.0153	0.0152	0.0110	8	0	0.0134	0.0134	0.0100	0.0138	0.0178
Chromium	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	mg/kg dw	0.126	0.0550	0.0740	0.0770	0.0720	0.100	0.0840	0.178	8	0	0.0958	0.0958	0.0550	0.0805	0.178
Copper	mg/kg dw	3.97	3.80	2.87	3.38	4.66	3.54	3.15	3.58	8	0	3.62	3.62	2.87	3.56	4.66
Iron	mg/kg dw	63.2	35.2	36.7	35.3	71.6	40.7	35.2	44.9	8	0	45.4	45.4	35.2	38.7	71.6
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	622	689	552	637	683	701	704	571	8	0	645	645	552	660	704
Manganese	mg/kg dw	19.9	11.7	16.9	17.0	16.0	19.2	22.9	29.2	8	0	19.1	19.1	11.7	18.1	29.2
Mercury	mg/kg dw	0.00560	0.00540	<0.005	0.00580	0.00830	<0.005	0.0111	<0.005	8	38	0.00640	0.00640	<0.005	0.00550	0.0111
	mg/kg ww	0.00210	0.00200	0.00150	0.00220	0.00300	0.00130	0.00400	0.00150	8	0	0.00220	0.00220	0.00130	0.00205	0.00400
Molybdenum	mg/kg dw	0.0740	0.0750	0.0670	0.0750	0.0720	0.0660	0.0900	0.0690	8	0	0.0735	0.0735	0.0660	0.0730	0.0900
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	11,500	11,700	11,400	11,300	12,000	11,400	11,600	11,800	8	0	11,588	11,588	11,300	11,550	12,000
Potassium	mg/kg dw	5,600	5,720	5,430	5,880	6,490	5,700	6,240	5,750	8	0	5,851	5,851	5,430	5,735	6,490
Rubidium	mg/kg dw	4.69	3.27	2.24	4.10	4.43	3.77	4.51	2.48	8	0	3.69	3.69	2.24	3.94	4.69
Selenium	mg/kg dw	8.56	6.41	8.84	6.51	8.14	8.24	7.31	9.93	8	0	7.99	7.99	6.41	8.19	9.93
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,590	1,440	1,350	1,450	1,440	1,450	1,600	1,260	8	0	1,448	1,448	1,260	1,445	1,600
Strontium	mg/kg dw	0.814	0.584	0.507	0.471	0.600	0.572	0.722	0.675	8	0	0.618	0.618	0.471	0.592	0.814
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	0.00220	<0.002	<0.002	<0.002	<0.002	8	88	0.00202	0.00202	<0.002	<0.0021	0.00220
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.25	<0.25	<0.25	<0.25	1.12	<0.25	<0.25	<0.25	8	75	0.484	0.484	<0.25	<0.685	1.25
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	0.100	<0.1	<0.1	<0.1	0.180	<0.1	0.150	<0.1	8	62	0.116	0.116	0.100	<0.1	0.180
Zinc	mg/kg dw	78.7	83.9	71.4	92.2	91.4	77.5	87.7	86.8	8	0	83.7	83.7	71.4	85.3	92.2
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.3: Longnose Sucker Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Liver														
		POL_LSU-LI-1	POL_LSU-LI-2	POL_LSU-LI-3	POL_LSU-LI-4	POL_LSU-LI-5	POL_LSU-LI-6	POL_LSU-LI-7	POL_LSU-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	77.7	77.9	75.0	70.4	77.9	67.6	79.0	70.9	8	0	74.5	74.5	67.6	76.3	79.0
Aluminum	mg/kg dw	16.0	17.9	142	4.40	2.10	458	3.40	7.60	8	0	81.4	81.4	2.10	11.8	458
Antimony	mg/kg dw	0.0100	0.0200	0.0100	<0.01	<0.01	0.0130	0.0180	<0.01	8	38	0.0126	0.0126	0.0100	0.0100	0.0200
Arsenic	mg/kg dw	0.142	0.178	0.213	0.343	0.319	0.417	0.396	0.219	8	0	0.278	0.278	0.142	0.269	0.417
Barium	mg/kg dw	0.639	0.423	1.82	0.326	0.226	4.84	0.213	0.145	8	0	1.08	1.08	0.145	0.374	4.84
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	0.0140	<0.01	<0.01	8	88	0.0105	0.0105	<0.01	<0.012	0.0140
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.0891	0.134	0.148	0.0661	0.205	0.131	0.768	0.147	8	0	0.211	0.211	0.0661	0.140	0.768
Calcium	mg/kg dw	239	326	411	240	378	580	243	260	8	0	335	335	239	293	580
Cesium	mg/kg dw	0.0199	0.0280	0.0297	0.0239	0.0398	0.0727	0.0305	0.0160	8	0	0.0326	0.0326	0.0160	0.0288	0.0727
Chromium	mg/kg dw	0.161	0.0900	0.258	<0.05	<0.05	0.401	0.270	0.0520	8	25	0.166	0.166	<0.05	0.126	0.401
Cobalt	mg/kg dw	0.100	0.143	0.260	0.0780	0.120	0.405	0.124	0.213	8	0	0.180	0.180	0.0780	0.134	0.405
Copper	mg/kg dw	45.9	36.2	32.5	39.6	47.2	33.5	71.6	36.3	8	0	42.9	42.9	32.5	38.0	71.6
Iron	mg/kg dw	489	320	568	388	345	738	604	176	8	0	454	454	176	438	738
Lead	mg/kg dw	0.0350	<0.02	0.0520	<0.02	<0.02	0.116	<0.02	<0.02	8	62	0.0379	0.0379	<0.02	<0.0275	0.116
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,020	1,230	872	708	1,040	900	1,320	689	8	0	972	972	689	960	1,320
Manganese	mg/kg dw	15.8	18.9	15.9	11.8	17.0	33.9	15.2	7.81	8	0	17.0	17.0	7.81	15.8	33.9
Mercury	mg/kg dw	0.0496	0.0388	0.0416	0.0341	0.0707	0.0287	0.128	0.0285	8	0	0.0525	0.0525	0.0285	0.0402	0.128
	mg/kg ww	0.0110	0.00860	0.0104	0.0101	0.0156	0.00930	0.0269	0.00830	8	0	0.0125	0.0125	0.00830	0.0102	0.0269
Molybdenum	mg/kg dw	1.33	0.949	0.934	0.701	1.10	0.862	2.06	0.688	8	0	1.08	1.08	0.688	0.942	2.06
Nickel	mg/kg dw	<0.2	<0.2	0.250	<0.2	<0.2	0.340	<0.2	<0.2	8	75	0.224	0.224	<0.2	<0.225	0.340
Phosphorus	mg/kg dw	16,800	20,000	13,800	12,400	16,600	11,000	22,700	11,300	8	0	15,575	15,575	11,000	15,200	22,700
Potassium	mg/kg dw	13,400	17,200	12,400	10,100	14,500	9,320	19,100	9,660	8	0	13,210	13,210	9,320	12,900	19,100
Rubidium	mg/kg dw	10.9	9.68	5.21	6.50	10.8	6.26	14.0	4.04	8	0	8.42	8.42	4.04	8.09	14.0
Selenium	mg/kg dw	10.3	9.92	8.89	6.91	11.4	7.51	14.1	8.38	8	0	9.68	9.68	6.91	9.40	14.1
Silver	mg/kg dw	0.0399	0.0126	0.0348	0.0186	0.0143	0.0179	0.0688	0.0507	8	0	0.0322	0.0322	0.0126	0.0267	0.0688
Sodium	mg/kg dw	5,060	4,190	3,860	3,120	4,530	3,160	3,540	3,040	8	0	3,812	3,812	3,040	3,700	5,060
Strontium	mg/kg dw	0.986	0.970	2.16	0.763	1.52	4.19	0.494	0.824	8	0	1.49	1.49	0.494	0.978	4.19
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	0.00300	0.00360	0.00430	0.00490	0.00390	0.00240	8	25	0.00326	0.00326	<0.002	0.00330	0.00490
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.11	1.22	9.62	0.420	<0.25	35.7	0.360	0.740	8	12	6.18	6.18	<0.25	0.925	35.7
Uranium	mg/kg dw	<0.002	0.00240	0.00740	<0.002	0.00290	0.0251	0.00270	0.00270	8	25	0.00590	0.00590	<0.002	0.00270	0.0251
Vanadium	mg/kg dw	0.260	0.560	0.800	0.230	0.360	2.21	0.890	0.110	8	0	0.678	0.678	0.110	0.460	2.21
Zinc	mg/kg dw	101	110	88.6	98.4	129	85.3	120	86.1	8	0	102	102	85.3	99.7	129
Zirconium	mg/kg dw	<0.2	<0.4	<0.2	<0.2	<0.2	<0.4	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.4

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.3: Longnose Sucker Tissue Quality Data for Polley Lake (POL; Exposed), Spring 2024

Analyte	Units	Kidney														
		POL_LSU-KI-1	POL_LSU-KI-2	POL_LSU-KI-3	POL_LSU-KI-4	POL_LSU-KI-5	POL_LSU-KI-6	POL_LSU-KI-7	POL_LSU-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	76.4	79.4	54.6	66.5	74.4	77.2	79.9	52.1	8	0	70.1	70.1	52.1	75.4	79.9
Aluminum	mg/kg dw	32.0	22.0	<5	<5	3.00	6.40	<5	29.4	8	38	12.7	12.7	3.00	4.70	32.0
Antimony	mg/kg dw	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	0.0130	8	88	0.0104	0.0104	<0.01	<0.0115	0.0130
Arsenic	mg/kg dw	0.201	0.165	0.203	0.507	0.317	0.366	0.239	0.172	8	0	0.271	0.271	0.165	0.221	0.507
Barium	mg/kg dw	1.29	1.79	0.499	1.14	0.852	2.03	1.26	0.648	8	0	1.19	1.19	0.499	1.20	2.03
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	0.0130	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	88	0.0104	0.0104	<0.01	<0.0115	0.0130
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.782	0.666	0.551	0.311	1.05	1.01	4.77	0.543	8	0	1.21	1.21	0.311	0.724	4.77
Calcium	mg/kg dw	488	561	210	324	530	576	481	290	8	0	432	432	210	484	576
Cesium	mg/kg dw	0.0292	0.0338	0.00980	0.0194	0.0321	0.0401	0.0431	0.0113	8	0	0.0274	0.0274	0.00980	0.0306	0.0431
Chromium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	0.0850	0.148	<0.2	0.0550	8	62	0.0960	0.0960	0.0550	0.0850	0.148
Cobalt	mg/kg dw	0.913	0.256	0.335	0.388	0.376	0.667	0.600	0.629	8	0	0.520	0.520	0.256	0.494	0.913
Copper	mg/kg dw	7.24	6.64	2.20	3.33	6.81	6.10	7.04	2.62	8	0	5.25	5.25	2.20	6.37	7.24
Iron	mg/kg dw	635	430	137	208	314	334	330	209	8	0	325	325	137	322	635
Lead	mg/kg dw	0.230	0.125	<0.05	<0.05	<0.02	<0.02	<0.05	<0.02	8	75	0.0594	0.0594	<0.02	<0.0725	0.230
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	559	623	229	335	585	609	716	289	8	0	493	493	229	572	716
Manganese	mg/kg dw	8.59	6.75	2.47	4.44	7.73	8.41	5.42	3.33	8	0	5.89	5.89	2.47	6.08	8.59
Mercury	mg/kg dw	0.0697	0.0460	0.0240	0.0277	0.0879	0.0581	0.233	0.0204	8	0	0.0708	0.0708	0.0204	0.0520	0.233
	mg/kg ww	0.0165	0.00940	0.0110	0.00930	0.0225	0.0132	0.0467	0.00980	8	0	0.0173	0.0173	0.00930	0.0121	0.0467
Molybdenum	mg/kg dw	1.75	1.05	0.258	0.387	0.726	0.792	1.04	0.233	8	0	0.780	0.780	0.233	0.759	1.75
Nickel	mg/kg dw	0.220	0.220	0.270	0.240	0.230	0.300	0.510	0.320	8	0	0.289	0.289	0.220	0.255	0.510
Phosphorus	mg/kg dw	11,300	12,600	4,680	7,350	10,600	11,300	15,000	5,370	8	0	9,775	9,775	4,680	10,950	15,000
Potassium	mg/kg dw	9,220	10,300	3,800	5,310	9,060	10,200	12,400	4,500	8	0	8,099	8,099	3,800	9,140	12,400
Rubidium	mg/kg dw	9.16	6.09	1.76	3.63	6.49	6.86	9.26	1.94	8	0	5.65	5.65	1.76	6.29	9.26
Selenium	mg/kg dw	9.41	8.52	3.62	4.82	7.17	9.03	10.4	4.02	8	0	7.12	7.12	3.62	7.84	10.4
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	5,840	7,530	2,060	3,280	7,020	6,680	7,020	2,400	8	0	5,229	5,229	2,060	6,260	7,530
Strontium	mg/kg dw	1.24	1.21	0.370	0.660	1.02	1.30	1.04	0.678	8	0	0.940	0.940	0.370	1.03	1.30
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0470	<0.02	8	88	0.0234	0.0234	<0.02	<0.0335	0.0470
Thallium	mg/kg dw	0.00630	0.00350	0.00590	0.0100	0.00720	0.0112	0.0129	0.00430	8	0	0.00766	0.00766	0.00350	0.00675	0.0129
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Titanium	mg/kg dw	2.90	1.44	<0.5	<0.5	0.340	0.570	0.770	1.76	8	25	1.06	1.06	0.340	0.670	2.90
Uranium	mg/kg dw	0.0156	0.00850	<0.002	0.00210	0.00290	0.00470	0.0130	0.00240	8	12	0.00640	0.00640	<0.002	0.00380	0.0156
Vanadium	mg/kg dw	0.990	2.24	0.110	0.750	1.04	1.07	5.37	0.250	8	0	1.48	1.48	0.110	1.01	5.37
Zinc	mg/kg dw	127	218	113	183	179	169	156	92.7	8	0	155	155	92.7	162	218
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.4: Longnose Sucker Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Muscle														
		BOL_LSU-MU-1	BOL_LSU-MU-2	BOL_LSU-MU-3	BOL_LSU-MU-4	BOL_LSU-MU-5	BOL_LSU-MU-6	BOL_LSU-MU-7	BOL_LSU-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	73.0	76.8	77.5	76.2	77.2	77.8	72.3	74.7	8	0	75.7	75.7	72.3	76.5	77.8
Aluminum	mg/kg dw	<2	2.90	3.00	<2	2.40	<2	<2	<2	8	62	2.29	2.29	<2	<2.2	3.00
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0330	0.0740	0.195	0.114	0.189	0.341	0.0940	0.0540	8	0	0.137	0.137	0.0330	0.104	0.341
Barium	mg/kg dw	0.277	0.248	0.176	0.255	0.180	0.144	0.174	0.107	8	0	0.195	0.195	0.107	0.178	0.277
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium	mg/kg dw	321	560	382	530	714	472	308	321	8	0	451	451	308	427	714
Cesium	mg/kg dw	0.0593	0.124	0.176	0.149	0.174	0.196	0.103	0.0974	8	0	0.135	0.135	0.0593	0.136	0.196
Chromium	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	<0.05	<0.05	<0.05	<0.05
Cobalt	mg/kg dw	0.0220	<0.02	0.0210	<0.02	<0.02	<0.02	<0.02	0.0240	8	62	0.0209	0.0209	<0.02	<0.0205	0.0240
Copper	mg/kg dw	2.40	1.74	2.88	2.13	1.89	1.62	2.60	3.09	8	0	2.29	2.29	1.62	2.26	3.09
Iron	mg/kg dw	46.6	29.8	37.5	28.6	25.9	15.2	40.8	50.2	8	0	34.3	34.3	15.2	33.6	50.2
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,020	1,220	1,180	1,140	1,230	1,320	995	1,060	8	0	1,146	1,146	995	1,160	1,320
Manganese	mg/kg dw	0.728	1.33	0.902	1.11	1.86	0.670	0.740	0.688	8	0	1.00	1.00	0.670	0.821	1.86
Mercury	mg/kg dw	0.412	0.767	0.693	0.776	0.700	0.402	0.515	0.631	8	0	0.612	0.612	0.402	0.662	0.776
	mg/kg ww	0.111	0.178	0.156	0.184	0.160	0.0892	0.143	0.160	8	0	0.148	0.148	0.0892	0.158	0.184
Molybdenum	mg/kg dw	<0.02	<0.02	0.0230	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0204	0.0204	<0.02	<0.0215	0.0230
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	9,660	10,800	10,900	10,900	11,100	11,100	9,160	9,560	8	0	10,398	10,398	9,160	10,850	11,100
Potassium	mg/kg dw	14,400	18,600	18,200	18,300	19,200	19,800	14,300	15,700	8	0	17,313	17,313	14,300	18,250	19,800
Rubidium	mg/kg dw	5.50	8.39	14.4	10.8	11.2	13.6	9.83	9.71	8	0	10.4	10.4	5.50	10.3	14.4
Selenium	mg/kg dw	1.81	2.16	2.81	2.29	2.36	2.99	2.14	2.26	8	0	2.35	2.35	1.81	2.28	2.99
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,150	1,320	1,350	1,310	1,330	1,380	1,070	1,510	8	0	1,302	1,302	1,070	1,325	1,510
Strontium	mg/kg dw	0.301	0.841	0.339	0.805	1.12	0.512	0.377	0.353	8	0	0.581	0.581	0.301	0.444	1.12
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	0.00250	<0.002	<0.002	<0.002	0.00360	0.00460	8	62	0.00259	0.00259	<0.002	<0.00225	0.00460
Tin	mg/kg dw	0.320	0.550	0.410	0.160	0.320	0.300	0.420	0.190	8	0	0.334	0.334	0.160	0.320	0.550
Titanium	mg/kg dw	<0.25	0.320	0.290	<0.25	<0.25	<0.25	<0.25	<0.25	8	75	0.264	0.264	<0.25	<0.27	0.320
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	15.4	13.5	14.9	15.3	12.0	19.6	15.2	14.3	8	0	15.0	15.0	12.0	15.0	19.6
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.4: Longnose Sucker Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Ovary														
		BOL_LSU-OV-1	BOL_LSU-OV-2	BOL_LSU-OV-3	BOL_LSU-OV-4	BOL_LSU-OV-5	BOL_LSU-OV-6	BOL_LSU-OV-7	BOL_LSU-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	64.6	65.8	65.3	66.5	64.9	71.3	65.8	65.6	8	0	66.2	66.2	64.6	65.7	71.3
Aluminum	mg/kg dw	<2	<2	<2	<2	<2	<2	<2	<2	8	100	<2	<2	<2	<2	<2
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0230	0.0530	0.101	0.109	0.0720	0.230	0.0910	0.0570	8	0	0.0920	0.0920	0.0230	0.0815	0.230
Barium	mg/kg dw	0.270	0.234	0.195	0.304	0.232	0.185	0.269	0.198	8	0	0.236	0.236	0.185	0.233	0.304
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.00520	<0.005	<0.005	0.00540	0.00600	<0.005	<0.005	0.00690	8	50	0.00544	0.00544	<0.005	0.00510	0.00690
Calcium	mg/kg dw	666	650	579	874	608	1,480	668	763	8	0	786	786	579	667	1,480
Cesium	mg/kg dw	0.0109	0.0165	0.0276	0.0254	0.0183	0.0427	0.0218	0.0216	8	0	0.0231	0.0231	0.0109	0.0217	0.0427
Chromium	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	0.0660	<0.05	<0.05	8	88	0.0520	0.0520	<0.05	<0.058	0.0660
Cobalt	mg/kg dw	0.0320	0.0530	0.0630	0.0600	0.0630	0.0670	0.0500	0.0590	8	0	0.0559	0.0559	0.0320	0.0595	0.0670
Copper	mg/kg dw	3.04	3.41	3.34	3.96	3.31	6.71	3.66	3.94	8	0	3.92	3.92	3.04	3.54	6.71
Iron	mg/kg dw	52.8	56.5	44.3	54.5	42.1	84.3	53.5	57.0	8	0	55.6	55.6	42.1	54.0	84.3
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	708	791	747	813	725	961	738	795	8	0	785	785	708	769	961
Manganese	mg/kg dw	15.0	21.5	12.0	8.46	9.96	4.65	15.1	16.4	8	0	12.9	12.9	4.65	13.5	21.5
Mercury	mg/kg dw	0.0167	0.0232	0.0240	0.0266	0.0204	0.0285	0.0154	0.0224	8	0	0.0222	0.0222	0.0154	0.0228	0.0285
	mg/kg ww	0.00590	0.00790	0.00830	0.00890	0.00720	0.00820	0.00530	0.00770	8	0	0.00742	0.00742	0.00530	0.00780	0.00890
Molybdenum	mg/kg dw	0.0560	0.0470	0.0680	0.0720	0.0790	0.0950	0.0570	0.0540	8	0	0.0660	0.0660	0.0470	0.0625	0.0950
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	11,400	11,400	11,300	12,000	10,800	8,390	11,200	11,500	8	0	10,999	10,999	8,390	11,350	12,000
Potassium	mg/kg dw	6,510	6,780	6,990	6,990	6,100	9,570	6,600	6,980	8	0	7,065	7,065	6,100	6,880	9,570
Rubidium	mg/kg dw	3.03	4.42	6.97	5.42	4.80	8.05	5.73	5.15	8	0	5.45	5.45	3.03	5.28	8.05
Selenium	mg/kg dw	4.00	3.84	4.80	3.88	4.25	2.40	4.42	4.29	8	0	3.98	3.98	2.40	4.12	4.80
Silver	mg/kg dw	0.00620	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00780	8	75	0.00550	0.00550	<0.005	<0.0056	0.00780
Sodium	mg/kg dw	1,590	1,640	1,670	1,900	1,810	2,790	1,740	1,600	8	0	1,842	1,842	1,590	1,705	2,790
Strontium	mg/kg dw	0.802	0.689	0.726	1.22	0.820	1.27	0.858	0.776	8	0	0.895	0.895	0.689	0.811	1.27
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.00220	8	88	0.00202	0.00202	<0.002	<0.0021	0.00220
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	0.340	<0.1	<0.1	8	88	0.130	0.130	<0.1	<0.22	0.340
Titanium	mg/kg dw	<0.25	<0.25	<0.25	<0.25	<0.25	0.270	<0.25	<0.25	8	88	0.252	0.252	<0.25	<0.26	0.270
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/kg dw	83.2	82.6	80.5	84.4	68.6	127	69.9	81.0	8	0	84.7	84.7	68.6	81.8	127
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.4: Longnose Sucker Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Liver														
		BOL_LSU-LI-1	BOL_LSU-LI-2	BOL_LSU-LI-3	BOL_LSU-LI-4	BOL_LSU-LI-5	BOL_LSU-LI-6	BOL_LSU-LI-7	BOL_LSU-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	75.4	76.0	75.5	74.8	78.4	67.9	75.7	76.0	8	0	75	75	67.9	75.6	78.4
Aluminum	mg/kg dw	<2	3.70	<2	2.40	8.30	<2	5.70	18.5	8	38	5.58	5.58	<2	3.05	18.5
Antimony	mg/kg dw	0.0150	0.0320	0.0100	0.0130	0.0140	<0.01	0.0150	0.0290	8	12	0.0173	0.0173	0.0100	0.0145	0.0320
Arsenic	mg/kg dw	0.0870	0.170	0.115	0.108	0.162	0.0960	0.136	0.134	8	0	0.126	0.126	0.0870	0.124	0.170
Barium	mg/kg dw	0.0780	0.151	0.0610	0.316	1.07	0.0770	0.135	0.392	8	0	0.285	0.285	0.0610	0.143	1.07
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	0.272	0.334	0.329	0.267	0.342	0.0388	0.432	0.588	8	0	0.325	0.325	0.0388	0.332	0.588
Calcium	mg/kg dw	190	191	156	276	664	88.0	204	277	8	0	256	256	88.0	198	664
Cesium	mg/kg dw	0.0183	0.0244	0.0304	0.0267	0.0296	0.0190	0.0352	0.0419	8	0	0.0282	0.0282	0.0183	0.0282	0.0419
Chromium	mg/kg dw	<0.05	<0.05	0.0740	<0.05	<0.05	<0.05	<0.05	0.0580	8	75	0.0540	0.0540	<0.05	<0.054	0.0740
Cobalt	mg/kg dw	0.0640	0.0830	0.0920	0.0690	0.119	0.0320	0.106	0.108	8	0	0.0841	0.0841	0.0320	0.0875	0.119
Copper	mg/kg dw	9.05	36.8	28.6	16.4	14.3	16.4	21.4	17.8	8	0	20.1	20.1	9.05	17.1	36.8
Iron	mg/kg dw	176	123	104	211	176	86.9	396	300	8	0	197	197	86.9	176	396
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	915	1,020	945	864	1,100	502	953	1,050	8	0	919	919	502	949	1,100
Manganese	mg/kg dw	11.9	13.4	10.6	12.6	32.8	5.26	15.0	15.7	8	0	14.7	14.7	5.26	13.0	32.8
Mercury	mg/kg dw	0.138	0.199	0.162	0.136	0.137	0.0662	0.134	0.173	8	0	0.143	0.143	0.0662	0.138	0.199
	mg/kg ww	0.0340	0.0477	0.0395	0.0343	0.0296	0.0212	0.0325	0.0414	8	0	0.0350	0.0350	0.0212	0.0342	0.0477
Molybdenum	mg/kg dw	1.14	1.60	1.19	1.12	1.09	0.563	1.31	1.01	8	0	1.13	1.13	0.563	1.13	1.60
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	15,400	17,300	15,800	14,300	17,400	8,370	15,700	17,000	8	0	15,159	15,159	8,370	15,750	17,400
Potassium	mg/kg dw	14,000	14,800	14,600	13,200	17,000	9,010	16,400	15,200	8	0	14,276	14,276	9,010	14,700	17,000
Rubidium	mg/kg dw	7.54	10.5	13.6	9.44	14.2	7.89	13.1	11.6	8	0	11.0	11.0	7.54	11.0	14.2
Selenium	mg/kg dw	5.44	7.17	5.80	5.84	6.46	4.81	6.48	6.73	8	0	6.09	6.09	4.81	6.15	7.17
Silver	mg/kg dw	0.00880	0.109	0.0400	0.0158	0.0189	0.0238	0.0305	0.0443	8	0	0.0364	0.0364	0.00880	0.0272	0.109
Sodium	mg/kg dw	2,980	3,090	2,740	2,950	3,680	1,990	2,570	4,040	8	0	3,005	3,005	1,990	2,965	4,040
Strontium	mg/kg dw	0.428	0.408	0.289	1.15	3.60	0.183	0.434	0.765	8	0	0.907	0.907	0.183	0.431	3.60
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	0.00360	<0.002	0.00380	0.00440	8	62	0.00272	0.00272	<0.002	<0.0028	0.00440
Tin	mg/kg dw	<0.1	0.200	0.180	0.180	0.230	0.140	0.180	0.130	8	12	0.168	0.168	<0.1	0.180	0.230
Titanium	mg/kg dw	<0.25	0.260	<0.25	<0.25	0.480	<0.25	0.350	0.840	8	50	0.366	0.366	<0.25	0.255	0.840
Uranium	mg/kg dw	0.00310	0.00450	0.00260	0.00360	0.00630	<0.002	0.00440	0.00500	8	12	0.00394	0.00394	<0.002	0.00400	0.00630
Vanadium	mg/kg dw	0.260	0.360	0.320	0.260	0.270	<0.1	0.290	0.330	8	12	0.274	0.274	<0.1	0.280	0.360
Zinc	mg/kg dw	65.4	82.3	79.0	74.2	71.3	49.6	72.8	76.6	8	0	71.4	71.4	49.6	73.5	82.3
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.4: Longnose Sucker Tissue Quality Data for Bootjack Lake (BOL; Reference), Spring 2024

Analyte	Units	Kidney														
		BOL_LSU-KI-1	BOL_LSU-KI-2	BOL_LSU-KI-3	BOL_LSU-KI-4	BOL_LSU-KI-5	BOL_LSU-KI-6	BOL_LSU-KI-7	BOL_LSU-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	81.3	77.0	78.1	76.5	78.7	73.2	70.6	86.7	8	0	77.8	77.8	70.6	77.5	86.7
Aluminum	mg/kg dw	3.00	17.0	8.40	4.20	69.7	3.10	<2	4.30	8	12	14.0	14.0	<2	4.25	69.7
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	0.0130	<0.01	<0.01	0.0130	8	75	0.0107	0.0107	<0.01	<0.0115	0.0130
Arsenic	mg/kg dw	0.0990	0.0910	0.200	0.148	0.379	0.160	0.139	0.114	8	0	0.166	0.166	0.0910	0.144	0.379
Barium	mg/kg dw	2.48	3.79	1.75	1.81	7.39	0.688	1.21	7.45	8	0	3.32	3.32	0.688	2.14	7.45
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	<1	<1	<1	<1
Cadmium	mg/kg dw	2.26	1.83	2.03	1.43	0.483	0.508	1.94	2.61	8	0	1.64	1.64	0.483	1.88	2.61
Calcium	mg/kg dw	1,540	4,970	1,240	1,850	3,650	285	830	12,000	8	0	3,296	3,296	285	1,695	12,000
Cesium	mg/kg dw	0.0244	0.0257	0.0568	0.0336	0.0360	0.0416	0.0322	0.0404	8	0	0.0363	0.0363	0.0244	0.0348	0.0568
Chromium	mg/kg dw	0.140	0.105	0.0910	0.0520	0.197	0.0840	<0.05	0.0690	8	12	0.0985	0.0985	<0.05	0.0875	0.197
Cobalt	mg/kg dw	0.161	0.178	0.286	0.178	0.237	0.729	0.427	0.288	8	0	0.310	0.310	0.161	0.262	0.729
Copper	mg/kg dw	6.24	5.44	6.89	7.73	13.2	4.04	3.96	7.90	8	0	6.92	6.92	3.96	6.56	13.2
Iron	mg/kg dw	248	318	353	384	403	295	316	362	8	0	335	335	248	336	403
Lead	mg/kg dw	<0.02	0.0260	<0.02	<0.02	0.0380	<0.02	<0.02	0.0300	8	62	0.0242	0.0242	<0.02	<0.023	0.0380
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	611	557	660	614	843	509	400	746	8	0	618	618	400	612	843
Manganese	mg/kg dw	15.3	85.2	29.3	27.8	132	5.57	10.9	174	8	0	60.0	60.0	5.57	28.6	174
Mercury	mg/kg dw	0.370	0.310	0.302	0.296	0.157	0.121	0.216	0.342	8	0	0.264	0.264	0.121	0.299	0.370
	mg/kg ww	0.0692	0.0710	0.0661	0.0697	0.0334	0.0325	0.0633	0.0453	8	0	0.0563	0.0563	0.0325	0.0647	0.0710
Molybdenum	mg/kg dw	1.02	0.622	1.03	0.717	0.700	0.556	0.450	0.515	8	0	0.701	0.701	0.450	0.661	1.03
Nickel	mg/kg dw	0.390	0.460	0.380	0.270	0.350	0.230	0.480	0.650	8	0	0.401	0.401	0.230	0.385	0.650
Phosphorus	mg/kg dw	12,700	12,200	13,300	12,400	12,500	10,800	8,550	19,000	8	0	12,681	12,681	8,550	12,450	19,000
Potassium	mg/kg dw	9,610	8,230	11,000	9,820	10,600	9,390	6,850	9,520	8	0	9,378	9,378	6,850	9,565	11,000
Rubidium	mg/kg dw	4.72	5.32	10.6	7.26	8.61	8.37	6.36	7.16	8	0	7.30	7.30	4.72	7.21	10.6
Selenium	mg/kg dw	5.57	4.86	6.79	5.46	5.44	5.20	5.21	6.16	8	0	5.59	5.59	4.86	5.45	6.79
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	0.0166	<0.005	<0.005	0.00710	8	75	0.00671	0.00671	<0.005	<0.00605	0.0166
Sodium	mg/kg dw	9,580	8,310	6,200	6,160	6,800	4,660	5,650	18,100	8	0	8,182	8,182	4,660	6,500	18,100
Strontium	mg/kg dw	2.96	13.6	3.16	6.12	21.9	0.603	1.83	30.6	8	0	10.1	10.1	0.603	4.64	30.6
Tellurium	mg/kg dw	0.0410	0.0330	0.0230	0.0320	<0.02	<0.02	<0.02	0.0500	8	38	0.0299	0.0299	<0.02	0.0275	0.0500
Thallium	mg/kg dw	0.00720	0.00720	0.0143	0.00740	0.00420	0.0136	0.0104	0.00920	8	0	0.00919	0.00919	0.00420	0.00830	0.0143
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.310	8	88	0.126	0.126	<0.1	<0.205	0.310
Titanium	mg/kg dw	0.390	1.05	0.930	0.420	4.47	0.430	0.250	0.460	8	0	1.05	1.05	0.250	0.445	4.47
Uranium	mg/kg dw	0.0167	0.0195	0.0178	0.0118	0.0266	0.00350	0.0123	0.0205	8	0	0.0161	0.0161	0.00350	0.0173	0.0266
Vanadium	mg/kg dw	1.74	1.82	1.45	1.02	0.700	0.250	0.870	1.51	8	0	1.17	1.17	0.250	1.24	1.82
Zinc	mg/kg dw	88.5	73.2	103	71.8	71.8	106	75.4	117	8	0	88.3	88.3	71.8	82	117
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	<0.2	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 04]) used in the full sample identifiers.

Table C.7.5: Lake Trout Tissue Quality Data for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area,October 2024

Analyte	Units	Muscle														
		QUL-NCP_LT-MU-1	QUL-NCP_LT-MU-2	QUL-NCP_LT-MU-3	QUL-NCP_LT-MU-4	QUL-NCP_LT-MU-5	QUL-NCP_LT-MU-6	QUL-NCP_LT-MU-7	QUL-NCP_LT-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	82.2	76.8	76.1	77.5	73.2	78.3	80.5	75.4	8	0	77.5	2.86	73.2	77.2	82.2
Aluminum	mg/kg dw	<2	5.20	<2	20.6	3.90	3.70	2.70	3.50	8	25	5.45	6.26	<2	3.60	20.6
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.458	0.355	0.562	0.232	0.497	0.320	0.215	0.339	8	0	0.372	0.124	0.215	0.347	0.562
Barium	mg/kg dw	<0.05	0.0880	<0.05	0.143	0.103	0.123	<0.05	0.0580	8	38	0.0831	0.0355	<0.05	0.0730	0.143
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Calcium	mg/kg dw	426	324	224	391	317	377	359	406	8	0	353	64.3	224	368	426
Cesium	mg/kg dw	0.433	0.186	0.304	0.224	0.252	0.318	0.456	0.273	8	0	0.306	0.0955	0.186	0.288	0.456
Chromium	mg/kg dw	0.103	0.0990	<0.05	0.0820	0.0940	0.0790	0.0580	<0.05	8	25	0.0769	0.0195	<0.05	0.0805	0.103
Cobalt	mg/kg dw	<0.02	<0.02	<0.02	0.0300	<0.02	<0.02	<0.02	<0.02	8	88	0.0213	-	<0.02	<0.025	0.0300
Copper	mg/kg dw	1.36	1.99	1.53	1.78	1.43	1.81	1.63	1.53	8	0	1.63	0.213	1.36	1.58	1.99
Iron	mg/kg dw	16.8	19.0	20.3	49.4	21.1	21.9	32.9	17.3	8	0	24.8	11.1	16.8	20.7	49.4
Lead	mg/kg dw	<0.02	<0.02	<0.02	0.0250	0.0350	<0.02	0.0220	<0.02	8	62	0.0228	0.00523	<0.02	<0.021	0.0350
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,570	1,370	1,180	1,010	910	1,290	2,160	1,170	8	0	1,332	392	910	1,235	2,160
Manganese	mg/kg dw	0.451	0.418	0.376	0.773	0.327	0.485	0.456	0.358	8	0	0.456	0.139	0.327	0.434	0.773
Mercury	mg/kg dw	1.63	0.415	0.880	0.460	0.697	0.736	2.38	0.753	8	0	0.994	0.673	0.415	0.744	2.38
	mg/kg ww	0.290	0.0961	0.210	0.104	0.187	0.159	0.464	0.186	8	0	0.212	0.119	0.0961	0.186	0.464
Molybdenum	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	13,000	11,400	9,970	10,900	8,790	11,600	13,600	9,580	8	0	11,105	1,655	8,790	11,150	13,600
Potassium	mg/kg dw	24,200	20,000	16,500	21,300	16,000	20,200	22,500	18,400	8	0	19,888	2,837	16,000	20,100	24,200
Rubidium	mg/kg dw	74.4	42.5	53.6	52.7	45.5	56.4	46.9	44.5	8	0	52.1	10.3	42.5	49.8	74.4
Selenium	mg/kg dw	2.05	1.92	1.89	1.94	1.62	1.82	3.03	1.38	8	0	1.96	0.483	1.38	1.90	3.03
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	2,170	1,500	1,400	1,450	1,270	1,500	2,040	1,060	8	0	1,549	374	1,060	1,475	2,170
Strontium	mg/kg dw	0.281	0.237	0.190	0.404	0.280	0.364	0.295	0.342	8	0	0.299	0.0692	0.190	0.288	0.404
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0265	0.0356	0.0499	0.0393	0.0280	0.0383	0.0326	0.0372	8	0	0.0359	0.00734	0.0265	0.0364	0.0499
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.290	0.330	<0.25	1.95	0.320	0.410	0.280	0.330	8	12	0.520	0.584	<0.25	0.325	1.95
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	0.00330	<0.002	<0.002	<0.002	8	88	0.00216	-	<0.002	<0.00265	0.00330
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	14.2	17.4	12.3	14.4	11.2	14.8	18.5	10.8	8	0	14.2	2.76	10.8	14.3	18.5
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.5: Lake Trout Tissue Quality Data for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area,October 2024

Analyte	Units	Ovary								
		QUL-NCP_LT-OV-1	QUL-NCP_LT-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	66.6	65.0	2	0	65.8	1.13	65.0	65.8	66.6
Aluminum	mg/kg dw	<2	2.20	2	50	2.10	-	<2	2.10	2.20
Antimony	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.227	0.166	2	0	0.196	0.0431	0.166	0.196	0.227
Barium	mg/kg dw	<0.05	<0.05	2	100	<0.05	-	<0.05	<0.05	<0.05
Beryllium	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	2	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	2	100	<0.005	-	<0.005	<0.005	<0.005
Calcium	mg/kg dw	840	1,260	2	0	1,050	297	840	1,050	1,260
Cesium	mg/kg dw	0.0677	0.0648	2	0	0.0662	0.00205	0.0648	0.0662	0.0677
Chromium	mg/kg dw	<0.05	<0.05	2	100	<0.05	-	<0.05	<0.05	<0.05
Cobalt	mg/kg dw	0.0200	0.0380	2	0	0.0290	0.0127	0.0200	0.0290	0.0380
Copper	mg/kg dw	8.90	13.2	2	0	11.0	3.04	8.90	11.0	13.2
Iron	mg/kg dw	44.3	51.1	2	0	47.7	4.81	44.3	47.7	51.1
Lead	mg/kg dw	<0.02	<0.02	2	100	<0.02	-	<0.02	<0.02	<0.02
Lithium	mg/kg dw	<0.5	<0.5	2	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,230	1,280	2	0	1,255	35.4	1,230	1,255	1,280
Manganese	mg/kg dw	0.378	1.46	2	0	0.919	0.765	0.378	0.919	1.46
Mercury	mg/kg dw	0.182	0.0496	2	0	0.116	0.0936	0.0496	0.116	0.182
	mg/kg ww	0.0608	0.0173	2	0	0.0390	0.0308	0.0173	0.0390	0.0608
Molybdenum	mg/kg dw	<0.02	<0.02	2	100	<0.02	-	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	2	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	11,000	10,000	2	0	10,500	707	10,000	10,500	11,000
Potassium	mg/kg dw	6,220	5,710	2	0	5,965	361	5,710	5,965	6,220
Rubidium	mg/kg dw	16.3	13.4	2	0	14.8	2.05	13.4	14.8	16.3
Selenium	mg/kg dw	3.81	4.79	2	0	4.30	0.693	3.81	4.30	4.79
Silver	mg/kg dw	0.0128	0.0174	2	0	0.0151	0.00325	0.0128	0.0151	0.0174
Sodium	mg/kg dw	3,390	3,350	2	0	3,370	28.3	3,350	3,370	3,390
Strontium	mg/kg dw	2.24	2.55	2	0	2.40	0.219	2.24	2.40	2.55
Tellurium	mg/kg dw	<0.02	<0.02	2	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0155	0.0408	2	0	0.0282	0.0179	0.0155	0.0282	0.0408
Tin	mg/kg dw	<0.1	<0.1	2	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	<0.25	2	100	<0.25	-	<0.25	<0.25	<0.25
Uranium	mg/kg dw	<0.002	<0.002	2	100	<0.002	-	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	2	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	61.3	59.5	2	0	60.4	1.27	59.5	60.4	61.3
Zirconium	mg/kg dw	<0.2	<0.2	2	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.5: Lake Trout Tissue Quality Data for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area,October 2024

Analyte	Units	Liver														
		QUL-NCP_LT-LI-1	QUL-NCP_LT-LI-2	QUL-NCP_LT-LI-3	QUL-NCP_LT-LI-4	QUL-NCP_LT-LI-5	QUL-NCP_LT-LI-6	QUL-NCP_LT-LI-7	QUL-NCP_LT-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	81.1	73.2	55.1	73.5	61.3	73.3	74.1	75.4	8	0	70.9	8.40	55.1	73.4	81.1
Aluminum	mg/kg dw	<5	2.10	2.80	3.50	<2	2.70	4.20	20.5	8	25	5.09	6.43	<2	2.80	20.5
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	1.04	1.16	1.06	1.78	1.24	2.11	0.792	0.547	8	0	1.22	0.508	0.547	1.11	2.11
Barium	mg/kg dw	<0.05	<0.05	<0.05	0.0920	0.0870	<0.05	<0.05	<0.05	8	75	0.0599	0.00234	<0.05	<0.0685	0.0920
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.641	0.155	0.229	0.328	0.191	0.360	0.409	0.294	8	0	0.326	0.154	0.155	0.311	0.641
Calcium	mg/kg dw	491	176	94.0	210	102	318	174	242	8	0	226	129	94.0	193	491
Cesium	mg/kg dw	0.204	0.163	0.0337	0.0420	0.0419	0.0620	0.116	0.134	8	0	0.0996	0.0641	0.0337	0.0890	0.204
Chromium	mg/kg dw	0.240	0.0600	0.0950	0.184	0.0880	0.176	0.253	0.0790	8	0	0.147	0.0760	0.0600	0.136	0.253
Cobalt	mg/kg dw	0.0880	0.0770	0.0640	0.106	0.0560	0.144	0.126	0.0870	8	0	0.0935	0.0302	0.0560	0.0875	0.144
Copper	mg/kg dw	82.1	88.7	269	140	298	337	157	76.5	8	0	181	105	76.5	148	337
Iron	mg/kg dw	1,010	103	325	142	122	310	1,310	360	8	0	460	450	103	318	1,310
Lead	mg/kg dw	<0.05	<0.02	<0.02	0.0240	<0.02	0.0220	0.0550	0.0300	8	50	0.0267	0.0124	<0.02	0.0220	0.0550
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,010	490	222	496	293	678	478	842	8	0	564	266	222	493	1,010
Manganese	mg/kg dw	5.11	4.37	2.20	5.16	2.72	7.02	4.12	3.77	8	0	4.31	1.51	2.20	4.24	7.02
Mercury	mg/kg dw	3.43	0.410	0.851	0.622	0.760	1.12	5.84	1.18	8	0	1.78	1.89	0.410	0.986	5.84
	mg/kg ww	0.649	0.110	0.382	0.165	0.294	0.300	1.51	0.292	8	0	0.463	0.453	0.110	0.297	1.51
Molybdenum	mg/kg dw	0.354	0.505	0.192	0.547	0.192	0.416	0.616	0.326	8	0	0.394	0.157	0.192	0.385	0.616
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	17,500	11,700	5,290	14,300	6,910	11,500	10,400	15,700	8	0	11,662	4,177	5,290	11,600	17,500
Potassium	mg/kg dw	15,100	9,700	4,290	11,500	5,330	10,800	10,200	15,300	8	0	10,278	3,981	4,290	10,500	15,300
Rubidium	mg/kg dw	56.4	36.5	15.4	37.7	18.1	35.3	22.0	44.5	8	0	33.2	14.0	15.4	35.9	56.4
Selenium	mg/kg dw	6.77	12.4	4.11	7.94	3.82	7.22	13.3	5.21	8	0	7.60	3.56	3.82	7.00	13.3
Silver	mg/kg dw	0.529	0.465	1.03	0.812	1.57	1.56	1.10	0.632	8	0	0.962	0.434	0.465	0.921	1.57
Sodium	mg/kg dw	9,760	4,840	2,380	4,520	3,400	5,680	5,160	3,470	8	0	4,901	2,239	2,380	4,680	9,760
Strontium	mg/kg dw	0.460	0.303	0.186	0.482	0.322	0.495	0.305	0.278	8	0	0.354	0.112	0.186	0.314	0.495
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.550	0.249	0.0912	0.143	0.169	0.257	0.184	0.635	8	0	0.285	0.199	0.0912	0.216	0.635
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	0.250	<0.25	0.300	<0.25	<0.25	<0.25	<0.25	8	75	0.257	0.0265	0.250	<0.25	0.300
Uranium	mg/kg dw	<0.002	<0.002	<0.002	0.00310	<0.002	0.00220	<0.002	<0.002	8	75	0.00216	0.000421	<0.002	<0.0021	0.00310
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.190	<0.1	8	88	0.111	-	<0.1	<0.145	0.190
Zinc	mg/kg dw	134	124	98.9	181	112	241	148	156	8	0	149	45.1	98.9	141	241
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.5: Lake Trout Tissue Quality Data for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area,October 2024

Analyte	Units	Kidney														
		QUL-NCP_LT-KI-1	QUL-NCP_LT-KI-2	QUL-NCP_LT-KI-3	QUL-NCP_LT-KI-4	QUL-NCP_LT-KI-5	QUL-NCP_LT-KI-6	QUL-NCP_LT-KI-7	QUL-NCP_LT-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	79.5	79.5	81.5	81.5	80.7	78.7	81.6	80.3	8	0	80.4	1.10	78.7	80.5	81.6
Aluminum	mg/kg dw	17.1	10.8	14.2	9.70	9.70	14.1	36.1	17.5	8	0	16.2	8.62	9.70	14.2	36.1
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	0.0860	0.0160	<0.01	8	75	0.0202	0.0327	<0.01	<0.013	0.0860
Arsenic	mg/kg dw	0.698	0.634	0.776	0.505	0.664	0.497	0.324	0.448	8	0	0.568	0.150	0.324	0.570	0.776
Barium	mg/kg dw	0.147	0.169	0.224	0.110	0.0900	0.128	0.314	0.0720	8	0	0.157	0.0794	0.0720	0.138	0.314
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	2.60	0.812	2.41	1.04	1.30	1.13	2.24	1.26	8	0	1.60	0.700	0.812	1.28	2.60
Calcium	mg/kg dw	1,700	439	471	578	440	472	717	583	8	0	675	425	439	525	1,700
Cesium	mg/kg dw	0.100	0.138	0.229	0.113	0.145	0.128	0.194	0.186	8	0	0.154	0.0445	0.100	0.142	0.229
Chromium	mg/kg dw	0.720	0.680	0.500	0.330	<0.2	0.280	0.545	0.242	8	12	0.437	0.197	<0.2	0.415	0.720
Cobalt	mg/kg dw	0.112	0.172	0.333	0.137	0.186	0.273	0.303	0.165	8	0	0.210	0.0817	0.112	0.179	0.333
Copper	mg/kg dw	5.16	5.58	3.78	3.79	3.01	3.02	3.68	3.78	8	0	3.98	0.927	3.01	3.78	5.58
Iron	mg/kg dw	1,640	463	656	793	592	1,020	1,310	440	8	0	864	429	440	724	1,640
Lead	mg/kg dw	<0.05	0.0510	0.0660	<0.05	<0.05	<0.05	0.0240	0.0210	8	50	0.0315	0.0187	0.0210	0.0240	0.0660
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	266	756	466	381	508	576	476	396	8	0	478	146	266	471	756
Manganese	mg/kg dw	0.880	1.69	1.50	1.60	0.923	1.35	1.46	1.12	8	0	1.32	0.307	0.880	1.40	1.69
Mercury	mg/kg dw	5.62	0.783	1.79	0.776	1.24	1.48	9.38	1.89	8	0	2.87	3.06	0.776	1.64	9.38
	mg/kg ww	1.15	0.160	0.332	0.144	0.239	0.316	1.72	0.372	8	0	0.554	0.570	0.144	0.324	1.72
Molybdenum	mg/kg dw	0.179	0.244	0.331	0.172	0.156	0.155	0.317	0.252	8	0	0.226	0.0711	0.155	0.212	0.331
Nickel	mg/kg dw	0.470	0.340	0.400	0.200	0.290	0.280	0.340	0.320	8	0	0.330	0.0809	0.200	0.330	0.470
Phosphorus	mg/kg dw	6,780	12,600	11,300	10,800	10,700	10,000	10,800	11,600	8	0	10,572	1,712	6,780	10,800	12,600
Potassium	mg/kg dw	8,500	10,700	11,300	11,500	10,700	10,700	11,600	11,400	8	0	10,800	1,004	8,500	11,000	11,600
Rubidium	mg/kg dw	28.3	31.5	52.8	39.2	41.5	38.8	30.6	36.2	8	0	37.4	7.79	28.3	37.5	52.8
Selenium	mg/kg dw	8.43	6.48	7.34	5.08	5.36	5.69	15.6	7.26	8	0	7.66	3.40	5.08	6.87	15.6
Silver	mg/kg dw	0.0162	0.00920	<0.005	<0.005	<0.005	<0.005	0.00770	0.00610	8	50	0.00740	0.00380	<0.005	0.00555	0.0162
Sodium	mg/kg dw	10,000	10,100	12,000	11,000	11,400	9,920	12,200	9,390	8	0	10,751	1,047	9,390	10,550	12,200
Strontium	mg/kg dw	2.34	0.760	1.48	1.31	0.930	1.02	2.41	0.874	8	0	1.39	0.651	0.760	1.16	2.41
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0330	<0.02	8	88	0.0216	-	<0.02	<0.0265	0.0330
Thallium	mg/kg dw	0.0825	0.126	0.127	0.0897	0.0871	0.0983	0.0998	0.138	8	0	0.106	0.0212	0.0825	0.0990	0.138
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.860	0.700	1.29	0.580	0.550	0.800	2.00	0.780	8	0	0.945	0.484	0.550	0.790	2.00
Uranium	mg/kg dw	0.00570	<0.002	0.00420	0.00710	0.00400	0.00280	0.00650	0.00370	8	12	0.00450	0.00166	<0.002	0.00410	0.00710
Vanadium	mg/kg dw	0.150	<0.1	0.100	<0.1	<0.1	<0.1	0.280	<0.1	8	62	0.129	0.0728	<0.1	<0.1	0.280
Zinc	mg/kg dw	70.6	133	81.9	113	92.7	93.4	104	91.2	8	0	97.5	19.2	70.6	93.0	133
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.6: Lake Trout Tissue Quality Data for the Quesnel Lake East Arm (QUL-EAA; Reference) Monitoring Area, October 2024

Analyte	Units	Muscle														
		QUL-EAA_LT-MU-1	QUL-EAA_LT-MU-2	QUL-EAA_LT-MU-3	QUL-EAA_LT-MU-4	QUL-EAA_LT-MU-5	QUL-EAA_LT-MU-6	QUL-EAA_LT-MU-7	QUL-EAA_LT-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	79.3	74.2	81.0	77.4	74.4	68.9	75.2	81.4	8	0	76.5	4.18	68.9	76.3	81.4
Aluminum	mg/kg dw	5.80	<2	18.1	4.60	2.60	<2	<2	3.60	8	38	5.09	5.54	<2	3.10	18.1
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0560	0.196	0.292	0.163	0.264	0.479	0.189	0.193	8	0	0.229	0.123	0.0560	0.194	0.479
Barium	mg/kg dw	0.0720	<0.05	0.118	<0.05	<0.05	<0.05	<0.05	<0.05	8	75	0.0612	0.0215	<0.05	<0.061	0.118
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Calcium	mg/kg dw	844	270	495	261	245	188	327	343	8	0	372	212	188	298	844
Cesium	mg/kg dw	0.476	0.260	0.933	0.277	0.249	0.229	0.296	0.458	8	0	0.397	0.236	0.229	0.286	0.933
Chromium	mg/kg dw	0.0550	<0.05	0.102	<0.05	<0.05	0.0530	<0.05	<0.05	8	62	0.0575	0.0197	<0.05	<0.0515	0.102
Cobalt	mg/kg dw	<0.02	<0.02	0.0200	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0200	-	<0.02	<0.02	0.0200
Copper	mg/kg dw	0.870	1.74	1.46	0.920	0.820	1.03	1.14	2.97	8	0	1.37	0.720	0.820	1.08	2.97
Iron	mg/kg dw	40.5	20.6	72.0	23.2	13.1	9.30	22.8	46.6	8	0	31.0	20.8	9.30	23.0	72.0
Lead	mg/kg dw	<0.02	<0.02	<0.02	0.0260	<0.02	<0.02	<0.02	<0.02	8	88	0.0208	-	<0.02	<0.023	0.0260
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,330	938	1,560	1,260	1,090	997	1,040	1,510	8	0	1,216	237	938	1,175	1,560
Manganese	mg/kg dw	0.528	0.402	0.753	0.325	0.308	0.220	0.311	0.507	8	0	0.419	0.171	0.220	0.364	0.753
Mercury	mg/kg dw	2.54	1.04	2.12	1.60	1.12	0.725	1.96	2.62	8	0	1.72	0.710	0.725	1.78	2.62
	mg/kg ww	0.526	0.269	0.404	0.362	0.285	0.226	0.486	0.488	8	0	0.381	0.113	0.226	0.383	0.526
Molybdenum	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	11,700	8,460	12,600	10,400	9,510	7,330	8,930	13,000	8	0	10,241	2,043	7,330	9,955	13,000
Potassium	mg/kg dw	20,600	14,500	23,900	18,900	17,400	13,200	15,600	23,300	8	0	18,425	3,972	13,200	18,150	23,900
Rubidium	mg/kg dw	36.0	26.0	56.5	36.8	35.1	35.7	33.7	44.5	8	0	38.0	8.99	26.0	35.8	56.5
Selenium	mg/kg dw	1.83	1.62	1.93	2.10	1.68	1.24	1.88	2.07	8	0	1.79	0.280	1.24	1.86	2.10
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,560	1,310	2,400	1,700	1,270	897	1,340	2,230	8	0	1,588	507	897	1,450	2,400
Strontium	mg/kg dw	0.806	0.182	0.586	0.122	0.128	0.113	0.334	0.168	8	0	0.305	0.258	0.113	0.175	0.806
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0232	0.0283	0.0424	0.0247	0.0203	0.0441	0.0386	0.0353	8	0	0.0321	0.00918	0.0203	0.0318	0.0441
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	0.270	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	8	88	0.252	-	<0.25	<0.26	0.270
Uranium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	100	<0.002	-	<0.002	<0.002	<0.002
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	13.1	13.3	17.1	13.0	11.6	8.90	14.6	21.2	8	0	14.1	3.70	8.90	13.2	21.2
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.6: Lake Trout Tissue Quality Data for the Quesnel Lake East Arm (QUL-EAA; Reference) Monitoring Area, October 2024

Analyte	Units	Ovary	Liver														
		QUL-EAA_LT-OV-3	QUL-EAA_LT-LI-1	QUL-EAA_LT-LI-2	QUL-EAA_LT-LI-3	QUL-EAA_LT-LI-4	QUL-EAA_LT-LI-5	QUL-EAA_LT-LI-6	QUL-EAA_LT-LI-7	QUL-EAA_LT-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	84.4	67.2	67.6	78.8	73.9	72.4	58.0	65.4	70.7	8	0	69.2	6.25	58.0	69.2	78.8
Aluminum	mg/kg dw	<2	3.80	3.10	3.60	8.10	2.40	<2	<2	12.0	8	25	4.62	3.58	<2	3.35	12.0
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	0.172	<0.01	<0.01	<0.01	<0.01	8	88	0.0302	-	<0.01	<0.091	0.172
Arsenic	mg/kg dw	0.0590	0.291	0.551	0.314	0.760	0.638	0.815	0.210	0.717	8	0	0.537	0.235	0.210	0.594	0.815
Barium	mg/kg dw	<0.05	<0.05	0.0550	<0.05	0.129	<0.05	<0.05	<0.05	0.0940	8	62	0.0660	0.0318	<0.05	<0.0525	0.129
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0327	0.315	0.325	0.760	0.302	0.158	0.192	0.161	0.384	8	0	0.325	0.195	0.158	0.308	0.760
Calcium	mg/kg dw	1,020	167	169	272	305	223	86.0	277	674	8	0	272	178	86.0	248	674
Cesium	mg/kg dw	0.595	0.0945	0.0662	0.280	0.101	0.132	0.0337	0.0628	0.106	8	0	0.110	0.0753	0.0337	0.0978	0.280
Chromium	mg/kg dw	0.128	0.337	0.219	0.466	0.294	0.136	0.0520	0.117	0.368	8	0	0.249	0.142	0.0520	0.256	0.466
Cobalt	mg/kg dw	0.168	0.106	0.125	0.216	0.157	0.101	0.0580	0.124	0.176	8	0	0.133	0.0490	0.0580	0.124	0.216
Copper	mg/kg dw	10.2	102	74.2	11.2	232	275	137	87.0	156	8	0	134	86.1	11.2	120	275
Iron	mg/kg dw	244	2,630	455	691	1,420	436	459	508	2,290	8	0	1,111	898	436	600	2,630
Lead	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0340	8	88	0.0217	-	<0.02	<0.027	0.0340
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	636	420	467	640	446	509	202	368	670	8	0	465	149	202	456	670
Manganese	mg/kg dw	3.48	3.58	3.57	2.83	3.17	4.10	1.78	2.96	6.50	8	0	3.56	1.37	1.78	3.37	6.50
Mercury	mg/kg dw	2.76	5.15	1.52	6.15	3.01	1.87	0.836	3.70	4.31	8	0	3.32	1.86	0.836	3.36	6.15
	mg/kg ww	0.430	1.69	0.494	1.30	0.786	0.516	0.351	1.28	1.26	8	0	0.960	0.486	0.351	1.02	1.69
Molybdenum	mg/kg dw	0.0700	0.843	0.424	0.280	0.574	0.378	0.202	0.315	0.706	8	0	0.465	0.223	0.202	0.401	0.843
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	10,300	8,760	10,300	14,000	11,400	10,500	4,420	9,000	14,600	8	0	10,372	3,208	4,420	10,400	14,600
Potassium	mg/kg dw	13,800	7,760	7,480	13,600	9,310	8,210	4,300	5,730	9,550	8	0	8,242	2,783	4,300	7,985	13,600
Rubidium	mg/kg dw	40.5	17.2	16.0	41.4	25.2	20.1	13.3	15.9	22.6	8	0	21.5	8.95	13.3	18.6	41.4
Selenium	mg/kg dw	5.10	8.84	12.0	10.3	11.5	8.82	2.58	7.96	26.1	8	0	11.0	6.75	2.58	9.57	26.1
Silver	mg/kg dw	0.0158	0.480	0.289	0.0293	1.92	1.47	0.755	0.617	1.10	8	0	0.833	0.630	0.0293	0.686	1.92
Sodium	mg/kg dw	13,800	4,270	4,150	8,090	6,130	5,110	2,340	4,840	4,010	8	0	4,868	1,692	2,340	4,555	8,090
Strontium	mg/kg dw	1.15	0.265	0.266	0.302	0.590	0.366	0.177	0.410	3.81	8	0	0.773	1.23	0.177	0.334	3.81
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0629	0.0949	0.145	0.340	0.192	0.167	0.0973	0.125	0.206	8	0	0.171	0.0795	0.0949	0.156	0.340
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	<0.25	<0.25	<0.25	0.560	<0.25	<0.25	<0.25	0.410	8	75	0.309	0.0702	<0.25	<0.33	0.560
Uranium	mg/kg dw	<0.002	0.00230	<0.002	0.00250	<0.002	<0.002	<0.002	<0.002	0.00320	8	62	0.00225	0.000362	<0.002	<0.00215	0.00320
Vanadium	mg/kg dw	<0.1	0.160	<0.1	0.110	0.120	<0.1	<0.1	<0.1	0.170	8	50	0.120	0.0271	<0.1	0.105	0.170
Zinc	mg/kg dw	129	148	136	108	149	162	74.8	109	149	8	0	129	29.5	74.8	142	162
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.6: Lake Trout Tissue Quality Data for the Quesnel Lake East Arm (QUL-EAA; Reference) Monitoring Area, October 2024

Analyte	Units	Kidney														
		QUL-EAA_LT-KI-1	QUL-EAA_LT-KI-2	QUL-EAA_LT-KI-3	QUL-EAA_LT-KI-4	QUL-EAA_LT-KI-5	QUL-EAA_LT-KI-6	QUL-EAA_LT-KI-7	QUL-EAA_LT-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	81.3	82.9	85.2	81.2	79.1	79.6	79.2	84.2	8	0	81.6	2.32	79.1	81.2	85.2
Aluminum	mg/kg dw	19.7	25.1	69.9	23.9	22.8	19.8	10.0	14.8	8	0	25.8	18.5	10.0	21.3	69.9
Antimony	mg/kg dw	<0.01	<0.01	0.0180	<0.01	<0.02	<0.01	<0.01	<0.01	8	88	0.0111	-	<0.01	<0.014	0.0180
Arsenic	mg/kg dw	0.190	0.281	0.286	0.356	0.438	0.595	0.190	0.187	8	0	0.315	0.144	0.187	0.284	0.595
Barium	mg/kg dw	0.188	0.148	0.283	0.145	0.148	0.112	0.184	0.198	8	0	0.176	0.0518	0.112	0.166	0.283
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1.1	<1	<1	<1	8	100	<1	-	<1	<1	<1.1
Cadmium	mg/kg dw	1.23	1.62	3.70	1.71	1.56	1.63	1.15	2.10	8	0	1.84	0.807	1.15	1.62	3.70
Calcium	mg/kg dw	593	632	736	734	806	457	688	620	8	0	658	108	457	660	806
Cesium	mg/kg dw	0.228	0.205	0.436	0.142	0.196	0.195	0.171	0.219	8	0	0.224	0.0898	0.142	0.200	0.436
Chromium	mg/kg dw	1.06	0.262	0.823	0.601	0.470	0.303	0.278	0.578	8	0	0.547	0.283	0.262	0.524	1.06
Cobalt	mg/kg dw	0.380	0.493	0.361	0.409	0.490	0.296	0.387	0.276	8	0	0.386	0.0790	0.276	0.384	0.493
Copper	mg/kg dw	3.41	4.63	3.36	3.73	4.76	3.46	3.46	4.36	8	0	3.90	0.589	3.36	3.60	4.76
Iron	mg/kg dw	1,850	1,000	1,300	1,940	952	747	1,090	1,520	8	0	1,300	434	747	1,195	1,940
Lead	mg/kg dw	0.0280	0.0850	0.0570	0.0750	<0.05	<0.02	<0.02	0.0300	8	38	0.0424	0.0250	<0.02	0.0300	0.0850
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	546	562	623	518	866	353	636	677	8	0	598	147	353	592	866
Manganese	mg/kg dw	1.05	1.82	2.00	1.36	2.03	1.15	0.918	0.916	8	0	1.41	0.476	0.916	1.25	2.03
Mercury	mg/kg dw	10.7	4.45	14.8	7.04	2.79	2.75	8.24	8.87	8	0	7.46	4.14	2.75	7.64	14.8
	mg/kg ww	2.00	0.761	2.18	1.32	0.583	0.562	1.71	1.40	8	0	1.31	0.631	0.562	1.36	2.18
Molybdenum	mg/kg dw	0.331	0.334	0.273	0.331	0.271	0.257	0.184	0.263	8	0	0.280	0.0511	0.184	0.272	0.334
Nickel	mg/kg dw	0.580	0.530	0.860	0.490	0.820	0.500	0.350	0.440	8	0	0.571	0.179	0.350	0.515	0.860
Phosphorus	mg/kg dw	12,300	12,100	11,600	10,000	12,000	9,860	9,590	12,900	8	0	11,294	1,280	9,590	11,800	12,900
Potassium	mg/kg dw	11,500	11,500	12,400	10,100	10,800	10,300	10,200	14,700	8	0	11,438	1,540	10,100	11,150	14,700
Rubidium	mg/kg dw	25.5	27.7	35.6	24.5	31.9	38.4	26.7	34.2	8	0	30.6	5.17	24.5	29.8	38.4
Selenium	mg/kg dw	17.7	11.6	14.4	16.1	11.0	7.44	9.95	16.1	8	0	13.0	3.57	7.44	13.0	17.7
Silver	mg/kg dw	0.00860	0.00520	0.0118	0.0107	0.0104	<0.005	0.00710	0.00930	8	12	0.00851	0.00253	<0.005	0.00895	0.0118
Sodium	mg/kg dw	9,830	12,200	14,500	10,700	10,200	10,500	10,100	13,800	8	0	11,479	1,807	9,830	10,600	14,500
Strontium	mg/kg dw	2.43	2.04	2.49	2.28	2.13	0.841	2.19	1.78	8	0	2.02	0.527	0.841	2.16	2.49
Tellurium	mg/kg dw	<0.02	0.0200	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0200	-	<0.02	<0.02	0.0200
Thallium	mg/kg dw	0.116	0.161	0.150	0.119	0.127	0.162	0.125	0.110	8	0	0.134	0.0208	0.110	0.126	0.162
Tin	mg/kg dw	<0.1	<0.1	0.100	<0.1	<0.1	<0.1	<0.1	<0.1	8	88	0.100	-	<0.1	<0.1	0.100
Titanium	mg/kg dw	0.420	0.790	1.38	0.610	<0.56	0.980	<0.25	0.280	8	25	0.628	0.407	<0.25	0.515	1.38
Uranium	mg/kg dw	0.00900	0.00470	0.0121	0.00590	0.00420	0.00360	0.00300	0.00690	8	0	0.00618	0.00308	0.00300	0.00530	0.0121
Vanadium	mg/kg dw	0.150	<0.1	0.130	0.100	<0.1	<0.1	<0.1	<0.1	8	62	0.110	0.0221	<0.1	<0.1	0.150
Zinc	mg/kg dw	114	136	104	111	149	110	103	120	8	0	118	16.2	103	112	149
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.7: Northern Pikeminnow Tissue Quality Data for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) Monitoring Area, October 2024

Analyte	Units	Whole-body														
		QUL-NHC _NSC_WB-1	QUL-NHC _NSC_WB-2	QUL-NHC _NSC_WB-3	QUL-NHC _NSC_WB-4	QUL-NHC _NSC_WB-5	QUL-NHC _NSC_WB-6	QUL-NHC _NSC_WB-7	QUL-NHC _NSC_WB-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	81.4	77.8	81.0	67.2	68.5	82.0	80.2	73.4	8	0	76.4	5.98	67.2	79.0	82.0
Aluminum	mg/kg dw	9.40	6.80	10.4	3.50	23.1	2.20	24.7	25.4	8	0	13.2	9.69	2.20	9.90	25.4
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0880	0.170	0.0750	0.0550	0.0860	0.0540	0.0710	0.0930	8	0	0.0865	0.0367	0.0540	0.0805	0.170
Barium	mg/kg dw	2.63	3.26	0.264	0.550	1.88	0.491	2.26	2.84	8	0	1.77	1.18	0.264	2.07	3.26
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0644	0.117	0.103	0.0458	0.0899	0.0499	0.0478	0.156	8	0	0.0842	0.0396	0.0458	0.0772	0.156
Calcium	mg/kg dw	58,600	42,900	4,670	10,900	40,600	7,020	37,600	58,200	8	0	32,561	22,142	4,670	39,100	58,600
Cesium	mg/kg dw	0.0530	0.0601	0.112	0.0368	0.0424	0.0634	0.0784	0.0934	8	0	0.0674	0.0257	0.0368	0.0618	0.112
Chromium	mg/kg dw	<0.05	0.0800	<0.05	<0.05	0.0710	<0.05	0.122	0.0560	8	50	0.0661	0.0251	<0.05	0.0530	0.122
Cobalt	mg/kg dw	0.0970	0.0430	0.0620	0.0340	0.110	0.234	0.122	0.114	8	0	0.102	0.0630	0.0340	0.104	0.234
Copper	mg/kg dw	4.31	4.45	5.57	2.46	3.66	4.17	2.42	2.98	8	0	3.75	1.09	2.42	3.92	5.57
Iron	mg/kg dw	75.6	105	113	47.8	83.9	55.2	86.5	90.1	8	0	82.1	22.4	47.8	85.2	113
Lead	mg/kg dw	0.0340	0.0290	<0.02	<0.02	0.0270	<0.02	0.0600	0.0780	8	38	0.0360	0.0204	<0.02	0.0280	0.0780
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	2,210	1,930	1,080	787	1,510	2,520	2,180	1,840	8	0	1,757	593	787	1,885	2,520
Manganese	mg/kg dw	9.23	14.9	1.54	1.95	8.18	3.73	14.5	14.2	8	0	8.53	5.66	1.54	8.70	14.9
Mercury	mg/kg dw	0.234	0.264	0.324	0.190	0.144	0.167	0.201	0.141	8	0	0.208	0.0631	0.141	0.196	0.324
	mg/kg ww	0.0437	0.0586	0.0617	0.0621	0.0453	0.0302	0.0399	0.0376	8	0	0.0474	0.0120	0.0302	0.0445	0.0621
Molybdenum	mg/kg dw	0.0470	0.0440	0.0700	0.0330	0.0440	0.0360	0.0500	0.0440	8	0	0.0460	0.0112	0.0330	0.0440	0.0700
Nickel	mg/kg dw	0.210	0.390	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	75	0.225	0.0842	<0.2	<0.205	0.390
Phosphorus	mg/kg dw	40,100	32,500	10,400	10,900	28,600	13,100	28,700	39,700	8	0	25,500	12,413	10,400	28,650	40,100
Potassium	mg/kg dw	13,700	14,700	16,600	9,710	10,800	15,200	14,500	11,800	8	0	13,376	2,373	9,710	14,100	16,600
Rubidium	mg/kg dw	14.3	9.40	29.6	12.7	12.7	19.2	17.1	20.0	8	0	16.9	6.26	9.40	15.7	29.6
Selenium	mg/kg dw	3.06	6.48	3.73	1.73	3.04	4.20	3.50	3.47	8	0	3.65	1.35	1.73	3.48	6.48
Silver	mg/kg dw	0.0112	<0.005	0.0104	<0.005	0.0125	0.00540	<0.005	<0.005	8	50	0.00744	0.00339	<0.005	0.00520	0.0125
Sodium	mg/kg dw	2,310	3,090	3,820	2,650	2,920	5,310	2,940	3,300	8	0	3,292	928	2,310	3,015	5,310
Strontium	mg/kg dw	101	77.2	5.22	16.5	62.2	7.55	65.6	74.2	8	0	51.2	36.3	5.22	63.9	101
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0180	0.00670	0.0122	0.00650	0.0112	0.00810	0.00840	0.00620	8	0	0.00966	0.00402	0.00620	0.00825	0.0180
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.540	0.640	0.910	0.300	1.50	<0.25	1.39	1.08	8	12	0.826	0.470	<0.25	0.775	1.50
Uranium	mg/kg dw	0.00780	0.00600	0.00200	<0.002	0.0114	<0.002	0.00690	0.00950	8	25	0.00595	0.00374	0.00200	0.00645	0.0114
Vanadium	mg/kg dw	<0.1	0.100	<0.1	<0.1	0.110	<0.1	0.140	0.200	8	50	0.119	0.0385	<0.1	0.100	0.200
Zinc	mg/kg dw	188	115	93.4	85.8	114	126	160	153	8	0	129	35.0	85.8	120	188
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.8: Northern Pikeminnow Tissue Quality Data for the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024

Analyte	Units	Whole-body														
		QUL-NGC _NSC_WB-1	QUL-NGC _NSC_WB-2	QUL-NGC _NSC_WB-3	QUL-NGC _NSC_WB-4	QUL-NGC _NSC_WB-5	QUL-NGC _NSC_WB-6	QUL-NGC _NSC_WB-7	QUL-NGC _NSC_WB-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	79.6	86.9	78.6	77.8	80.5	80.2	78.2	72.7	8	0	79.3	3.92	72.7	79.1	86.9
Aluminum	mg/kg dw	4.50	58.9	6.20	4.00	209	13.3	3.20	<2	8	12	37.6	72.5	<2	5.35	209
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0580	0.125	0.0770	0.0570	0.0660	0.0440	0.0600	0.0560	8	0	0.0679	0.0249	0.0440	0.0590	0.125
Barium	mg/kg dw	1.37	2.70	1.24	1.42	3.15	4.16	6.06	1.17	8	0	2.66	1.75	1.17	2.06	6.06
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	0.0100	<0.01	<0.01	<0.01	8	88	0.0100	-	<0.01	<0.01	0.0100
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0336	0.0197	0.0703	0.0271	0.0322	0.0246	0.107	0.0212	8	0	0.0420	0.0308	0.0197	0.0296	0.107
Calcium	mg/kg dw	56,800	64,800	33,500	53,200	43,400	91,800	97,400	18,600	8	0	57,438	27,068	18,600	55,000	97,400
Cesium	mg/kg dw	0.113	0.119	0.242	0.110	0.414	0.0598	0.0690	0.106	8	0	0.154	0.119	0.0598	0.112	0.414
Chromium	mg/kg dw	<0.05	0.294	<0.05	<0.05	0.474	0.0680	0.0590	<0.05	8	50	0.137	0.170	<0.05	0.0545	0.474
Cobalt	mg/kg dw	0.138	0.0820	0.0910	0.0700	0.290	0.144	0.0560	0.0370	8	0	0.114	0.0804	0.0370	0.0865	0.290
Copper	mg/kg dw	3.23	6.09	4.25	2.76	3.69	3.26	7.77	2.13	8	0	4.15	1.88	2.13	3.48	7.77
Iron	mg/kg dw	61.0	187	86.5	62.9	439	78.0	59.0	48.2	8	0	128	133	48.2	70.5	439
Lead	mg/kg dw	0.0380	0.360	0.0320	0.0240	0.176	0.137	0.0360	<0.02	8	12	0.103	0.120	<0.02	0.0370	0.360
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	2,710	2,650	1,910	1,980	2,680	2,940	2,720	777	8	0	2,296	717	777	2,665	2,940
Manganese	mg/kg dw	7.24	11.6	10.4	8.24	17.0	12.2	24.2	5.08	8	0	12.0	6.11	5.08	11.0	24.2
Mercury	mg/kg dw	0.155	0.313	0.256	0.102	0.196	0.117	0.169	0.404	8	0	0.214	0.104	0.102	0.182	0.404
	mg/kg ww	0.0316	0.0410	0.0549	0.0226	0.0382	0.0231	0.0368	0.110	8	0	0.0448	0.0283	0.0226	0.0375	0.110
Molybdenum	mg/kg dw	0.0360	0.0530	0.0520	0.0400	0.0630	0.0400	0.0540	0.0260	8	0	0.0455	0.0120	0.0260	0.0460	0.0630
Nickel	mg/kg dw	<0.2	0.610	<0.2	<0.2	0.440	0.210	<0.2	<0.2	8	62	0.282	0.175	<0.2	<0.205	0.610
Phosphorus	mg/kg dw	38,800	41,600	26,200	37,000	31,900	55,200	58,900	15,800	8	0	38,175	14,224	15,800	37,900	58,900
Potassium	mg/kg dw	13,000	12,700	14,900	13,400	14,300	9,850	13,800	10,800	8	0	12,844	1,722	9,850	13,200	14,900
Rubidium	mg/kg dw	21.6	22.4	29.6	25.8	33.5	14.2	15.1	15.5	8	0	22.2	7.12	14.2	22.0	33.5
Selenium	mg/kg dw	2.39	2.10	2.20	1.94	1.45	2.04	2.85	2.14	8	0	2.14	0.396	1.45	2.12	2.85
Silver	mg/kg dw	0.0172	0.00550	0.00720	<0.005	0.0108	0.0118	0.0444	<0.005	8	25	0.0134	0.0135	<0.005	0.00900	0.0444
Sodium	mg/kg dw	3,200	2,450	3,350	2,590	3,070	2,090	4,080	2,900	8	0	2,966	613	2,090	2,985	4,080
Strontium	mg/kg dw	85.1	101	58.0	77.4	70.4	201	156	32.2	8	0	97.6	55.1	32.2	81.2	201
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00680	0.0119	0.00700	0.0106	0.0132	0.0118	0.00980	0.00310	8	0	0.00928	0.00338	0.00310	0.0102	0.0132
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	0.400	5.29	0.540	0.410	12.6	1.14	0.370	<0.25	8	12	2.62	4.41	<0.25	0.475	12.6
Uranium	mg/kg dw	0.00930	0.0490	0.0266	0.0138	0.0963	0.0330	0.0520	0.00620	8	0	0.0358	0.0299	0.00620	0.0298	0.0963
Vanadium	mg/kg dw	<0.1	0.520	<0.1	<0.1	0.440	0.160	<0.1	<0.1	8	62	0.202	0.171	<0.1	<0.13	0.520
Zinc	mg/kg dw	154	174	146	150	173	237	257	205	8	0	187	41.8	146	174	257
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.9: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) Monitoring Area, October 2024

Analyte	Units	Muscle														
		QUL-NHC_PCC-MU-1	QUL-NHC_PCC-MU-2	QUL-NHC_PCC-MU-3	QUL-NHC_PCC-MU-4	QUL-NHC_PCC-MU-5	QUL-NHC_PCC-MU-6	QUL-NHC_PCC-MU-7	QUL-NHC_PCC-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	78.7	79.5	76.9	80.2	74.4	79.6	81.4	83.5	8	0	79.3	2.75	74.4	79.5	83.5
Aluminum	mg/kg dw	<5	<5	<5	<5	<5	<5	<5	<5	8	100	<5	-	<5	<5	<5
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.163	0.172	0.0950	0.188	0.165	0.198	0.230	0.155	8	0	0.171	0.0390	0.0950	0.168	0.230
Barium	mg/kg dw	0.456	0.583	0.631	0.790	0.675	0.648	0.703	0.717	8	0	0.650	0.100	0.456	0.662	0.790
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	0.0140	0.0140	0.0150	8	62	0.0116	0.000405	<0.01	<0.012	0.0150
Calcium	mg/kg dw	4,840	5,170	2,860	3,310	4,370	3,410	6,680	5,550	8	0	4,524	1,294	2,860	4,605	6,680
Cesium	mg/kg dw	0.144	0.144	0.126	0.0596	0.134	0.133	0.155	0.208	8	0	0.138	0.0407	0.0596	0.139	0.208
Chromium	mg/kg dw	<0.2	<0.2	<0.2	0.440	<0.2	<0.2	<0.2	<0.2	8	88	0.230	-	<0.2	<0.32	0.440
Cobalt	mg/kg dw	<0.02	<0.02	0.0300	0.0200	<0.02	0.0250	<0.02	<0.02	8	62	0.0219	0.00426	<0.02	<0.02	0.0300
Copper	mg/kg dw	0.910	0.890	1.06	1.00	0.720	1.18	0.760	1.07	8	0	0.949	0.159	0.720	0.955	1.18
Iron	mg/kg dw	8.80	10.1	19.5	52.2	8.30	12.7	9.10	13.5	8	0	16.8	14.8	8.30	11.4	52.2
Lead	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	-	<0.05	<0.05	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,650	2,140	1,330	1,770	1,530	1,960	2,500	2,820	8	0	1,962	504	1,330	1,865	2,820
Manganese	mg/kg dw	2.14	2.39	1.68	1.71	1.60	1.38	2.50	2.27	8	0	1.96	0.416	1.38	1.92	2.50
Mercury	mg/kg dw	1.14	1.44	0.982	1.33	0.863	0.981	0.939	1.47	8	0	1.14	0.240	0.863	1.06	1.47
	mg/kg ww	0.243	0.295	0.227	0.264	0.221	0.200	0.174	0.243	8	0	0.233	0.0373	0.174	0.235	0.295
Molybdenum	mg/kg dw	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	8	100	<0.04	-	<0.04	<0.04	<0.04
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	13,500	15,900	10,600	13,200	11,400	14,100	17,400	19,000	8	0	14,388	2,883	10,600	13,800	19,000
Potassium	mg/kg dw	22,100	25,900	17,500	23,200	17,400	22,900	27,100	32,100	8	0	23,525	4,903	17,400	23,050	32,100
Rubidium	mg/kg dw	23.4	29.0	20.1	12.8	20.0	24.1	27.7	35.5	8	0	24.1	6.84	12.8	23.8	35.5
Selenium	mg/kg dw	2.17	3.52	2.65	2.91	3.09	2.78	2.51	3.85	8	0	2.94	0.544	2.17	2.84	3.85
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,100	1,330	1,100	1,250	1,040	996	1,620	1,100	8	0	1,192	204	996	1,100	1,620
Strontium	mg/kg dw	11.4	10.5	5.45	6.50	8.92	6.78	14.8	11.6	8	0	9.49	3.17	5.45	9.71	14.8
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00520	0.00740	0.00400	0.00500	0.00490	0.0107	0.00930	0.00430	8	0	0.00635	0.00250	0.00400	0.00510	0.0107
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Uranium	mg/kg dw	0.00390	0.00370	0.00310	0.00210	0.00340	<0.002	0.00420	0.00330	8	12	0.00321	0.000784	<0.002	0.00335	0.00420
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	23.0	33.3	25.6	36.1	19.0	21.8	22.6	33.4	8	0	26.8	6.45	19.0	24.3	36.1
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.9: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) Monitoring Area, October 2024

Analyte	Units	Ovary								
		QUL-NHC_PCC-OV-1	QUL-NHC_PCC-OV-7	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	64.7	64.5	2	0	64.6	0.141	64.5	64.6	64.7
Aluminum	mg/kg dw	<2	<5	2	100	<2	-	<2	<2	<5
Antimony	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.143	0.105	2	0	0.124	0.0269	0.105	0.124	0.143
Barium	mg/kg dw	0.295	0.272	2	0	0.284	0.0163	0.272	0.284	0.295
Beryllium	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	2	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	2	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0117	0.0190	2	0	0.0154	0.00516	0.0117	0.0154	0.0190
Calcium	mg/kg dw	254	676	2	0	465	298	254	465	676
Cesium	mg/kg dw	0.0366	0.0380	2	0	0.0373	0.000990	0.0366	0.0373	0.0380
Chromium	mg/kg dw	<0.05	<0.2	2	100	<0.05	-	<0.05	<0.05	<0.2
Cobalt	mg/kg dw	0.0590	0.0730	2	0	0.0660	0.00990	0.0590	0.0660	0.0730
Copper	mg/kg dw	3.95	4.17	2	0	4.06	0.156	3.95	4.06	4.17
Iron	mg/kg dw	207	65.8	2	0	136	99.8	65.8	136	207
Lead	mg/kg dw	<0.02	<0.05	2	100	<0.02	-	<0.02	<0.02	<0.05
Lithium	mg/kg dw	<0.5	<0.5	2	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	586	770	2	0	678	130	586	678	770
Manganese	mg/kg dw	8.01	7.43	2	0	7.72	0.410	7.43	7.72	8.01
Mercury	mg/kg dw	0.0356	0.0289	2	0	0.0322	0.00474	0.0289	0.0322	0.0356
	mg/kg ww	0.0126	0.0103	2	0	0.0114	0.00163	0.0103	0.0114	0.0126
Molybdenum	mg/kg dw	0.0820	0.0910	2	0	0.0865	0.00636	0.0820	0.0865	0.0910
Nickel	mg/kg dw	<0.2	<0.2	2	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	9,920	11,400	2	0	10,660	1,047	9,920	10,660	11,400
Potassium	mg/kg dw	6,770	8,280	2	0	7,525	1,068	6,770	7,525	8,280
Rubidium	mg/kg dw	8.90	9.63	2	0	9.26	0.516	8.90	9.26	9.63
Selenium	mg/kg dw	9.99	7.59	2	0	8.79	1.70	7.59	8.79	9.99
Silver	mg/kg dw	0.0202	0.0337	2	0	0.0270	0.00955	0.0202	0.0270	0.0337
Sodium	mg/kg dw	1,270	1,690	2	0	1,480	297	1,270	1,480	1,690
Strontium	mg/kg dw	0.452	1.07	2	0	0.761	0.437	0.452	0.761	1.07
Tellurium	mg/kg dw	<0.02	<0.02	2	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00410	0.00440	2	0	0.00425	0.000212	0.00410	0.00425	0.00440
Tin	mg/kg dw	<0.1	<0.1	2	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	<0.5	2	100	<0.25	-	<0.25	<0.25	<0.5
Uranium	mg/kg dw	0.00540	0.00850	2	0	0.00695	0.00219	0.00540	0.00695	0.00850
Vanadium	mg/kg dw	<0.1	<0.1	2	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	99.3	105	2	0	102	4.03	99.3	102	105
Zirconium	mg/kg dw	<0.2	<0.2	2	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.9: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) Monitoring Area, October 2024

Analyte	Units	Liver														
		QUL-NHC_PCC-LI-1	QUL-NHC_PCC-LI-2	QUL-NHC_PCC-LI-3	QUL-NHC_PCC-LI-4	QUL-NHC_PCC-LI-5	QUL-NHC_PCC-LI-6	QUL-NHC_PCC-LI-7	QUL-NHC_PCC-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	75.7	67.7	68.1	72.1	74.3	68.1	75.0	79.5	8	0	72.6	4.32	67.7	73.2	79.5
Aluminum	mg/kg dw	8.00	9.20	10.7	24.4	16.9	5.40	7.50	9.20	8	0	11.4	6.24	5.40	9.20	24.4
Antimony	mg/kg dw	<0.02	<0.02	0.0200	<0.02	<0.02	<0.02	<0.01	<0.01	8	88	0.0112	-	<0.01	<0.015	0.0200
Arsenic	mg/kg dw	0.144	0.225	0.144	0.128	0.146	0.352	0.232	0.335	8	0	0.213	0.0894	0.128	0.186	0.352
Barium	mg/kg dw	0.144	0.123	0.468	0.309	0.292	0.100	0.197	0.238	8	0	0.234	0.122	0.100	0.218	0.468
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	0.0270	0.0110	0.0220	<0.01	<0.01	<0.01	8	62	0.0138	0.00732	<0.01	<0.0105	0.0270
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	1.03	0.363	1.17	1.11	1.78	0.524	1.51	1.56	8	0	1.13	0.496	0.363	1.14	1.78
Calcium	mg/kg dw	220	130	538	193	153	93.0	345	275	8	0	243	144	93.0	206	538
Cesium	mg/kg dw	0.0362	0.0319	0.0394	0.0219	0.0465	0.0246	0.0290	0.0371	8	0	0.0333	0.00811	0.0219	0.0340	0.0465
Chromium	mg/kg dw	0.220	0.340	0.500	0.420	0.340	0.210	0.280	0.320	8	0	0.329	0.0973	0.210	0.330	0.500
Cobalt	mg/kg dw	0.123	0.132	0.273	0.157	0.158	0.134	0.131	0.136	8	0	0.156	0.0491	0.123	0.135	0.273
Copper	mg/kg dw	10.2	10.0	10.0	13.9	14.5	12.4	14.2	13.0	8	0	12.3	1.95	10.0	12.7	14.5
Iron	mg/kg dw	268	943	752	1,470	849	676	779	793	8	0	816	332	268	786	1,470
Lead	mg/kg dw	<0.05	<0.05	0.0640	<0.05	<0.05	<0.05	<0.05	<0.05	8	88	0.0518	-	<0.05	<0.057	0.0640
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	771	514	685	510	612	388	848	615	8	0	618	149	388	614	848
Manganese	mg/kg dw	6.22	4.14	5.02	2.41	3.30	3.29	6.30	5.07	8	0	4.47	1.42	2.41	4.58	6.30
Mercury	mg/kg dw	0.498	0.688	0.413	0.544	0.635	0.496	0.369	0.569	8	0	0.526	0.107	0.369	0.521	0.688
	mg/kg ww	0.121	0.222	0.131	0.152	0.163	0.158	0.0926	0.117	8	0	0.145	0.0392	0.0926	0.142	0.222
Molybdenum	mg/kg dw	0.547	1.00	0.739	0.960	1.07	0.666	0.586	0.984	8	0	0.819	0.207	0.547	0.850	1.07
Nickel	mg/kg dw	0.250	<0.2	0.420	<0.2	<0.2	<0.2	<0.2	<0.2	8	75	0.234	0.0795	<0.2	<0.225	0.420
Phosphorus	mg/kg dw	12,200	10,300	10,300	9,820	11,800	7,390	13,300	11,400	8	0	10,814	1,799	7,390	10,850	13,300
Potassium	mg/kg dw	11,300	9,460	10,500	9,550	11,600	7,960	13,900	11,500	8	0	10,721	1,791	7,960	10,900	13,900
Rubidium	mg/kg dw	14.0	12.2	13.1	6.07	15.0	10.6	15.7	15.5	8	0	12.8	3.22	6.07	13.6	15.7
Selenium	mg/kg dw	6.53	12.7	10.8	9.26	16.2	7.41	6.60	10.4	8	0	9.99	3.32	6.53	9.83	16.2
Silver	mg/kg dw	0.0172	0.0893	0.0344	0.0504	0.0351	0.0775	0.0505	0.132	8	0	0.0608	0.0371	0.0172	0.0504	0.132
Sodium	mg/kg dw	3,710	2,290	3,050	2,550	3,320	2,300	3,380	4,970	8	0	3,196	888	2,290	3,185	4,970
Strontium	mg/kg dw	0.620	0.260	1.25	0.600	0.410	0.240	0.770	0.710	8	0	0.608	0.326	0.240	0.610	1.25
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0162	0.0285	0.0201	0.0195	0.0203	0.0216	0.0163	0.0162	8	0	0.0198	0.00410	0.0162	0.0198	0.0285
Tin	mg/kg dw	<0.1	0.570	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	88	0.159	-	<0.1	<0.335	0.570
Titanium	mg/kg dw	<0.5	<0.5	0.570	<0.5	<0.5	<0.5	<0.5	<0.5	8	88	0.509	-	<0.5	<0.535	0.570
Uranium	mg/kg dw	0.0147	0.0135	0.0105	0.0363	0.0357	0.00580	0.0185	0.0108	8	0	0.0182	0.0116	0.00580	0.0141	0.0363
Vanadium	mg/kg dw	0.160	0.420	0.360	1.17	0.800	0.180	0.250	0.430	8	0	0.471	0.347	0.160	0.390	1.17
Zinc	mg/kg dw	81.6	82.3	83.7	73.1	89.0	54.1	98.2	88.4	8	0	81.3	13.1	54.1	83.0	98.2
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.9: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) Monitoring Area, October 2024

Analyte	Units	Kidney														
		QUL-NHC_PCC-KI-1	QUL-NHC_PCC-KI-2	QUL-NHC_PCC-KI-3	QUL-NHC_PCC-KI-4	QUL-NHC_PCC-KI-5	QUL-NHC_PCC-KI-6	QUL-NHC_PCC-KI-7	QUL-NHC_PCC-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	66.7	74.5	74.6	79.2	78.9	68.7	73.6	75.2	8	0	73.9	4.38	66.7	74.5	79.2
Aluminum	mg/kg dw	6.80	<5	8.50	21.9	13.4	<5	<5	<5	8	50	8.82	5.86	<5	5.90	21.9
Antimony	mg/kg dw	<0.02	0.0260	<0.027	<0.02	0.0360	<0.02	<0.02	<0.01	8	75	0.0156	0.00468	<0.01	<0.018	0.0360
Arsenic	mg/kg dw	0.311	0.338	0.254	0.196	0.239	0.484	0.307	0.373	8	0	0.313	0.0896	0.196	0.309	0.484
Barium	mg/kg dw	1.41	1.50	3.70	2.40	2.64	1.87	1.74	1.84	8	0	2.14	0.757	1.41	1.86	3.70
Beryllium	mg/kg dw	<0.01	<0.01	<0.013	<0.01	<0.012	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.013
Bismuth	mg/kg dw	<0.01	0.0160	0.0450	0.0210	0.0260	<0.01	<0.01	<0.01	8	50	0.0185	0.0110	<0.01	0.0130	0.0450
Boron	mg/kg dw	<1.1	1.20	<1.8	<1	<1.6	<1	<1	<1	8	88	1.03	-	<1	<1.1	1.20
Cadmium	mg/kg dw	9.80	11.2	16.7	9.89	16.5	13.2	11.6	14.1	8	0	12.9	2.73	9.80	12.4	16.7
Calcium	mg/kg dw	267	299	362	418	431	554	2,920	350	8	0	700	901	267	390	2,920
Cesium	mg/kg dw	0.0400	0.0690	0.0824	0.0421	0.0929	0.0402	0.0459	0.0565	8	0	0.0586	0.0206	0.0400	0.0512	0.0929
Chromium	mg/kg dw	0.910	5.30	0.900	0.570	0.780	0.410	0.330	0.700	8	0	1.24	1.66	0.330	0.740	5.30
Cobalt	mg/kg dw	1.60	1.25	5.89	2.58	3.09	2.86	2.20	1.42	8	0	2.61	1.49	1.25	2.39	5.89
Copper	mg/kg dw	3.55	4.61	6.44	7.33	6.79	4.21	4.13	4.77	8	0	5.23	1.41	3.55	4.69	7.33
Iron	mg/kg dw	201	268	334	401	347	301	351	366	8	0	321	63	201	340	401
Lead	mg/kg dw	0.0530	<0.05	0.162	<0.05	0.0770	<0.05	<0.05	<0.05	8	62	0.0678	0.0438	<0.05	<0.0515	0.162
Lithium	mg/kg dw	<0.5	<0.5	<0.67	<0.5	<0.59	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.67
Magnesium	mg/kg dw	471	573	572	812	417	419	532	602	8	0	550	127	417	552	812
Manganese	mg/kg dw	3.95	3.32	5.26	5.08	3.42	5.29	4.36	4.29	8	0	4.37	0.787	3.32	4.32	5.29
Mercury	mg/kg dw	0.283	0.391	0.315	0.409	0.343	0.400	0.237	0.300	8	0	0.335	0.0619	0.237	0.329	0.409
	mg/kg ww	0.0941	0.0995	0.0799	0.0850	0.0722	0.125	0.0625	0.0744	8	0	0.0866	0.0196	0.0625	0.0824	0.125
Molybdenum	mg/kg dw	0.493	0.507	0.588	0.844	0.788	0.550	0.466	0.459	8	0	0.587	0.148	0.459	0.528	0.844
Nickel	mg/kg dw	0.900	1.16	1.86	1.30	1.27	0.680	1.44	0.940	8	0	1.19	0.366	0.680	1.22	1.86
Phosphorus	mg/kg dw	8,410	11,600	12,500	12,400	12,300	8,060	11,300	10,500	8	0	10,884	1,766	8,060	11,450	12,500
Potassium	mg/kg dw	7,800	11,600	13,700	11,900	13,100	7,280	9,700	10,400	8	0	10,685	2,336	7,280	11,000	13,700
Rubidium	mg/kg dw	9.53	15.7	19.3	7.75	18.3	9.01	11.2	13.0	8	0	13.0	4.37	7.75	12.1	19.3
Selenium	mg/kg dw	4.32	7.31	6.57	7.05	7.90	5.16	4.70	5.56	8	0	6.07	1.32	4.32	6.06	7.90
Silver	mg/kg dw	<0.005	0.00680	0.00890	0.00580	<0.0059	0.00590	<0.005	0.00910	8	38	0.00647	0.00150	<0.005	0.00585	0.00910
Sodium	mg/kg dw	2,660	4,780	4,180	5,020	6,150	3,050	4,160	4,240	8	0	4,280	1,099	2,660	4,210	6,150
Strontium	mg/kg dw	0.680	0.640	0.930	0.850	1.13	1.40	7.73	0.970	8	0	1.79	2.41	0.640	0.950	7.73
Tellurium	mg/kg dw	<0.02	0.0490	0.0400	0.0300	0.0490	0.0420	0.0200	0.0520	8	12	0.0378	0.0131	<0.02	0.0410	0.0520
Thallium	mg/kg dw	0.0301	0.0364	0.0334	0.0334	0.0341	0.0300	0.0261	0.0217	8	0	0.0306	0.00481	0.0217	0.0318	0.0364
Tin	mg/kg dw	<0.1	<0.1	<0.13	<0.1	<0.12	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.13
Titanium	mg/kg dw	<0.55	<0.5	<0.89	<0.5	<0.79	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.89
Uranium	mg/kg dw	0.0361	0.0392	0.0303	0.0590	0.0520	0.0184	0.0296	0.0221	8	0	0.0358	0.0140	0.0184	0.0332	0.0590
Vanadium	mg/kg dw	0.280	0.510	0.490	1.14	0.620	0.370	0.200	0.450	8	0	0.507	0.288	0.200	0.470	1.14
Zinc	mg/kg dw	154	179	227	193	152	133	132	175	8	0	168	32.2	132	164	227
Zirconium	mg/kg dw	<0.2	0.250	<0.27	<0.2	<0.24	<0.2	<0.2	<0.2	8	88	0.207	-	<0.2	<0.225	0.250

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.10: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024

Analyte	Units	Muscle											
		QUL-NGC_PCC-MU-1	QUL-NGC_PCC-MU-2	QUL-NGC_PCC-MU-3	QUL-NGC_PCC-MU-4	QUL-NGC_PCC-MU-5	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	78.7	78.9	79.9	82.8	77.1	5	0	79.5	2.11	77.1	78.9	82.8
Aluminum	mg/kg dw	<5	<5	<5	<5	<5	5	100	<5	-	<5	<5	<5
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.162	0.204	0.203	0.423	0.254	5	0	0.249	0.102	0.162	0.204	0.423
Barium	mg/kg dw	0.517	0.167	0.143	0.739	0.180	5	0	0.349	0.267	0.143	0.180	0.739
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	0.0100	<0.01	<0.01	<0.01	5	80	0.0100	-	<0.01	<0.01	0.0100
Boron	mg/kg dw	<1	<1	<1	<1	<1	5	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0240	0.0180	<0.01	<0.01	<0.01	5	60	0.0144	0.00339	<0.01	<0.014	0.0240
Calcium	mg/kg dw	6,000	1,270	1,170	876	1,650	5	0	2,193	2,146	876	1,270	6,000
Cesium	mg/kg dw	0.146	0.166	0.208	0.237	0.203	5	0	0.192	0.0360	0.146	0.203	0.237
Chromium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2
Cobalt	mg/kg dw	<0.02	0.0440	0.0270	0.0500	<0.02	5	40	0.0322	0.0122	<0.02	0.0270	0.0500
Copper	mg/kg dw	0.760	0.920	1.35	4.23	0.900	5	0	1.63	1.47	0.760	0.920	4.23
Iron	mg/kg dw	14.6	38.3	16.8	60.6	10.4	5	0	28.1	21.1	10.4	16.8	60.6
Lead	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	5	100	<0.05	-	<0.05	<0.05	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,800	881	1,170	1,740	1,160	5	0	1,350	401	881	1,170	1,800
Manganese	mg/kg dw	2.32	0.268	0.374	0.660	0.602	5	0	0.845	0.840	0.268	0.602	2.32
Mercury	mg/kg dw	0.673	0.653	0.634	0.818	0.471	5	0	0.650	0.124	0.471	0.653	0.818
	mg/kg ww	0.144	0.138	0.127	0.140	0.108	5	0	0.131	0.0145	0.108	0.138	0.144
Molybdenum	mg/kg dw	<0.04	<0.04	<0.04	<0.04	<0.04	5	100	<0.04	-	<0.04	<0.04	<0.04
Nickel	mg/kg dw	<0.2	1.10	<0.2	<0.2	<0.2	5	80	0.380	-	<0.2	<0.65	1.10
Phosphorus	mg/kg dw	13,200	9,640	10,500	14,800	9,570	5	0	11,542	2,343	9,570	10,500	14,800
Potassium	mg/kg dw	20,000	19,700	20,800	27,700	18,500	5	0	21,340	3,650	18,500	20,000	27,700
Rubidium	mg/kg dw	17.6	22.3	22.0	41.0	23.9	5	0	25.4	9.05	17.6	22.3	41.0
Selenium	mg/kg dw	1.80	1.70	1.80	2.58	1.24	5	0	1.82	0.482	1.24	1.80	2.58
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	5	100	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	904	1,190	1,110	1,510	774	5	0	1,098	283	774	1,110	1,510
Strontium	mg/kg dw	14.8	0.910	0.890	1.40	2.72	5	0	4.14	6.00	0.890	1.40	14.8
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	5	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00340	0.00530	0.00640	0.00960	0.00540	5	0	0.00602	0.00228	0.00340	0.00540	0.00960
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Uranium	mg/kg dw	0.00570	<0.002	<0.002	<0.002	<0.002	5	80	0.00274	-	<0.002	<0.00385	0.00570
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	22.8	25.2	40.2	75.6	26.8	5	0	38.1	22.0	22.8	26.8	75.6
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.10: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024

Analyte	Units	Ovary											
		QUL-NGC_PCC-OV-1	QUL-NGC_PCC-OV-2	QUL-NGC_PCC-OV-3	QUL-NGC_PCC-OV-4	QUL-NGC_PCC-OV-5	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	70.3	65.9	71.1	68.5	74.0	5	0	70	3.01	65.9	70.3	74.0
Aluminum	mg/kg dw	<5	<5	<2	<5	<5	5	100	<2	-	<2	<2	<5
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0450	0.162	0.147	0.319	0.199	5	0	0.174	0.0989	0.0450	0.162	0.319
Barium	mg/kg dw	0.331	0.522	0.392	0.303	0.690	5	0	0.448	0.160	0.303	0.392	0.690
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	5	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0350	0.0240	0.00790	0.0140	0.0150	5	0	0.0192	0.0105	0.00790	0.0150	0.0350
Calcium	mg/kg dw	484	316	473	459	515	5	0	449	77.4	316	473	515
Cesium	mg/kg dw	0.0628	0.0576	0.0972	0.0743	0.111	5	0	0.0806	0.0228	0.0576	0.0743	0.111
Chromium	mg/kg dw	0.220	3.43	<0.05	<0.2	<0.2	5	60	0.760	1.82	<0.05	<0.135	3.43
Cobalt	mg/kg dw	0.150	0.185	0.126	0.132	0.102	5	0	0.139	0.0309	0.102	0.132	0.185
Copper	mg/kg dw	4.76	4.55	5.15	6.55	5.03	5	0	5.21	0.786	4.55	5.03	6.55
Iron	mg/kg dw	106	112	91.1	85.6	58.0	5	0	90.5	21.1	58.0	91.1	112
Lead	mg/kg dw	<0.05	<0.05	<0.02	<0.05	<0.05	5	100	<0.02	-	<0.02	<0.02	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	896	871	1,040	897	915	5	0	924	66.8	871	897	1,040
Manganese	mg/kg dw	7.86	8.76	17.2	11.9	9.56	5	0	11.1	3.75	7.86	9.56	17.2
Mercury	mg/kg dw	0.0439	0.0312	0.0325	0.0286	0.0283	5	0	0.0329	0.00640	0.0283	0.0312	0.0439
	mg/kg ww	0.0131	0.0106	0.00940	0.00900	0.00740	5	0	0.00990	0.00212	0.00740	0.00940	0.0131
Molybdenum	mg/kg dw	0.133	0.150	0.195	0.119	0.138	5	0	0.147	0.0290	0.119	0.138	0.195
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	10,500	8,930	11,600	11,600	11,200	5	0	10,766	1,120	8,930	11,200	11,600
Potassium	mg/kg dw	10,300	8,200	10,200	9,620	12,200	5	0	10,104	1,441	8,200	10,200	12,200
Rubidium	mg/kg dw	11.4	12.0	13.5	17.7	20.2	5	0	15.0	3.83	11.4	13.5	20.2
Selenium	mg/kg dw	8.94	13.1	13.6	9.18	6.89	5	0	10.3	2.89	6.89	9.18	13.6
Silver	mg/kg dw	0.0439	0.0184	0.0298	0.0195	0.0141	5	0	0.0251	0.0120	0.0141	0.0195	0.0439
Sodium	mg/kg dw	1,890	1,630	1,860	2,120	2,400	5	0	1,980	292	1,630	1,890	2,400
Strontium	mg/kg dw	0.720	0.440	0.568	0.580	0.500	5	0	0.562	0.105	0.440	0.568	0.720
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	5	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.00520	0.00440	0.00840	0.00510	0.00930	5	0	0.00648	0.00221	0.00440	0.00520	0.00930
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	<0.5	<0.25	<0.5	<0.5	5	100	<0.25	-	<0.25	<0.25	<0.5
Uranium	mg/kg dw	0.0166	0.00370	0.00920	0.0147	0.00250	5	0	0.00934	0.00633	0.00250	0.00920	0.0166
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	153	130	173	127	199	5	0	156	30.3	127	153	199
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.10: Peamouth Chub Tissue Quality Data for the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024

Analyte	Units	Liver											
		QUL-NGC_PCC-LI-1	QUL-NGC_PCC-LI-2	QUL-NGC_PCC-LI-3	QUL-NGC_PCC-LI-4	QUL-NGC_PCC-LI-5	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	73.5	75.1	74.4	65.8	68.2	5	0	71.4	4.14	65.8	73.5	75.1
Aluminum	mg/kg dw	9.40	8.20	6.90	7.90	5.90	5	0	7.66	1.33	5.90	7.90	9.40
Antimony	mg/kg dw	0.0230	0.0200	<0.02	<0.01	0.0150	5	40	0.0161	0.00407	<0.01	0.0150	0.0230
Arsenic	mg/kg dw	0.141	0.179	0.206	0.518	0.452	5	0	0.299	0.173	0.141	0.206	0.518
Barium	mg/kg dw	0.490	0.293	0.203	0.125	0.0870	5	0	0.240	0.161	0.0870	0.203	0.490
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	0.0890	0.0470	0.0390	0.0240	0.0300	5	0	0.0458	0.0257	0.0240	0.0390	0.0890
Boron	mg/kg dw	<1	<1	<1	<1	<1	5	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.924	0.535	0.529	0.650	0.358	5	0	0.599	0.209	0.358	0.535	0.924
Calcium	mg/kg dw	185	172	219	114	112	5	0	160	46.6	112	172	219
Cesium	mg/kg dw	0.0364	0.0535	0.0680	0.0383	0.0380	5	0	0.0468	0.0137	0.0364	0.0383	0.0680
Chromium	mg/kg dw	0.780	1.22	0.300	<0.2	0.210	5	20	0.542	0.461	<0.2	0.300	1.22
Cobalt	mg/kg dw	0.246	0.341	0.226	0.166	0.193	5	0	0.234	0.0670	0.166	0.226	0.341
Copper	mg/kg dw	14.4	17.7	11.8	12.5	21.4	5	0	15.6	3.99	11.8	14.4	21.4
Iron	mg/kg dw	438	911	1,050	663	601	5	0	733	246	438	663	1,050
Lead	mg/kg dw	0.0510	<0.05	<0.05	<0.05	<0.05	5	80	0.0502	-	<0.05	<0.0505	0.0510
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	766	1,090	1,080	514	633	5	0	817	261	514	766	1,090
Manganese	mg/kg dw	5.99	7.03	6.59	3.53	4.31	5	0	5.49	1.51	3.53	5.99	7.03
Mercury	mg/kg dw	0.364	0.341	0.295	0.247	0.251	5	0	0.300	0.0525	0.247	0.295	0.364
	mg/kg ww	0.0964	0.0851	0.0754	0.0845	0.0798	5	0	0.0842	0.00785	0.0754	0.0845	0.0964
Molybdenum	mg/kg dw	0.835	0.724	0.767	0.500	0.486	5	0	0.662	0.160	0.486	0.724	0.835
Nickel	mg/kg dw	0.400	0.260	0.220	<0.2	<0.2	5	40	0.256	0.0854	<0.2	0.220	0.400
Phosphorus	mg/kg dw	14,000	15,100	15,500	10,500	11,900	5	0	13,400	2,140	10,500	14,000	15,500
Potassium	mg/kg dw	11,900	13,300	13,600	7,990	9,680	5	0	11,294	2,410	7,990	11,900	13,600
Rubidium	mg/kg dw	11.4	16.9	16.2	13.8	13.5	5	0	14.4	2.22	11.4	13.8	16.9
Selenium	mg/kg dw	9.56	9.96	8.81	6.29	6.43	5	0	8.21	1.74	6.29	8.81	9.96
Silver	mg/kg dw	0.0976	0.149	0.0414	0.0358	0.196	5	0	0.104	0.0691	0.0358	0.0976	0.196
Sodium	mg/kg dw	2,400	1,930	2,400	1,750	1,520	5	0	2,000	393	1,520	1,930	2,400
Strontium	mg/kg dw	0.500	0.290	0.510	0.260	0.220	5	0	0.356	0.138	0.220	0.290	0.510
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	5	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0238	0.0350	0.0277	0.0180	0.0200	5	0	0.0249	0.00676	0.0180	0.0238	0.0350
Tin	mg/kg dw	<0.1	0.320	<0.1	<0.1	<0.1	5	80	0.144	-	<0.1	<0.21	0.320
Titanium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Uranium	mg/kg dw	0.0266	0.0230	0.0209	0.0529	0.0120	5	0	0.0271	0.0154	0.0120	0.0230	0.0529
Vanadium	mg/kg dw	0.300	0.210	0.540	0.200	0.200	5	0	0.290	0.146	0.200	0.210	0.540
Zinc	mg/kg dw	119	115	110	71.6	77.7	5	0	98.7	22.3	71.6	110	119
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.10: **Peamouth Chub Tissue Quality Data for the Quesnel Lake near Grain Creek (QUL-NGC; Reference) Monitoring Area, October 2024**

Analyte	Units	Kidney											
		QUL-NGC_PCC-KI-1	QUL-NGC_PCC-KI-2	QUL-NGC_PCC-KI-3	QUL-NGC_PCC-KI-4	QUL-NGC_PCC-KI-5	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	74.3	77.3	76.9	74.5	78.4	5	0	76.3	1.80	74.3	76.9	78.4
Aluminum	mg/kg dw	5.40	<5	<5	<5	<5	5	80	5.08	-	<5	<5.2	5.40
Antimony	mg/kg dw	0.0230	<0.01	<0.01	<0.01	<0.01	5	80	0.0126	-	<0.01	<0.0165	0.0230
Arsenic	mg/kg dw	0.173	0.196	0.228	0.411	0.404	5	0	0.282	0.116	0.173	0.228	0.411
Barium	mg/kg dw	1.45	1.20	1.10	0.820	1.16	5	0	1.15	0.226	0.820	1.16	1.45
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	0.0840	0.0440	0.0300	0.0140	0.0230	5	0	0.0390	0.0274	0.0140	0.0300	0.0840
Boron	mg/kg dw	<1	<1	<1	<1	<1	5	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	13.8	6.03	4.44	4.79	3.91	5	0	6.59	4.10	3.91	4.79	13.8
Calcium	mg/kg dw	489	308	790	273	351	5	0	442	211	273	351	790
Cesium	mg/kg dw	0.0684	0.0917	0.0970	0.0695	0.100	5	0	0.0853	0.0152	0.0684	0.0917	0.100
Chromium	mg/kg dw	0.430	0.360	0.970	0.310	0.670	5	0	0.548	0.273	0.310	0.430	0.970
Cobalt	mg/kg dw	4.41	6.84	3.21	1.15	1.57	5	0	3.44	2.31	1.15	3.21	6.84
Copper	mg/kg dw	6.74	5.75	6.08	3.81	6.80	5	0	5.84	1.22	3.81	6.08	6.80
Iron	mg/kg dw	409	399	456	507	366	5	0	427	54.9	366	409	507
Lead	mg/kg dw	0.0510	<0.05	<0.05	<0.05	<0.05	5	80	0.0502	-	<0.05	<0.0505	0.0510
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	903	868	828	491	730	5	0	764	166	491	828	903
Manganese	mg/kg dw	6.83	4.54	5.49	2.41	2.88	5	0	4.43	1.83	2.41	4.54	6.83
Mercury	mg/kg dw	0.345	0.210	0.176	0.170	0.144	5	0	0.209	0.0796	0.144	0.176	0.345
	mg/kg ww	0.0886	0.0478	0.0407	0.0433	0.0311	5	0	0.0503	0.0223	0.0311	0.0433	0.0886
Molybdenum	mg/kg dw	0.607	0.495	0.539	0.414	0.439	5	0	0.499	0.0776	0.414	0.495	0.607
Nickel	mg/kg dw	1.46	1.20	1.62	1.02	1.28	5	0	1.32	0.232	1.02	1.28	1.62
Phosphorus	mg/kg dw	14,000	13,600	12,400	9,050	12,600	5	0	12,330	1,952	9,050	12,600	14,000
Potassium	mg/kg dw	12,000	12,700	11,700	9,860	12,200	5	0	11,692	1,087	9,860	12,000	12,700
Rubidium	mg/kg dw	12.4	18.3	15.1	17.6	18.4	5	0	16.4	2.59	12.4	17.6	18.4
Selenium	mg/kg dw	6.46	6.04	6.08	4.26	4.39	5	0	5.45	1.04	4.26	6.04	6.46
Silver	mg/kg dw	0.0140	0.00680	0.00790	<0.005	0.00530	5	20	0.00780	0.00372	<0.005	0.00680	0.0140
Sodium	mg/kg dw	3,010	3,520	4,270	4,240	4,160	5	0	3,840	556	3,010	4,160	4,270
Strontium	mg/kg dw	1.20	0.600	1.72	0.690	0.670	5	0	0.976	0.480	0.600	0.690	1.72
Tellurium	mg/kg dw	0.0650	0.0250	0.0260	<0.02	<0.02	5	40	0.0312	0.0195	<0.02	0.0250	0.0650
Thallium	mg/kg dw	0.0408	0.0633	0.0690	0.0168	0.0459	5	0	0.0472	0.0206	0.0168	0.0459	0.0690
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	5	100	<0.5	-	<0.5	<0.5	<0.5
Uranium	mg/kg dw	0.0633	0.0428	0.0406	0.0742	0.0241	5	0	0.0490	0.0198	0.0241	0.0428	0.0742
Vanadium	mg/kg dw	0.360	0.320	0.440	0.220	0.200	5	0	0.308	0.0996	0.200	0.320	0.440
Zinc	mg/kg dw	191	181	183	95.0	169	5	0	164	39.3	95.0	181	191
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.11: **Rainbow Trout Tissue Quality Data for Quesnel River (QUR; Exposed), October 2024**

Analyte	Units	Muscle														
		QUR_RB-MU-1	QUR_RB-MU-2	QUR_RB-MU-3	QUR_RB-MU-4	QUR_RB-MU-5	QUR_RB-MU-6	QUR_RB-MU-7	QUR_RB-MU-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	77.1	78.6	78.9	80.1	77.4	77.1	80.2	65.6	8	0	76.9	4.72	65.6	78.0	80.2
Aluminum	mg/kg dw	2.70	12.3	3.10	<2	3.60	<2	<2	10.2	8	38	4.74	4.09	<2	2.90	12.3
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.0700	0.281	0.130	0.396	0.135	0.142	0.163	0.116	8	0	0.179	0.106	0.0700	0.138	0.396
Barium	mg/kg dw	0.0820	0.940	0.0950	0.186	0.0950	<0.05	<0.05	0.0520	8	25	0.194	0.312	<0.05	0.0885	0.940
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Calcium	mg/kg dw	581	14,200	304	1,130	1,920	1,300	348	392	8	0	2,522	4,753	304	856	14,200
Cesium	mg/kg dw	0.0472	0.0832	0.0774	0.0854	0.0508	0.0652	0.0580	0.0772	8	0	0.0680	0.0148	0.0472	0.0712	0.0854
Chromium	mg/kg dw	0.123	0.0680	0.0980	0.170	<0.05	0.240	0.904	0.110	8	12	0.220	0.284	<0.05	0.116	0.904
Cobalt	mg/kg dw	0.0410	0.0720	0.0650	0.0210	0.0270	0.0330	0.0240	<0.02	8	12	0.0379	0.0203	<0.02	0.0300	0.0720
Copper	mg/kg dw	2.32	0.950	1.85	1.29	0.870	0.770	0.870	0.700	8	0	1.20	0.586	0.700	0.910	2.32
Iron	mg/kg dw	36.0	46.2	42.4	26.2	14.0	12.2	23.3	27.3	8	0	28.4	12.4	12.2	26.8	46.2
Lead	mg/kg dw	<0.02	<0.02	0.0250	<0.02	<0.02	<0.02	<0.02	<0.02	8	88	0.0206	-	<0.02	<0.0225	0.0250
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	953	2,060	1,380	1,470	1,430	1,480	1,360	1,020	8	0	1,394	337	953	1,405	2,060
Manganese	mg/kg dw	0.423	4.41	0.718	0.457	0.862	0.491	0.262	0.503	8	0	1.02	1.38	0.262	0.497	4.41
Mercury	mg/kg dw	0.213	0.180	0.292	0.515	0.126	0.153	0.315	0.275	8	0	0.259	0.124	0.126	0.244	0.515
	mg/kg ww	0.0487	0.0385	0.0616	0.102	0.0284	0.0350	0.0624	0.0945	8	0	0.0589	0.0272	0.0284	0.0552	0.102
Molybdenum	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Nickel	mg/kg dw	<0.2	<0.2	0.270	0.200	<0.2	<0.2	<0.2	<0.2	8	75	0.209	0.0327	<0.2	<0.2	0.270
Phosphorus	mg/kg dw	10,800	21,500	12,300	13,400	12,900	12,900	12,900	8,160	8	0	13,108	3,800	8,160	12,900	21,500
Potassium	mg/kg dw	18,300	23,400	20,200	23,300	21,000	21,800	23,300	14,300	8	0	20,700	3,141	14,300	21,400	23,400
Rubidium	mg/kg dw	12.1	19.5	19.4	17.2	15.6	17.1	15.0	19.8	8	0	17.0	2.67	12.1	17.2	19.8
Selenium	mg/kg dw	2.40	2.58	2.39	2.23	2.28	2.00	2.17	1.50	8	0	2.19	0.329	1.50	2.26	2.58
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	8	100	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	1,360	1,730	1,760	1,540	995	986	1,280	854	8	0	1,313	348	854	1,320	1,760
Strontium	mg/kg dw	0.721	24.2	0.399	1.40	2.65	1.50	0.442	0.379	8	0	3.96	8.21	0.379	1.06	24.2
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0168	0.0171	0.0317	0.0188	0.0190	0.0158	0.0212	0.0116	8	0	0.0190	0.00585	0.0116	0.0180	0.0317
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.25	0.640	0.360	<0.25	<0.25	<0.25	<0.25	<0.25	8	75	0.312	0.131	<0.25	<0.305	0.640
Uranium	mg/kg dw	<0.002	0.00240	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	8	88	0.00205	-	<0.002	<0.0022	0.00240
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Zinc	mg/kg dw	19.4	28.1	19.8	14.8	15.2	13.8	12.6	9.65	8	0	16.7	5.70	9.65	15.0	28.1
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).
Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).
Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.11: Rainbow Trout Tissue Quality Data for Quesnel River (QUR; Exposed), October 2024

Analyte	Units	Ovary											
		QUR_RB-OV-1	QUR_RB-OV-5	QUR_RB-OV-6	QUR_RB-OV-7	QUR_RB-OV-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	77.9	79.8	77.7	66.1	73.7	5	0	75.0	5.47	66.1	77.7	79.8
Aluminum	mg/kg dw	2,050	<5	10.0	<2	<2	5	60	413	1,154	<2	<6	2,050
Antimony	mg/kg dw	<0.02	<0.02	<0.02	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.02
Arsenic	mg/kg dw	0.360	0.149	0.177	0.0270	0.254	5	0	0.193	0.124	0.0270	0.177	0.360
Barium	mg/kg dw	3.76	0.100	0.165	0.567	1.12	5	0	1.14	1.52	0.100	0.567	3.76
Beryllium	mg/kg dw	0.0270	<0.01	<0.01	<0.01	<0.01	5	80	0.0134	-	<0.01	<0.0185	0.0270
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	5	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1.1	<1	<1	<1	5	100	<1	-	<1	<1	<1.1
Cadmium	mg/kg dw	0.0400	0.0180	0.0280	0.00840	0.00660	5	0	0.0202	0.0140	0.00660	0.0180	0.0400
Calcium	mg/kg dw	668	511	304	1,720	1,940	5	0	1,029	747	304	668	1,940
Cesium	mg/kg dw	0.0639	0.0517	0.0631	0.0109	0.0300	5	0	0.0439	0.0230	0.0109	0.0517	0.0639
Chromium	mg/kg dw	9.96	<0.2	0.850	0.0820	0.116	5	20	2.22	4.48	0.0820	0.116	9.96
Cobalt	mg/kg dw	1.62	0.542	0.399	0.189	0.378	5	0	0.626	0.570	0.189	0.399	1.62
Copper	mg/kg dw	16.8	26.9	15.3	13.8	37.1	5	0	22.0	9.89	13.8	16.8	37.1
Iron	mg/kg dw	4,700	336	272	89.5	215	5	0	1,122	2,002	89.5	272	4,700
Lead	mg/kg dw	0.192	<0.05	<0.05	<0.02	<0.02	5	80	0.0544	-	<0.02	<0.106	0.192
Lithium	mg/kg dw	3.45	<0.5	<0.5	<0.5	<0.5	5	80	1.09	-	<0.5	<1.98	3.45
Magnesium	mg/kg dw	2,860	959	1,020	1,620	1,800	5	0	1,652	768	959	1,620	2,860
Manganese	mg/kg dw	64.8	26.1	10.8	9.45	14.0	5	0	25.0	23.2	9.45	14.0	64.8
Mercury	mg/kg dw	0.0840	0.0550	0.0630	0.0230	0.0425	5	0	0.0535	0.0228	0.0230	0.0550	0.0840
	mg/kg ww	0.0187	0.0110	0.0139	0.00780	0.0112	5	0	0.0125	0.00408	0.00780	0.0112	0.0187
Molybdenum	mg/kg dw	0.105	0.0470	0.0630	0.0250	0.0320	5	0	0.0544	0.0318	0.0250	0.0470	0.105
Nickel	mg/kg dw	4.20	<0.2	0.360	<0.2	<0.2	5	60	1.03	2.17	<0.2	<0.28	4.20
Phosphorus	mg/kg dw	13,400	15,800	16,200	10,600	10,400	5	0	13,280	2,755	10,400	13,400	16,200
Potassium	mg/kg dw	17,900	21,100	20,800	4,790	6,290	5	0	14,176	8,000	4,790	17,900	21,100
Rubidium	mg/kg dw	17.3	20.7	21.7	4.15	12.2	5	0	15.2	7.21	4.15	17.3	21.7
Selenium	mg/kg dw	34.5	50.3	27.2	16.6	10.7	5	0	27.9	15.6	10.7	27.2	50.3
Silver	mg/kg dw	0.0205	0.0401	0.0438	0.0161	0.0279	5	0	0.0297	0.0120	0.0161	0.0279	0.0438
Sodium	mg/kg dw	5,660	4,630	3,720	3,080	6,110	5	0	4,640	1,273	3,080	4,630	6,110
Strontium	mg/kg dw	2.34	0.960	0.660	4.72	2.22	5	0	2.18	1.60	0.660	2.22	4.72
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	5	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0166	0.0164	0.0147	0.0103	0.00930	5	0	0.0135	0.00344	0.00930	0.0147	0.0166
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	5	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	3.46	<0.54	0.820	<0.25	<0.25	5	60	1.01	1.49	<0.25	<0.535	3.46
Uranium	mg/kg dw	0.0178	<0.002	0.00490	0.00560	0.00250	5	20	0.00656	0.00659	<0.002	0.00490	0.0178
Vanadium	mg/kg dw	13.9	<0.1	<0.1	0.110	<0.1	5	60	2.86	7.80	<0.1	<0.105	13.9
Zinc	mg/kg dw	221	295	344	96.2	280	5	0	247	95.2	96.2	280	344
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	5	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish ovary tissue (11 mg/kg dw; BCMOE 2014).

Value exceeds Se Threshold for Effects, fish ovary tissue (20 mg/kg dw; DeForest et al 2012).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.11: Rainbow Trout Tissue Quality Data for Quesnel River (QUR; Exposed), October 2024

Analyte	Units	Liver														
		QUR_RB-LI-1	QUR_RB-LI-2	QUR_RB-LI-3	QUR_RB-LI-4	QUR_RB-LI-5	QUR_RB-LI-6	QUR_RB-LI-7	QUR_RB-LI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	73.4	69.6	74.9	71.7	68.2	67.8	72.5	73.4	8	0	71.4	2.62	67.8	72.1	74.9
Aluminum	mg/kg dw	11.7	<5	9.40	12.8	<5	5.90	15.2	10.9	8	25	9.49	3.65	<5	10.2	15.2
Antimony	mg/kg dw	<0.01	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.02
Arsenic	mg/kg dw	0.160	0.303	0.186	0.352	0.339	0.395	0.0880	1.11	8	0	0.367	0.319	0.0880	0.321	1.11
Barium	mg/kg dw	0.0990	0.290	0.118	0.0870	<0.05	<0.05	0.0590	0.0640	8	25	0.102	0.0801	<0.05	0.0755	0.290
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.492	0.435	0.805	0.701	0.457	0.561	1.03	0.648	8	0	0.641	0.202	0.435	0.604	1.03
Calcium	mg/kg dw	169	204	223	157	154	157	229	189	8	0	185	30.6	154	179	229
Cesium	mg/kg dw	0.0236	0.0268	0.0400	0.0197	0.0354	0.0365	0.0283	0.0420	8	0	0.0315	0.00808	0.0197	0.0319	0.0420
Chromium	mg/kg dw	<0.2	<0.2	<0.2	0.220	<0.2	<0.2	<0.2	0.240	8	75	0.208	0.00935	<0.2	<0.21	0.240
Cobalt	mg/kg dw	0.140	0.209	0.195	0.117	0.155	0.170	0.102	0.0720	8	0	0.145	0.0468	0.0720	0.148	0.209
Copper	mg/kg dw	519	122	167	30.4	518	124	41.5	259	8	0	223	196	30.4	146	519
Iron	mg/kg dw	1,290	661	1,930	2,410	783	976	1,260	1,490	8	0	1,350	589	661	1,275	2,410
Lead	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	8	100	<0.05	-	<0.05	<0.05	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	577	558	722	600	599	698	813	753	8	0	665	93.9	558	649	813
Manganese	mg/kg dw	4.40	7.45	5.12	5.06	5.35	5.04	10.7	6.56	8	0	6.21	2.06	4.40	5.24	10.7
Mercury	mg/kg dw	0.108	0.134	0.154	0.283	0.0731	0.108	0.231	0.211	8	0	0.163	0.0721	0.0731	0.144	0.283
	mg/kg ww	0.0286	0.0407	0.0387	0.0800	0.0233	0.0346	0.0637	0.0561	8	0	0.0457	0.0193	0.0233	0.0397	0.0800
Molybdenum	mg/kg dw	1.23	0.893	0.877	1.17	0.923	0.975	0.982	1.35	8	0	1.05	0.176	0.877	0.978	1.35
Nickel	mg/kg dw	<0.2	<0.2	<0.2	0.220	<0.2	<0.2	<0.2	<0.2	8	88	0.202	-	<0.2	<0.21	0.220
Phosphorus	mg/kg dw	13,300	11,900	16,200	11,700	14,000	14,700	15,800	15,200	8	0	14,100	1,695	11,700	14,350	16,200
Potassium	mg/kg dw	11,100	9,310	14,000	10,200	9,900	11,000	13,900	14,000	8	0	11,676	1,981	9,310	11,050	14,000
Rubidium	mg/kg dw	10.9	8.76	16.1	8.48	8.70	12.8	18.3	26.3	8	0	13.8	6.22	8.48	11.8	26.3
Selenium	mg/kg dw	136	55.0	40.1	19.8	137	54.3	12.6	42.2	8	0	62.1	48.3	12.6	48.2	137
Silver	mg/kg dw	3.86	3.60	1.97	1.60	4.29	3.45	0.836	2.55	8	0	2.77	1.22	0.836	3.00	4.29
Sodium	mg/kg dw	3,410	3,850	4,390	3,810	2,610	2,590	2,740	3,320	8	0	3,340	659	2,590	3,365	4,390
Strontium	mg/kg dw	0.320	0.920	0.440	0.330	0.290	0.280	0.310	0.250	8	0	0.392	0.220	0.250	0.315	0.920
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0554	0.0664	0.129	0.0967	0.128	0.183	0.150	0.0992	8	0	0.113	0.0426	0.0554	0.114	0.183
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Uranium	mg/kg dw	0.00960	0.00240	0.00620	0.0323	0.00230	0.00540	0.0305	0.0130	8	0	0.0127	0.0121	0.00230	0.00790	0.0323
Vanadium	mg/kg dw	<0.1	<0.1	<0.1	0.290	<0.1	<0.1	1.72	0.200	8	62	0.339	0.612	<0.1	<0.15	1.72
Zinc	mg/kg dw	111	91.0	120	121	101	107	135	160	8	0	118	21.6	91.0	116	160
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

Table C.7.11: **Rainbow Trout Tissue Quality Data for Quesnel River (QUR; Exposed), October 2024**

Analyte	Units	Kidney														
		QUR_RB-KI-1	QUR_RB-KI-2	QUR_RB-KI-3	QUR_RB-KI-4	QUR_RB-KI-5	QUR_RB-KI-6	QUR_RB-KI-7	QUR_RB-KI-8	n	% < LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	75.6	74.6	77.1	79.4	76.6	77.7	80.8	84.7	8	0	78.3	3.25	74.6	77.4	84.7
Aluminum	mg/kg dw	8.70	15.2	9.80	13.0	10.2	8.30	35.2	32.6	8	0	16.6	10.9	8.30	11.6	35.2
Antimony	mg/kg dw	<0.01	<0.02	<0.01	0.0210	<0.01	<0.01	<0.02	0.0140	8	75	0.0121	0.00327	<0.01	<0.012	0.0210
Arsenic	mg/kg dw	0.547	0.837	0.888	2.04	0.482	0.482	1.12	1.42	8	0	0.977	0.541	0.482	0.862	2.04
Barium	mg/kg dw	0.792	0.764	0.368	3.39	0.202	0.410	0.773	1.04	8	0	0.967	1.02	0.202	0.768	3.39
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.894	1.24	0.891	1.63	0.478	0.691	1.45	1.76	8	0	1.13	0.462	0.478	1.07	1.76
Calcium	mg/kg dw	965	1,360	912	1,640	1,090	889	978	1,910	8	0	1,218	381	889	1,034	1,910
Cesium	mg/kg dw	0.0261	0.0328	0.0379	0.0516	0.0343	0.0455	0.0300	0.0580	8	0	0.0395	0.0111	0.0261	0.0361	0.0580
Chromium	mg/kg dw	0.210	0.270	0.420	1.36	0.240	0.390	0.720	0.880	8	0	0.561	0.401	0.210	0.405	1.36
Cobalt	mg/kg dw	0.821	1.09	0.976	1.62	1.24	0.999	1.12	1.08	8	0	1.12	0.237	0.821	1.08	1.62
Copper	mg/kg dw	6.47	7.76	3.91	8.08	5.90	4.70	5.08	8.12	8	0	6.25	1.63	3.91	6.18	8.12
Iron	mg/kg dw	837	897	1,110	2,140	894	840	1,830	1,340	8	0	1,236	499	837	1,004	2,140
Lead	mg/kg dw	<0.05	<0.05	<0.05	0.0850	<0.05	<0.05	0.0650	0.0750	8	62	0.0594	0.00852	<0.05	<0.0575	0.0850
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	540	695	625	1,440	501	648	802	927	8	0	772	303	501	672	1,440
Manganese	mg/kg dw	2.93	8.73	2.33	3.39	2.49	4.11	3.03	12.6	8	0	4.95	3.72	2.33	3.21	12.6
Mercury	mg/kg dw	0.276	0.313	0.466	0.728	0.158	0.278	0.610	0.344	8	0	0.397	0.191	0.158	0.328	0.728
	mg/kg ww	0.0673	0.0795	0.107	0.150	0.0369	0.0618	0.117	0.0528	8	0	0.0840	0.0377	0.0369	0.0734	0.150
Molybdenum	mg/kg dw	0.537	0.581	0.318	0.842	0.278	0.334	0.450	0.342	8	0	0.460	0.189	0.278	0.396	0.842
Nickel	mg/kg dw	0.670	0.770	0.590	1.63	0.600	0.740	1.88	0.620	8	0	0.938	0.513	0.590	0.705	1.88
Phosphorus	mg/kg dw	8,520	9,050	10,100	16,700	9,110	11,100	11,400	12,200	8	0	11,022	2,630	8,520	10,600	16,700
Potassium	mg/kg dw	9,370	9,110	10,900	17,400	9,650	11,500	12,200	13,300	8	0	11,679	2,734	9,110	11,200	17,400
Rubidium	mg/kg dw	8.30	8.79	11.9	15.7	8.56	10.7	9.35	21.5	8	0	11.8	4.60	8.30	10.0	21.5
Selenium	mg/kg dw	12.6	18.6	14.8	23.5	16.6	17.1	20.1	12.8	8	0	17.0	3.71	12.6	16.8	23.5
Silver	mg/kg dw	0.00970	0.0128	0.00760	0.0184	0.0154	0.0115	0.0120	0.0231	8	0	0.0138	0.00500	0.00760	0.0124	0.0231
Sodium	mg/kg dw	6,490	8,400	7,250	14,300	7,310	7,120	9,900	12,900	8	0	9,209	2,925	6,490	7,855	14,300
Strontium	mg/kg dw	2.08	4.33	2.21	6.48	2.20	2.10	4.92	2.72	8	0	3.38	1.67	2.08	2.46	6.48
Tellurium	mg/kg dw	<0.02	0.0210	0.0280	0.0500	<0.02	<0.02	0.0550	<0.02	8	50	0.0292	0.0155	<0.02	0.0205	0.0550
Thallium	mg/kg dw	0.0661	0.0771	0.0767	0.0839	0.0562	0.0531	0.0931	0.0590	8	0	0.0706	0.0143	0.0531	0.0714	0.0931
Tin	mg/kg dw	0.120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	88	0.102	-	<0.1	<0.11	0.120
Titanium	mg/kg dw	0.530	0.830	0.530	0.670	0.540	0.530	1.36	1.65	8	0	0.830	0.436	0.530	0.605	1.65
Uranium	mg/kg dw	0.0172	0.0109	0.0204	0.0727	0.00730	0.0133	0.0915	0.0193	8	0	0.0316	0.0319	0.00730	0.0182	0.0915
Vanadium	mg/kg dw	0.120	0.120	0.150	0.940	<0.1	<0.1	4.01	0.470	8	25	0.751	1.38	<0.1	0.135	4.01
Zinc	mg/kg dw	124	140	110	162	107	126	134	202	8	0	138	31.1	107	130	202
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and are reported to three significant digits for display purposes. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (_YYYY-MM; where _YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 10]) used in the full sample identifiers.

APPENDIX D
DATA - CREEK HABITAT

APPENDIX D.1
WATER QUALITY

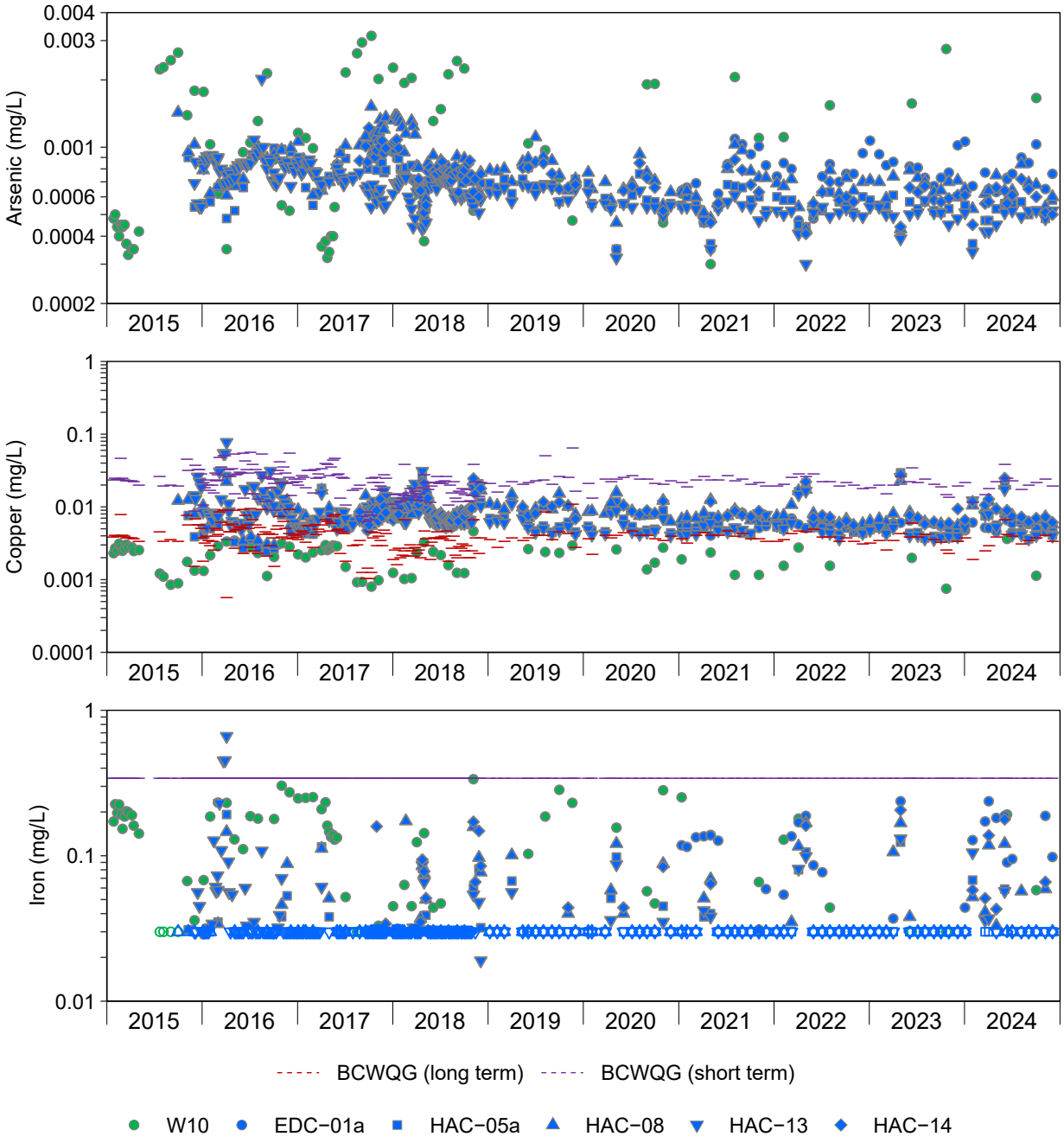

Figure D.1.1: Dissolved Aqueous Concentrations of Primary and Secondary Analytes in Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2015 to 2024

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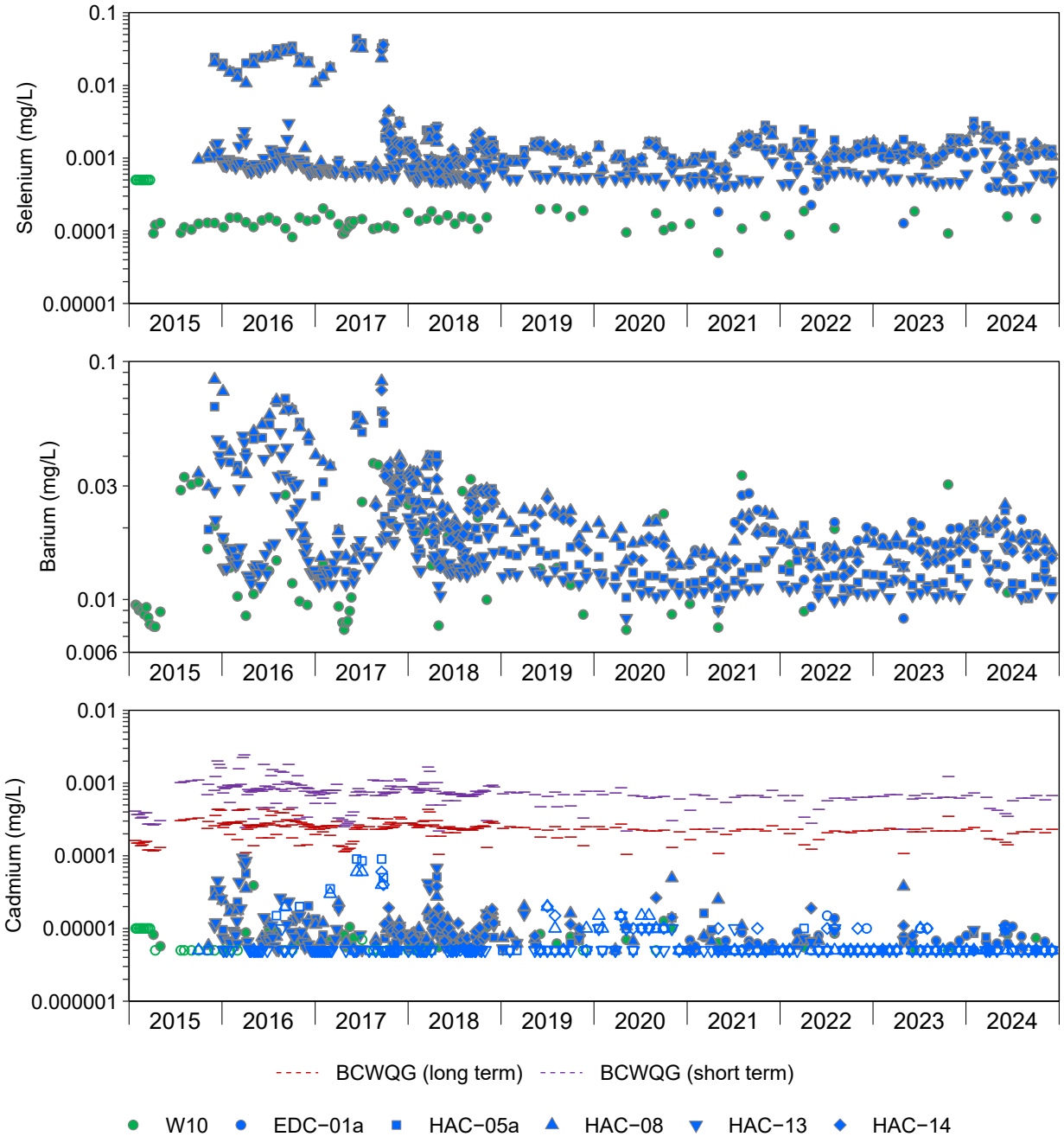

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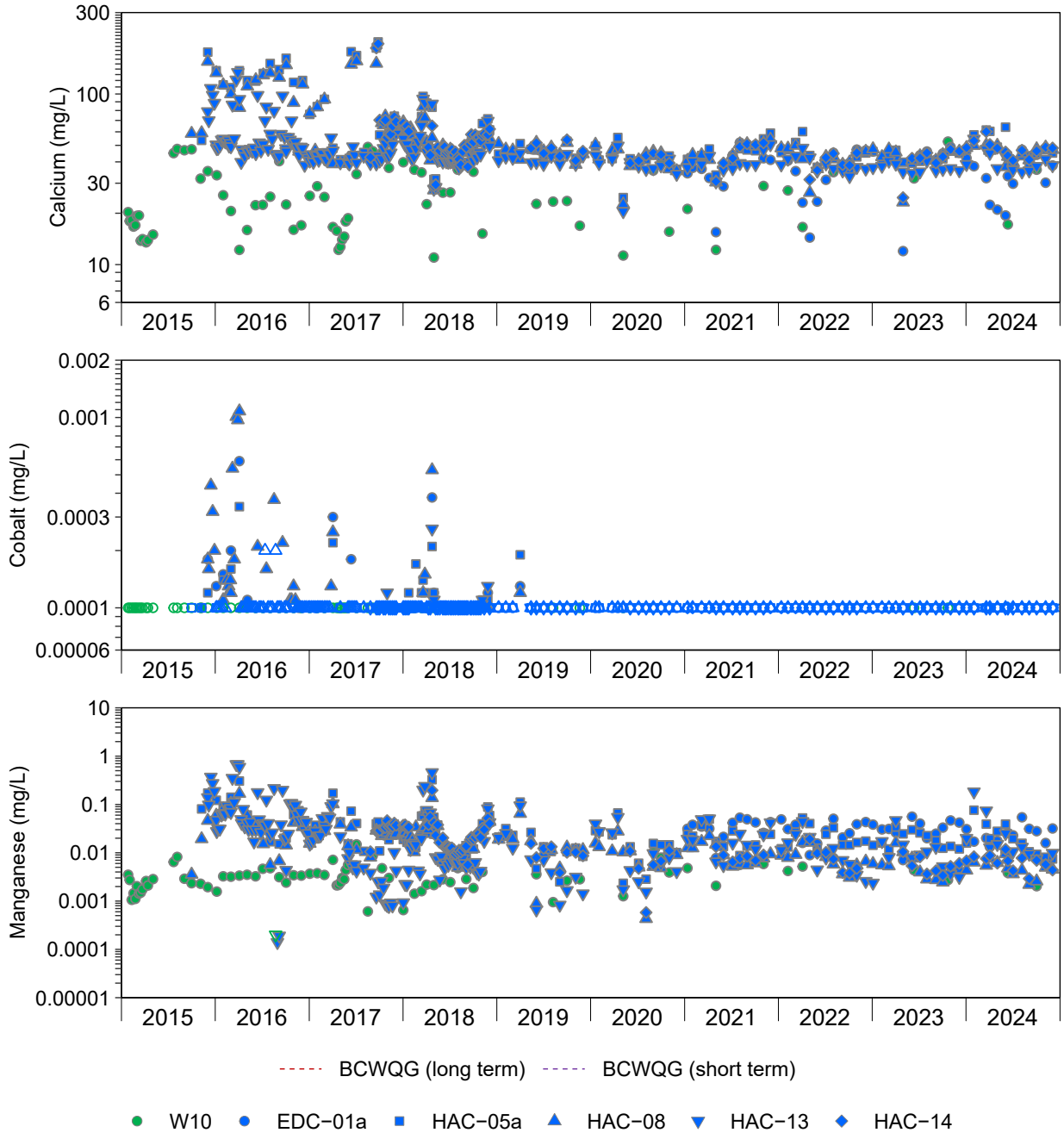

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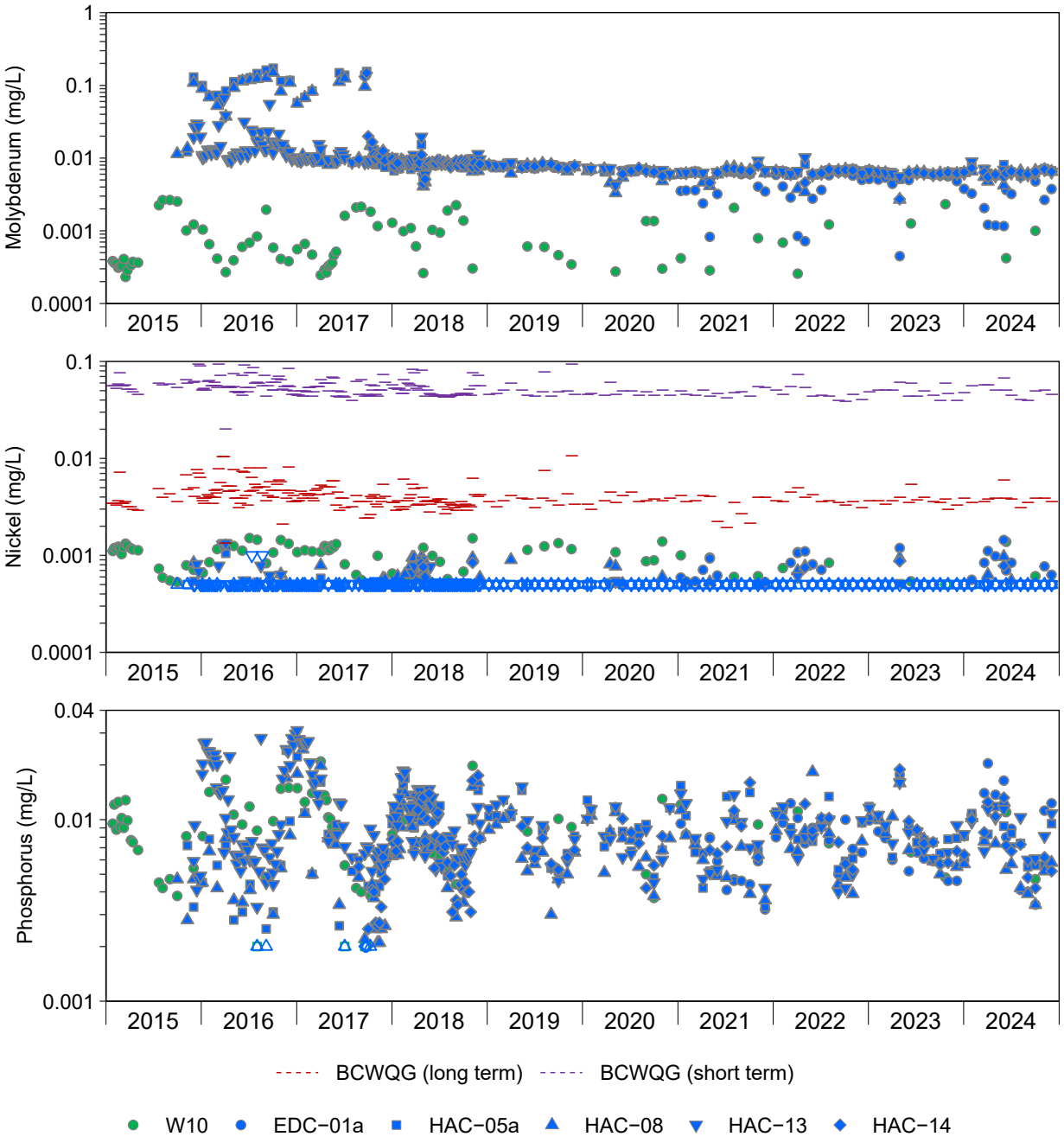

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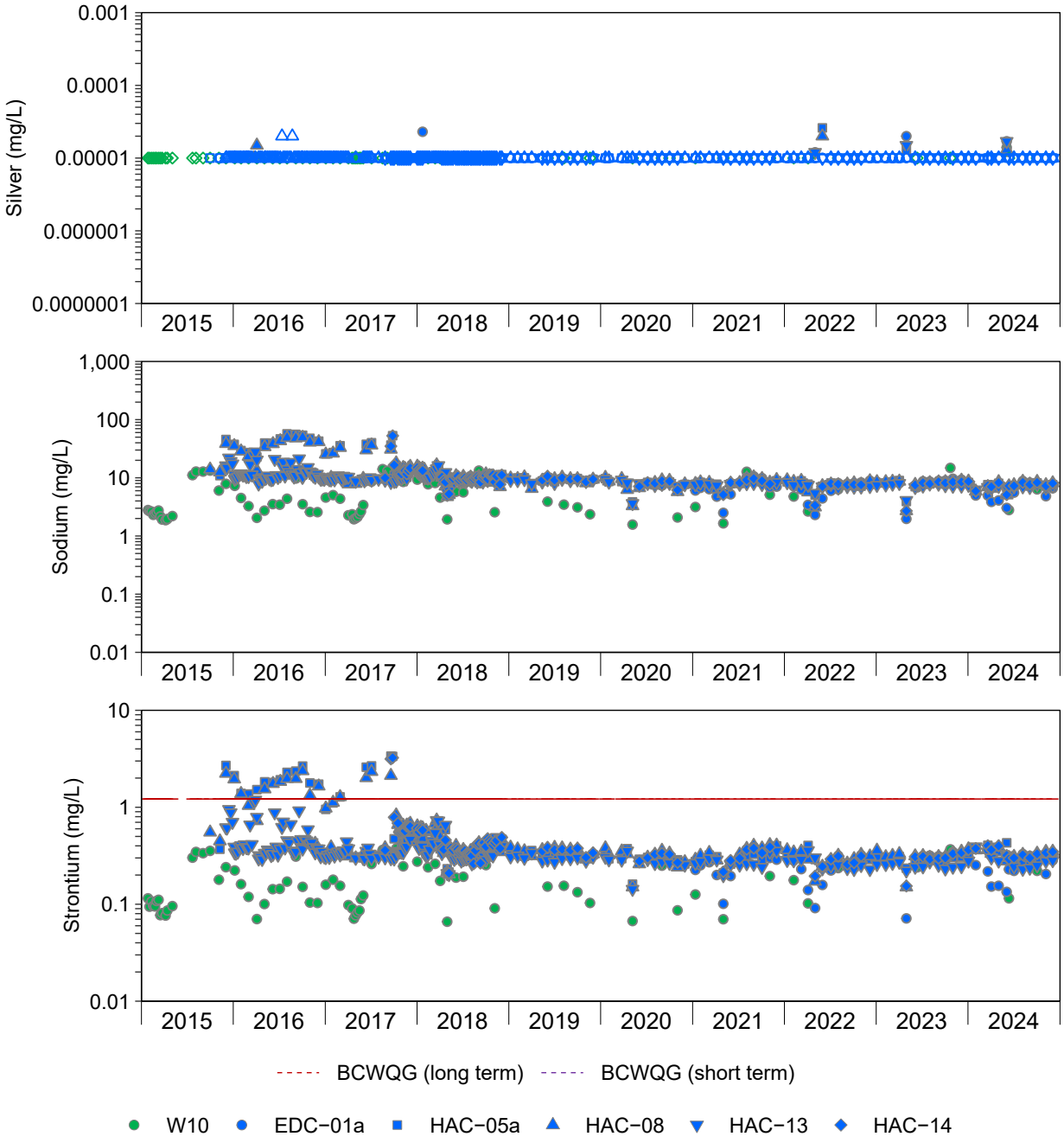

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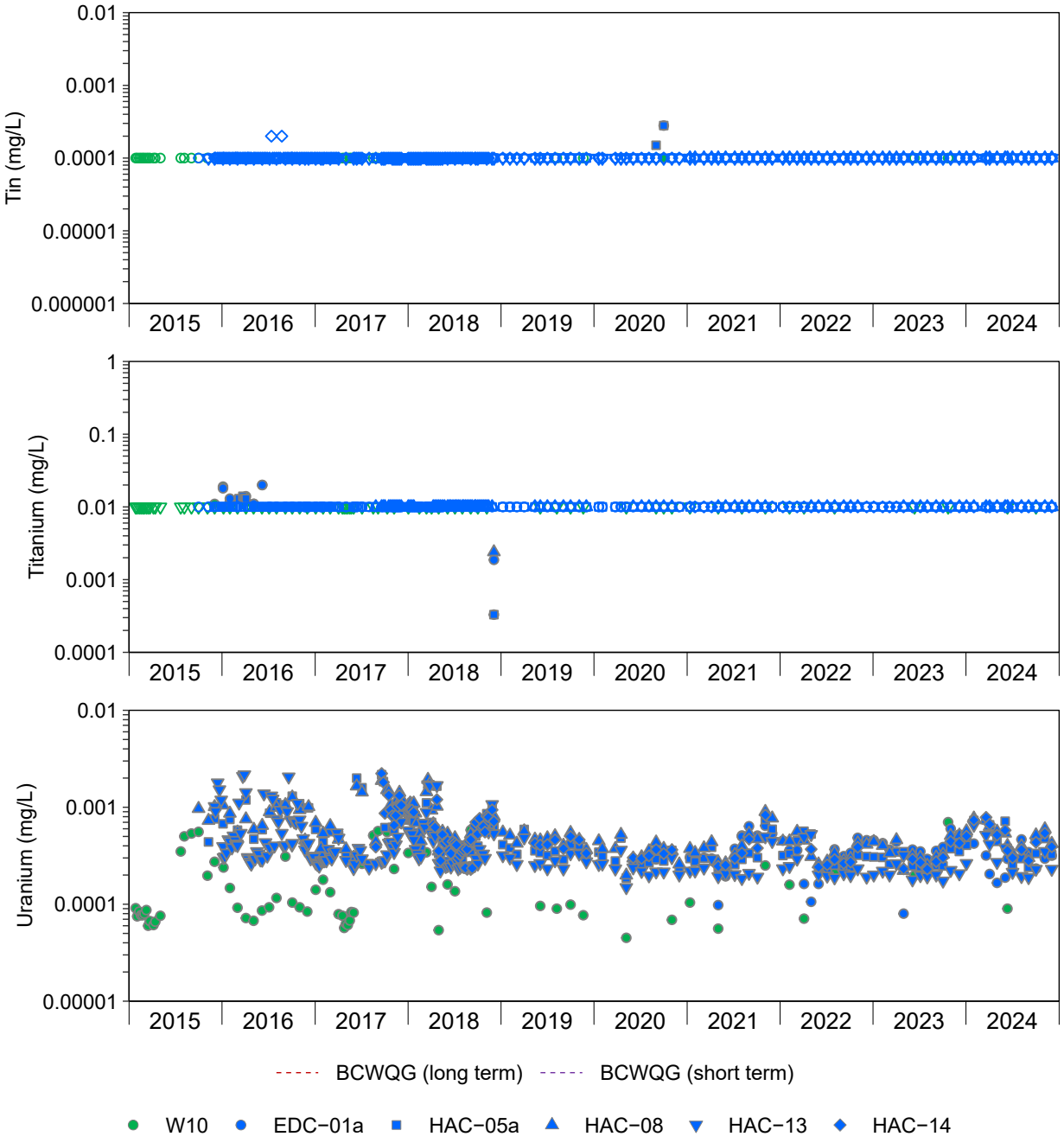

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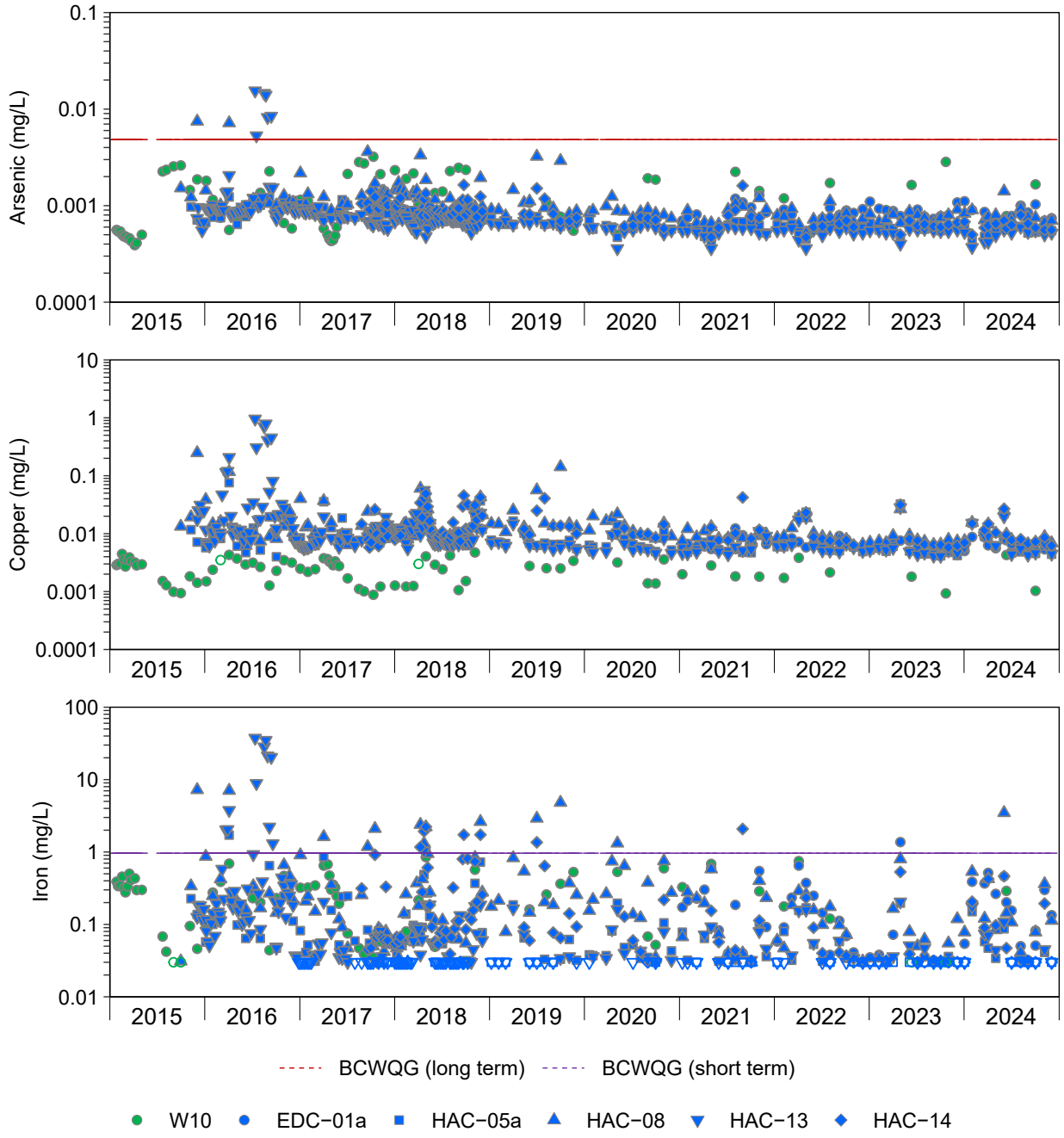

Figure D.1.2: Total Aqueous Concentrations of Primary and Secondary Analytes in Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2015 to 2024

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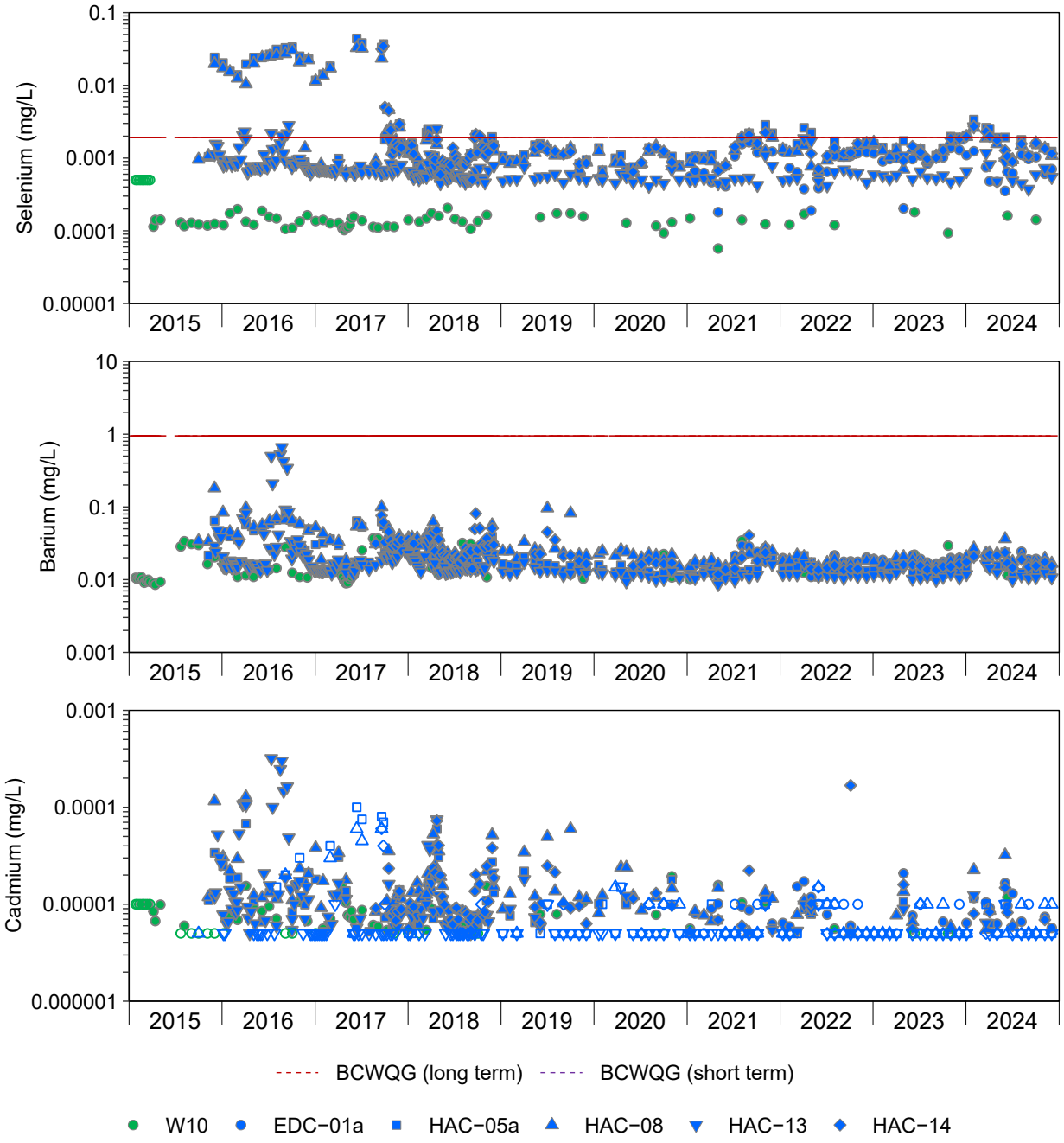

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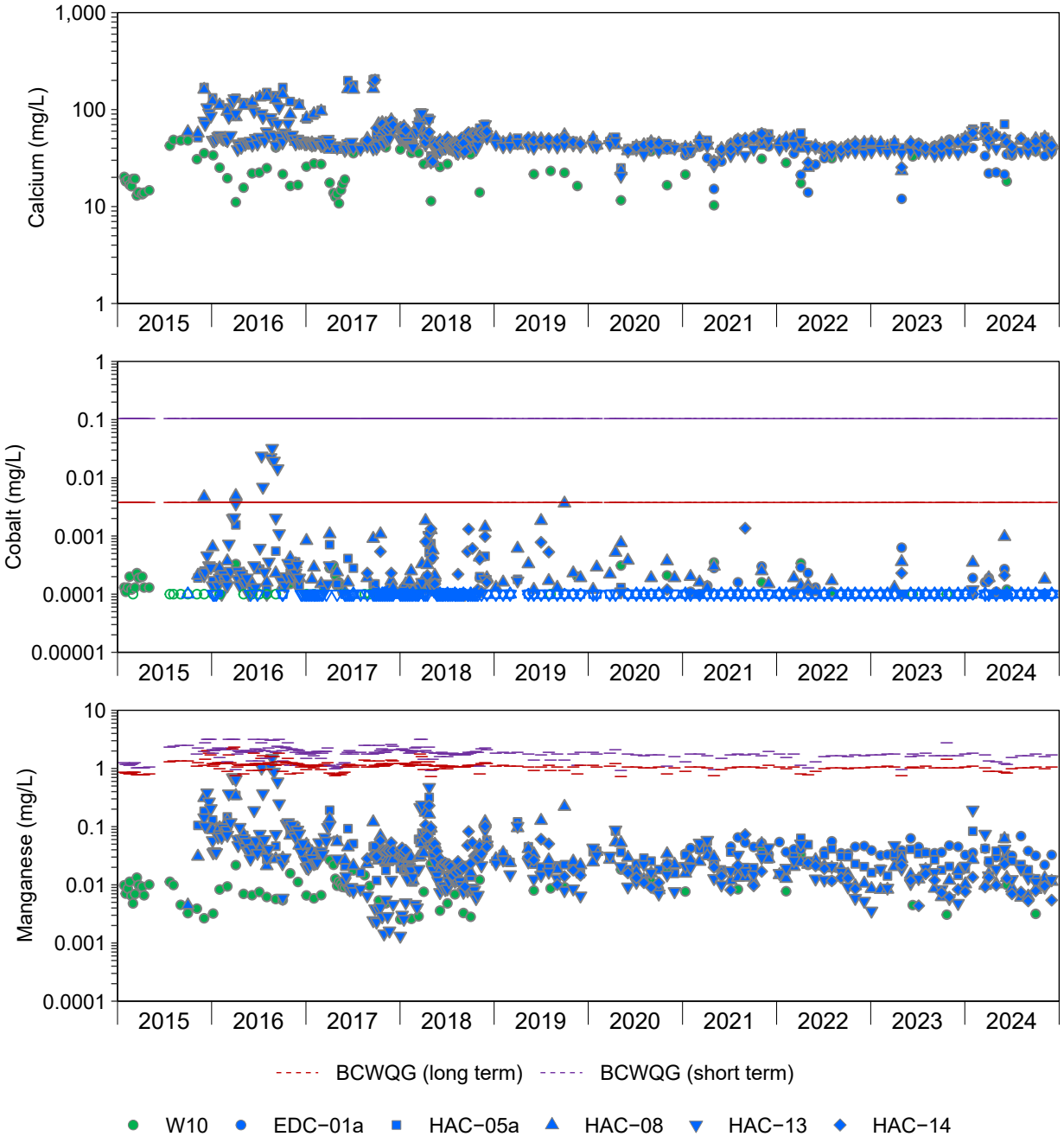

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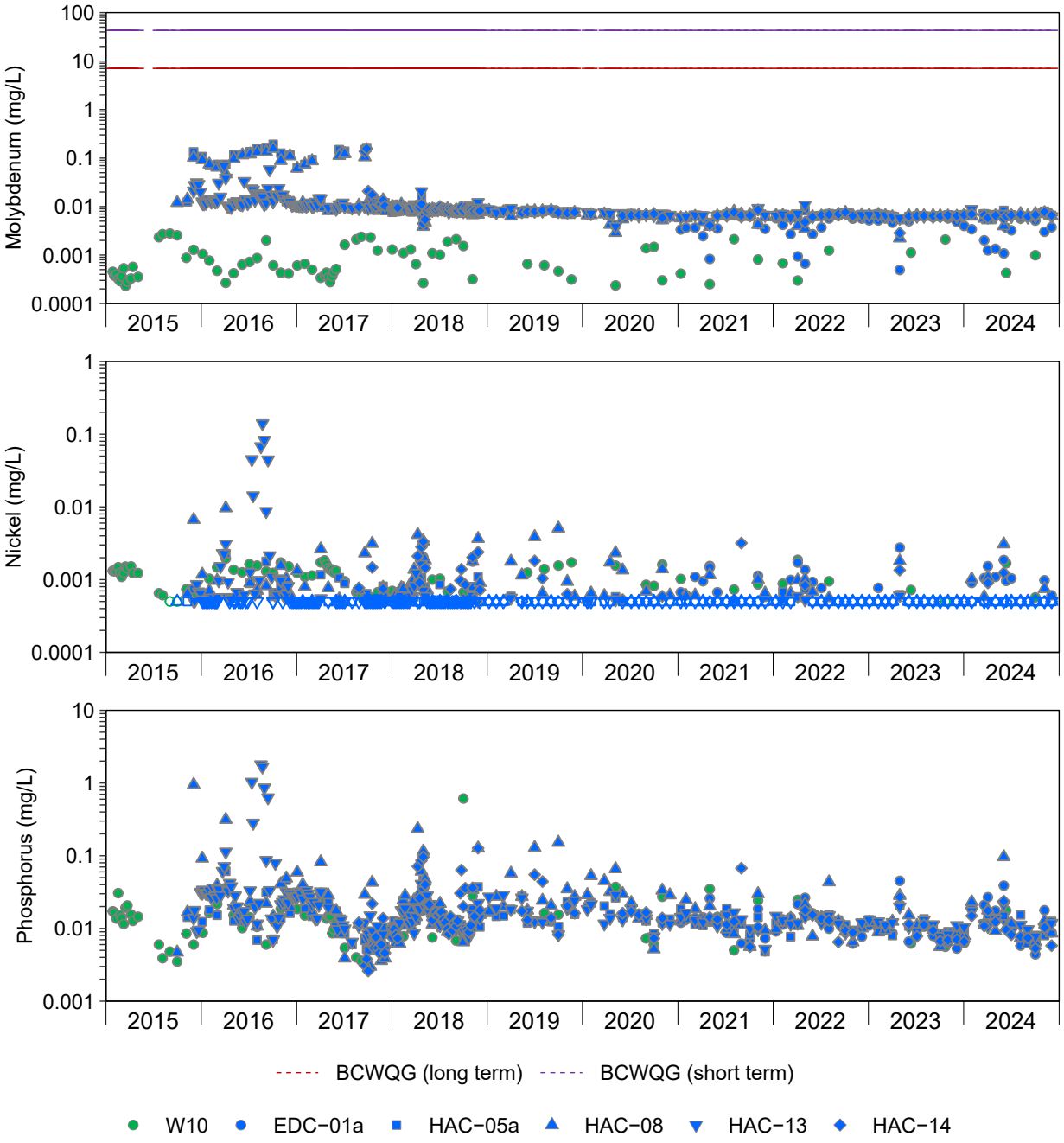

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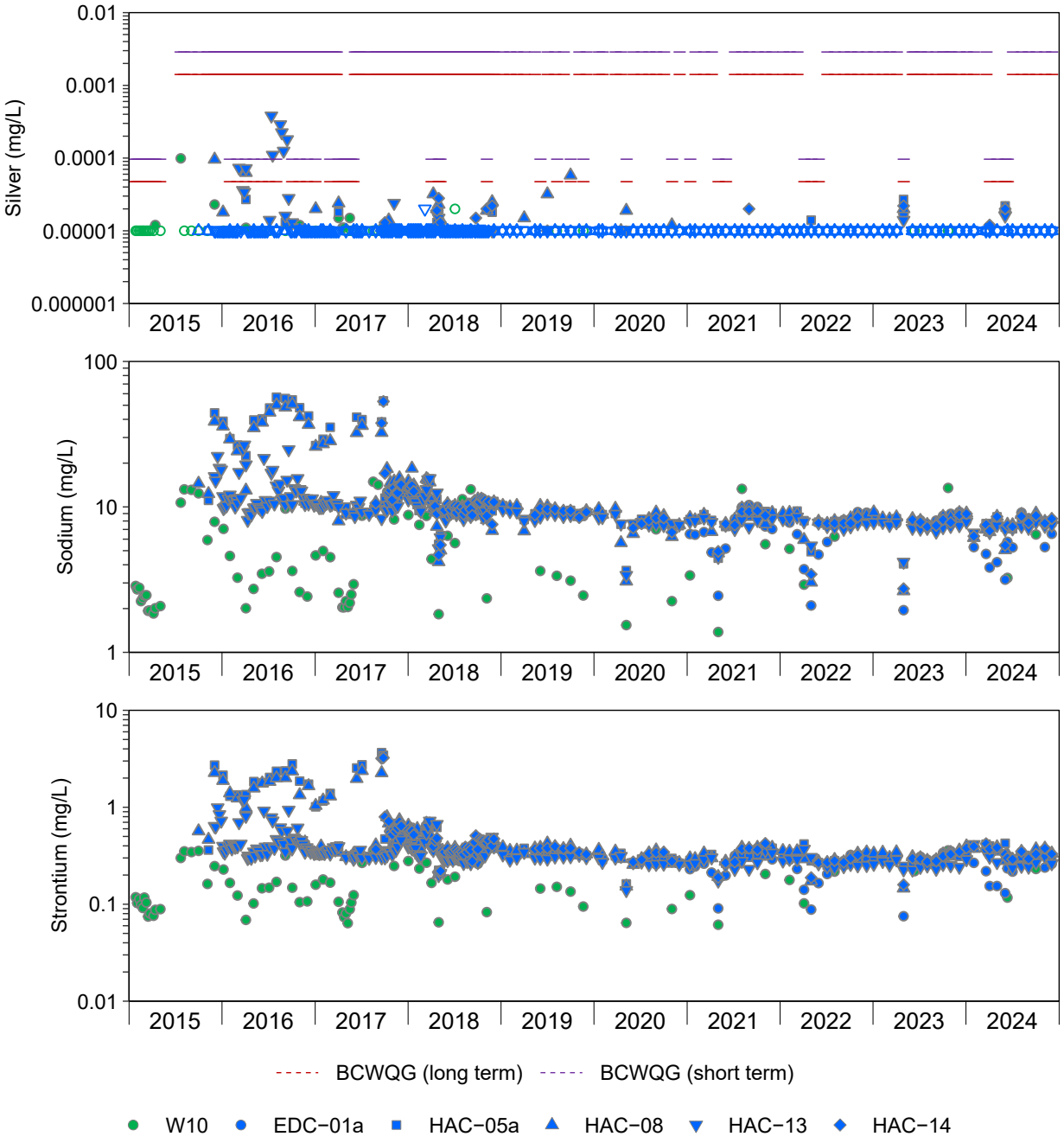

Figure D.1.2: Total Aqueous Concentrations of Primary and Secondary Analytes in Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2015 to 2024

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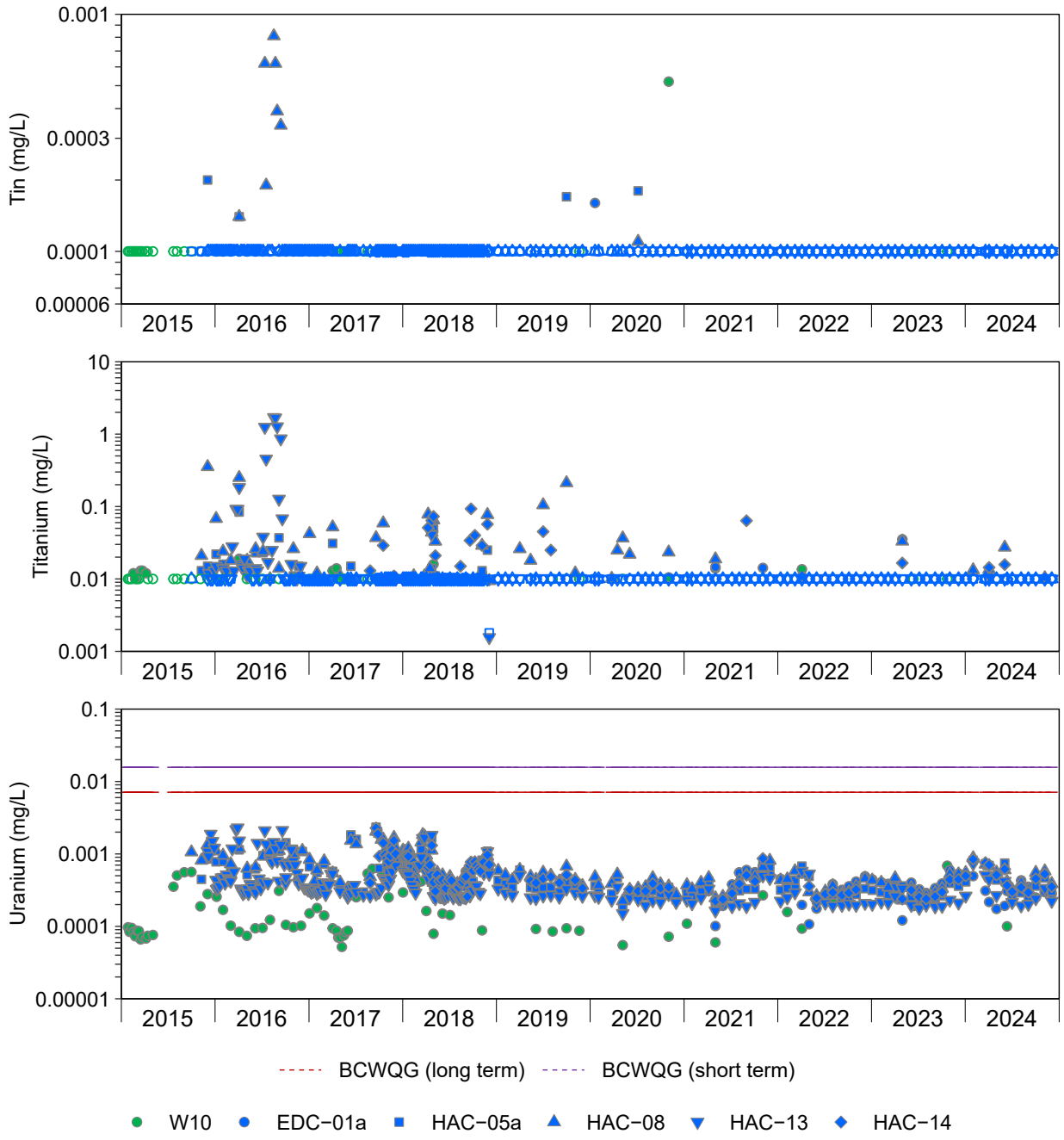

Figure D.1.2: Total Aqueous Concentrations of Primary and Secondary Analytes in Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2015 to 2024

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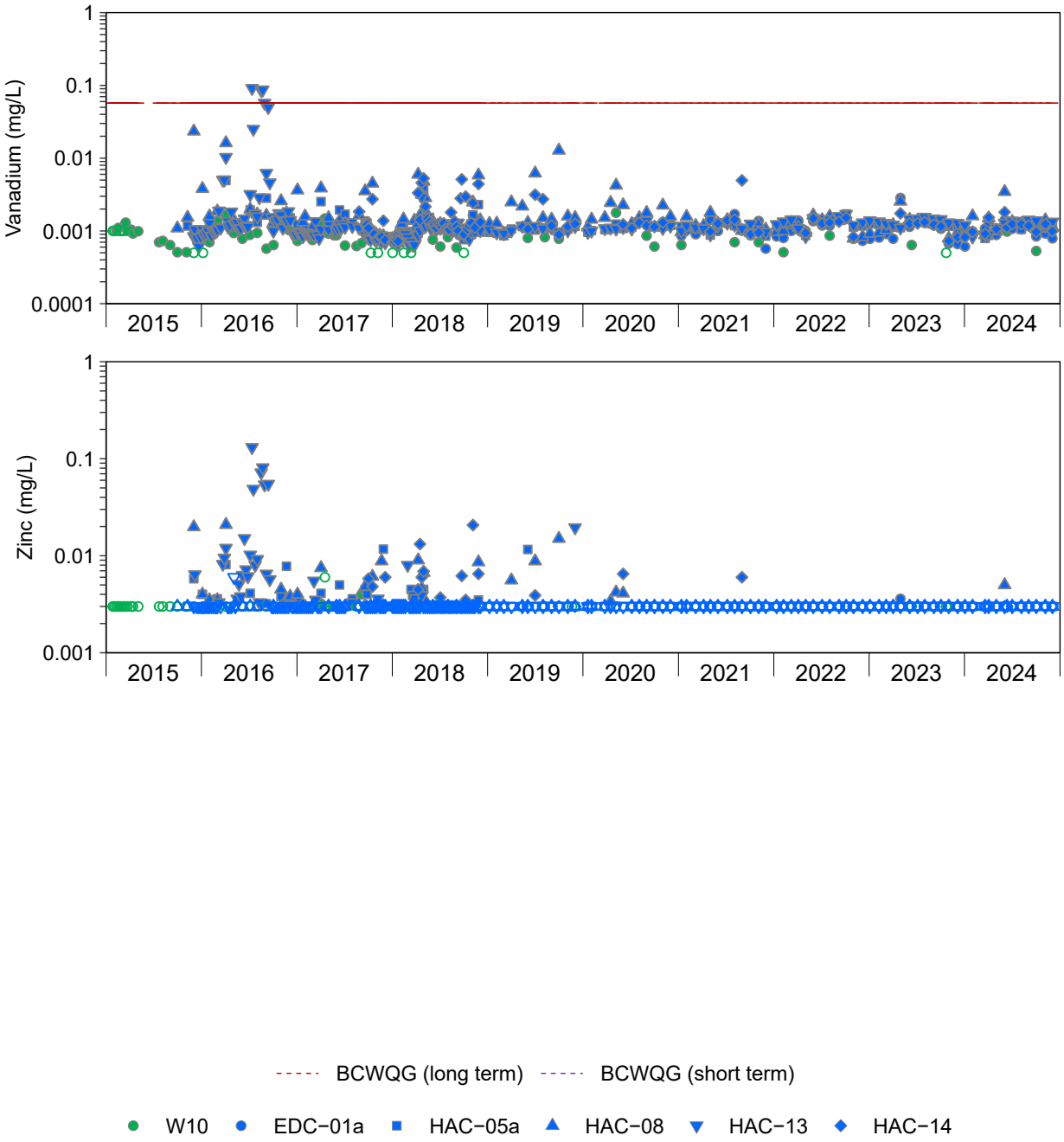

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Figure D.1.3: Guideline Exceedance Factor (GEF) of Dissolved Copper in Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2015 to 2024

Notes: GEF = Guideline Exceedance Factor. Acute and Chronic GEF's calculated from monthly averages. Green represents reference stations and blue represents exposed stations. Plots exclude data from EDC−01 in 2015 to 2020; EDC−01 was relocated and renamed as EDC−01a starting in 2021.

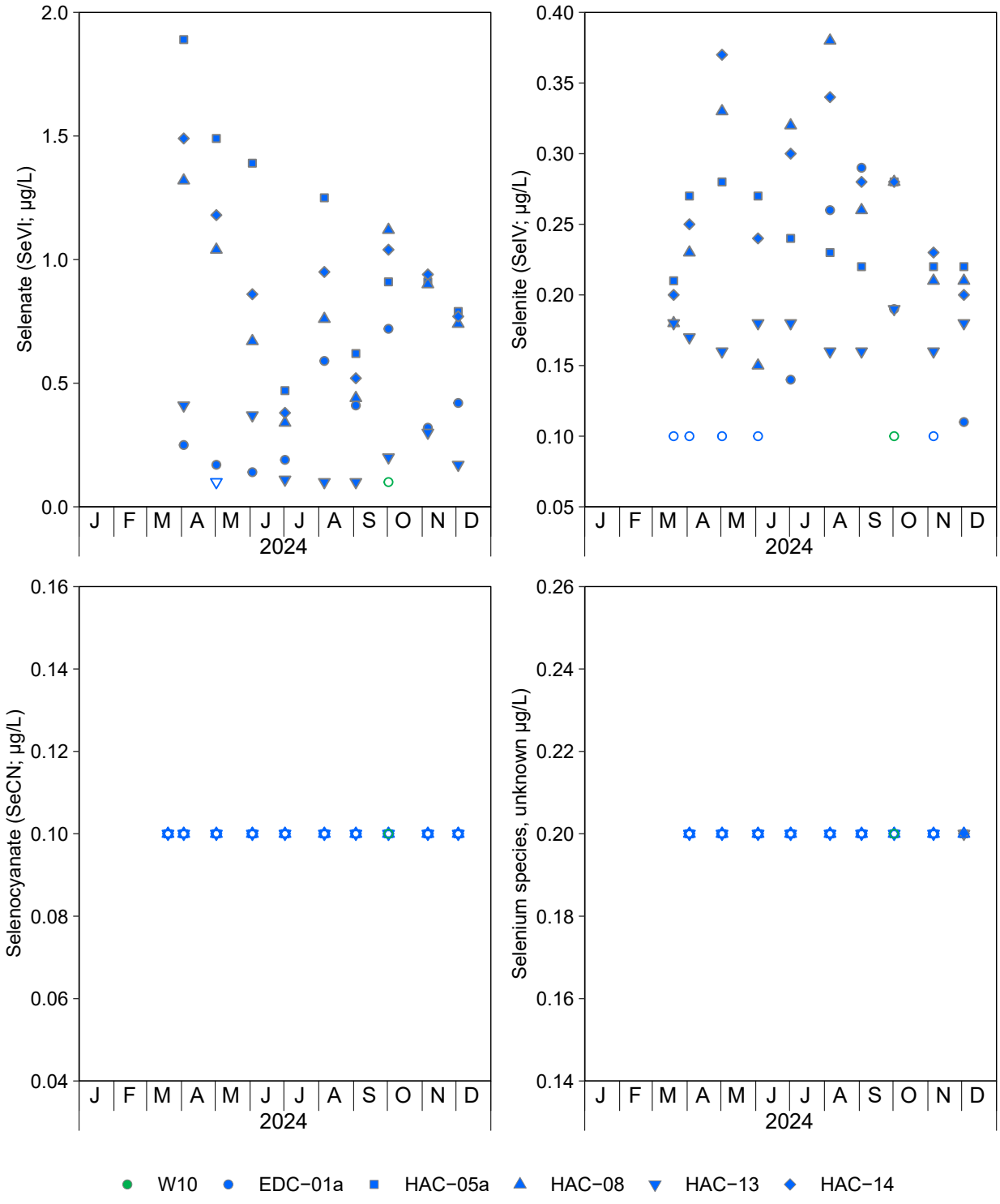


Figure D.1.4: Selenium Speciation Results from Surface Water Samples from Hazeltine Creek (HAC−13, HAC−05a, HAC−14, HAC−08) and Edney Creek (EDC−01a, W10), 2024

Notes: Green represents reference stations and blue represents exposed stations. Concentrations reported below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL. Selenium speciation monitoring commenced in April 2024. See Appendix Tables D.1.3 to D.1.8 for tabular comparison of analyte concentrations to BCWQG for the year preceding biological sampling (September 2023 to August 2024).

Table D.1.1: British Columbia Water Quality Guidelines for the Protection of Aquatic Life (BCMOWLRS 2024, 2025), 2024

Parameter	Units	Long-term Average	Short-term Maximum
Anions, Organics, Nutrients, and Physical Properties			
pH	pH units	6.5 - 9.0	
Temperature (*in situ*)[a]	°C	± 1	
Alkalinity ($CaCO_3$)	mg/L	> 20[b]	-
Conductivity	µS/cm	-	-
Dissolved Oxygen (*in situ*)[c]	mg/L	> 8	> 5
Dissolved Oxygen (*in situ*)[d]	mg/L	> 11	> 9
Total Suspended Solids[e]	mg/L	+ 5	+ 25
Turbidity[e]	NTU	+ 2	+ 8
Chloride	mg/L	150	600
Fluoride[f]	mg/L	-	For hardness ≤ 10 mg/L, WQG = 0.4 For hardness > 10 mg/L, WQG = [-51.73 + 92.57 × log10(hardness)]×0.01 Maximum applicable hardness = 385 mg/L
Sulphate[g]	mg/L	hardness dependent	-
Ammonia (as N)[h]	mg/L	temperature and pH dependent	temperature and pH dependent
Nitrate (as N)	mg/L	3.0	32.8
Nitrite (as N)[i]	mg/L	chloride dependent	chloride dependent
Phosphorus - Total[j]	mg/L	0.005 - 0.015	
Dissolved Organic Carbon[k]	mg/L	-	± 20%[k]
Total Metals			
Aluminum[f]	µg/L	For hardness 10 to 430 mg/L and pH 6 to 8.7 and DOC 0.08 to 12.3 mg/L, WQG = (exp([0.645 × ln(DOC)] + [2.255 × ln(hardness)] + [1.995 × pH] + [-0.284 × (ln(hardness) × pH)] -9.898))/3	-
Antimony	µg/L	74	250
Arsenic	µg/L	5	-
Barium	mg/L	1.0	
Beryllium	µg/L	0.13	-
Boron	mg/L	1.2	-
Chromium[l]	µg/L	For Cr VI, WQG = 0.0025 For Cr III, WQG = 0.0089	-
Cobalt	µg/L	4	110
Iron	mg/L	-	1
Manganese[f]	mg/L	For hardness 37 to 450 mg/L, WQG ≤ 0.004 × hardness + 0.605 Maximum applicable hardness = 450 mg/L	For hardness 25 to 259 mg/L, WQG ≤ 0.01102 × hardness + 0.54 Maximum applicable hardness = 259 mg/L
Molybdenum	mg/L	7.6	46
Selenium	µg/L	2	-
Silver[f]	mg/L	For hardness ≤ 100 mg/L, WQG = 0.00005 For hardness > 100 mg/L, WQG = 0.0015	For hardness ≤ 100 mg/L, WQG = 0.0001 For hardness > 100 mg/L, WQG = 0.003
Thallium	µg/L	0.3	-
Uranium	µg/L	7.5	16.5
Vanadium	mg/L	0.06	-
Dissolved Metals			
Cadmium[f]	mg/L	For hardness = 3.4 to 285 mg/L, WQG = {exp[0.736×ln - 4.943]} Maximum applicable hardness = 285 mg/L	For hardness = 7 to 455 mg/L, WQG = {exp[1.03×ln-5.274]} Maximum applicable hardness = 455 mg/L
Copper[m]	mg/L	Biotic Ligand Model	Biotic Ligand Model
Iron	mg/L	-	0.35
Lead[f]	µg/L	For Hardness 4.7 to 511 mg/L and Dissolved Organic Carbon 0.5 - 31.5 mg/L, WQG = {exp(0.514 [ln(DOC)] + 0.214[ln(hardness)] + 0. 4354)}/2	-
Nickel[m]	mg/L	Biotic Ligand Model	Biotic Ligand Model
Strontium	mg/L	1.25	-
Zinc[f]	µg/L	For hardness 23.4 to 399 mg/L, pH 6.5 to 8.13, and DOC 0.3 mg/L to 22.9 mg/L, WQG = (exp(0.947[ln(hardness)] − 0.815[pH] + 0.398[ln(DOC)] + 4.625))/2 Maximum applicable hardness = 399 mg/L	For hardness 13.8 to 250.5 mg/L and DOC 0.3 to 17.3 mg/L, WQG = (exp(0.833[ln(hardness)] + 0.240[ln(DOC)] + 0.526))/2 Maximum applicable hardness: 250.5 mg/L

Notes: "-" indicates no applicable guideline. BCMOWLRS = British Columbia Ministry of Water, Land and Resource Stewardship. WQG = Water Quality Guideline.

[a] Change from optimal. No guideline applied.

[b] For waterbodies with low sensitivity to acid inputs.

[c] Minimum for all life stages other than buried embryo / alevin.

[d] Minimum for buried embryo / alevin life stages.

[e] Increase relative to background; no guideline applied.

[f] For hardness-based guidelines, concurrent hardness values were used for calculating guidelines. If hardness values exceeding the maximum applicable hardness, then guidelines were determined using the maximum applicable hardness. If hardness values are lower than the minimum hardness, then guidelines were determined using the minimum hardness.

[g] 128 mg/L at hardness 0-30 mg/L; 218 mg/L at hardness 31-75 mg/L; 309 mg/L at hardness 76-180 mg/L; 429 mg/L at hardness > 250 mg/L.

[h] Used tables in BCMOWLRS 2025.

[i] When chloride < 2 mg/L, long-term = 0.02 mg/L and short-term = 0.06 mg/L; increase with increasing chloride.

[j] Aquatic Life - Lakes; minimum guideline was applied.

[k] ±20% of the background median; no guideline applied.

[l] Chromium VI is the dominant oxidation state in oxygenated environments, and so its guideline was applied.

[m] Guidelines calculated using the BLM model and calculated concurrently for each sample using the guideline lookup tables provided for dissolved copper and dissolved nickel (BCMOWLRS 2025).

Table D.1.2: Supporting Spot Water Quality Data Collected During Periphyton and Benthic Invertebrate Sampling in Hazeltine Creek, Frypan Creek, and Edney Creek, 2024

Analyte	Units	Guidelines for the Protection of Aquatic Life[a]		Upper Creek Areas					Lower Creek Areas		
				Reference		Exposed			Reference	Exposed	
				FPC-R3	EDC-U	HAC-R1	HAC-U (HAC-R2)	HAC-R3	EDC-D (EDC-REF)	E1 (EDC-EXP)	HAC-D (HAC-R5)
		Long-term Average	Short-term Maximum	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24
Anions, Organics, Nutrients, and Physical Properties											
Alkalinity (as $CaCO_3$)	mg/L	>20	-	90.4	76.0	94.5	100	100	175	177	122
Ammonia (as N)	mg/L	0.171 - 1.81	1.01 - 17.4	0.0214	0.0140	0.00740	0.00780	0.00670	0.00770	0.00920	0.00730
Chloride (Cl)	mg/L	150	600	<0.5	<0.5	0.760	1.11	1.08	0.510	0.510	0.980
Conductivity	µS/cm	-	-	167	144	246	288	295	328	325	324
Specific Conductance (*in situ*)	µS/cm	-	-	167	151	249	288	289	328	324	324
Dissolved Organic Carbon[b]	mg/L	-	-	16.2	14.9	5.76	5.55	5.53	8.65	8.24	4.57
Dissolved Oxygen (*in situ*)	%	-	-	78.6	34.8	-	-	-	96.3	-	-
Dissolved Oxygen (*in situ*)	mg/L	>8	>5	8.27	3.77	9.22	-	-	9.73	-	-
Fluoride (F)	mg/L	-	1.22 - 1.53	0.0480	0.0340	0.0610	0.0680	0.0680	0.0880	0.0910	0.0760
Hardness (as $CaCO_3$)	mg/L	-	-	83.1	76.7	111	136	131	167	160	152
Hardness, from Total CaMg (as $CaCO_3$)	mg/L	-	-	85.2	75.7	114	136	134	162	164	147
Nitrate (as N)	mg/L	3.00	32.8	0.0431	0.0344	0.00960	0.00630	<0.005	<0.005	0.00700	<0.005
Nitrate and Nitrite (as N)	mg/L	-	-	0.0431	0.0344	0.00960	0.00630	<0.0051	<0.0051	0.00700	<0.0051
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Orthophosphate-Dissolved (as P)	mg/L	-	-	0.0181	<0.001	0.00240	0.00230	0.00210	<0.001	<0.001	<0.001
pH (*in situ*)	pH units	6.5 - 9.0	-	7.57	7.18	8.13	8.83	8.81	8.26	8.33	8.28
pH	pH units	-	-	8.10	8.04	8.23	8.38	8.37	8.52	8.53	8.38
Phosphorus (P) Total Dissolved	mg/L	-	-	0.0413	0.00740	0.00990	0.0107	0.0101	0.00510	0.00540	0.00570
Phosphorus (P) Total	mg/L	-	-	0.0548	0.0168	0.0157	0.0123	0.0121	0.00620	0.00570	0.00750
Sulphate	mg/L	309	-	<0.3	0.710	33.1	50.2	50.7	8.87	8.85	48.9
Temperature (*in situ*)	°C	-	-	13.0	13.9	16.4	19.9	19.6	15.0	18.4	21.4
Total Dissolved Solids	mg/L	-	-	133	122	170	206	204	214	219	221
Total Nitrogen	mg/L	-	-	0.735	0.593	0.272	0.266	0.264	0.259	0.275	0.206
Total Suspended Solids[b]	mg/L	-	-	6.20	1.50	1.60	<1	<1	<1	<1	<1
Turbidity[b]	NTU	-	-	7.10	1.47	1.50	0.400	0.370	0.200	0.270	0.430
Total Metals											
Aluminum	mg/L	0.358 - 0.612	-	0.231	0.0704	0.0706	0.0106	0.00820	0.00930	0.0108	0.0206
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	0.00500	-	0.000750	0.000790	0.000640	0.000720	0.000680	0.00231	0.00183	0.000990
Barium	mg/L	1.00	-	0.00445	0.0146	0.0112	0.0106	0.0110	0.0281	0.0288	0.0209
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.20	-	<0.01	<0.01	0.0200	0.0210	0.0200	0.0230	0.0220	0.0230
Cadmium	mg/L	-	-	0.00000960	0.0000172	<0.00001	<0.00001	<0.000005	<0.000005	0.00000610	<0.00001
Calcium	mg/L	-	-	26.0	19.4	36.9	42.4	41.7	41.3	42.4	44.6
Chromium	mg/L	0.00250	-	0.000750	0.000620	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	0.00400	0.110	0.000250	0.000280	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	-	-	0.00257	0.00215	0.00548	0.00458	0.00445	0.00126	0.00178	0.00685
Iron	mg/L	-	1.00	0.546	0.289	0.0630	<0.03	<0.03	<0.03	<0.03	0.0340
Lead	mg/L	-	-	0.0000810	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.00130	0.00130	0.00120
Magnesium	mg/L	-	-	4.92	6.61	5.42	7.36	7.20	14.2	14.2	8.69
Manganese	mg/L	0.938 - 1.33	1.37 - 2.35	0.0598	0.198	0.0174	0.0213	0.0186	0.00486	0.00354	0.0772
Molybdenum	mg/L	7.60	46.0	0.000155	0.000362	0.00628	0.00672	0.00683	0.00164	0.00163	0.00615
Nickel	mg/L	-	-	0.000830	0.00150	<0.0005	<0.0005	<0.0005	0.000610	0.000630	<0.0005
Potassium	mg/L	-	-	0.247	0.868	0.938	0.936	0.921	1.24	1.25	1.12
Selenium	mg/L	0.00200	-	0.000106	0.000151	0.000492	0.00134	0.00138	0.000156	0.000112	0.00135
Silicon	mg/L	-	-	6.79	3.87	3.19	3.38	3.23	4.69	4.60	3.98
Silver	mg/L	0.0000500 - 0.00150	0.000100 - 0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	4.99	3.07	7.16	7.98	7.97	10.5	10.2	8.75
Strontium	mg/L	-	-	0.0894	0.123	0.241	0.268	0.270	0.294	0.295	0.310
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	0.00750	0.0165	0.0000340	0.0000500	0.000209	0.000292	0.000304	0.000311	0.000337	0.000421
Vanadium	mg/L	0.0600	-	0.00232	0.000840	0.00163	0.00164	0.00155	0.000610	0.000670	0.00144
Zinc	mg/L	-	-	0.00400	0.0134	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Dissolved Metals											
Aluminum	mg/L	-	-	0.0302	0.0332	0.00660	0.00310	0.00300	0.00520	0.00590	0.00380
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	-	0.000640	0.000720	0.000560	0.000690	0.000650	0.00222	0.00175	0.000960
Barium	mg/L	-	-	0.00304	0.0144	0.0102	0.0108	0.0104	0.0279	0.0280	0.0210
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	<0.01	<0.01	0.0190	0.0200	0.0190	0.0230	0.0200	0.0230
Cadmium	mg/L	0.000172 - 0.000304	0.000442 - 0.000979	0.00000620	0.0000156	<0.000005	<0.000005	<0.000005	0.00000530	0.00000550	<0.00001
Calcium	mg/L	-	-	25.4	19.6	35.0	42.6	40.2	42.6	40.2	46.3
Chromium	mg/L	-	-	<0.0005	0.000520	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt	mg/L	-	-	0.000120	0.000230	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.00340 - 0.00700	0.0204 - 0.0398	0.00161	0.00194	0.00394	0.00412	0.00427	0.00126	0.00170	0.00637
Iron	mg/L	-	0.350	0.299	0.202	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Lead	mg/L	0.00491 - 0.00837	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.00130	0.00120	0.00110
Magnesium	mg/L	-	-	4.77	6.74	5.69	7.30	7.50	14.7	14.4	8.91
Manganese	mg/L	-	-	0.0484	0.187	0.00875	0.0147	0.0123	0.00360	0.00254	0.0638
Molybdenum	mg/L	-	-	0.000147	0.000330	0.00599	0.00675	0.00652	0.00166	0.00155	0.00641
Nickel	mg/L	0.00210 - 0.00610	0.0433 - 0.0669	0.000560	0.00143	<0.0005	<0.0005	<0.0005	0.000580	0.000570	<0.0005
Potassium	mg/L	-	-	0.252	0.880	0.969	0.966	0.956	1.28	1.27	1.11
Selenium	mg/L	-	-	0.0000970	0.000159	0.000448	0.00136	0.00140	0.000137	0.000173	0.00121
Silicon	mg/L	-	-	6.54	3.71	2.99	3.21	3.20	4.96	4.63	3.90
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	5.05	3.03	7.35	7.93	7.94	10.4	10.1	8.33
Strontium	mg/L	1.25	-	0.0884	0.125	0.234	0.277	0.269	0.299	0.284	0.314
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	0.0000300	0.0000430	0.000200	0.000281	0.000293	0.000291	0.000320	0.000387
Vanadium	mg/L	-	-	0.00173	0.000640	0.00150	0.00151	0.00157	0.000550	0.000630	0.00131
Zinc	mg/L	0.0120 - 0.0259	0.0595 - 0.0984	<0.003	0.00840	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Selenium Speciation											
Selenate (Se(VI))	µg/L	-	-	<0.1	<0.1	0.11	0.87	0.86	<0.1	<0.1	0.54
Selenite (Se(IV))	µg/L	-	-	<0.1	<0.1	0.12	0.26	0.26	<0.1	<0.1	0.30
Selenocyanate (SeCN)	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Selenium Unknown	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Notes: "-" indicates data not available. HAC-R2, EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for HAC-U, EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.3: Surface Water Quality Data Collected Routinely at HAC-13 in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date													Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	2-Jul-24	9-Jul-24	6-Aug-24								
Anions, Organics, Nutrients, and Physical Properties																								
Alkalinity (as $CaCO_3$)	mg/L	>20	-	94.0	95.1	97.4	95.8	108	117	114	100	104	117	94.6	-	95.0	12	103	9.1	94	117	0%	0%	-
Ammonia (as N)	mg/L	0.810 - 2.04	4.21 - 19.6	0.00790	0.00600	0.00520	0.00580	0.00540	0.00680	0.00670	0.00770	0.0219	0.00950	0.0117	-	0.00760	12	0.0085	0.0046	0.0052	0.022	0%	0%	0%
Chloride	mg/L	150	600	0.780	0.720	0.780	0.760	0.790	<0.5	0.620	0.600	0.760	<0.5	0.730	-	0.770	12	0.69	0.080	<0.5	0.79	17%	0%	0%
Conductivity	µS/cm	-	-	247	248	259	258	292	375	339	291	273	327	259	-	255	12	285	41	247	375	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	244	246	253	254	282	375	335	290	273	314	251	-	255	12	281	41	244	375	0%	-	-
Dissolved Organic Carbon [c]	mg/L	-	-	6.50	5.88	5.88	6.00	6.39	7.15	6.64	6.68	6.83	13.1	6.64	-	5.78	12	7.0	2.0	5.8	13	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	87.6	95.0	85.1	88.3	-	-	92.8	93.6	92.0	92.9	96.8	-	94.4	10	92	3.7	85	97	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	9.14	10.2	11.2	12.3	-	-	12.6	12.1	10.8	9.60	9.35	-	9.64	10	11	1.3	9.1	13	0%	0%	0%
Fluoride	mg/L	-	1.37 - 1.55	0.0750	0.0650	0.0660	0.0660	0.0760	0.104	0.0880	0.0880	0.0720	0.0890	0.0700	-	0.0690	12	0.077	0.012	0.065	0.10	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	111	112	113	111	121	171	150	140	115	136	112	-	110	12	125	20	110	171	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	<0.005	<0.005	<0.005	0.0142	0.0122	0.0150	0.0237	0.00790	0.0158	<0.005	<0.005	-	<0.005	12	0.0099	0.0053	<0.005	0.024	50%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0051	<0.0051	<0.0051	0.0142	0.0122	0.0160	0.0237	0.00790	0.0158	<0.0051	<0.0051	-	<0.0051	12	0.010	0.0053	<0.0051	0.024	50%	-	-
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	0.00100	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	12	0.0010	-	0.0010	0.0010	92%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	<0.001	<0.001	<0.001	0.00340	0.00250	0.00180	<0.001	<0.001	0.00170	0.00160	<0.001	-	0.00230	12	0.0016	0.00059	<0.001	0.0034	50%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	8.09	8.14	7.61	8.05	7.96	7.19	7.55	7.67	7.99	7.84	8.06	-	7.94	12	7.8	0.28	7.2	8.1	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.17	8.20	8.17	8.24	8.25	8.20	8.16	8.21	8.18	8.36	8.25	-	8.25	12	8.2	0.055	8.2	8.4	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00610	0.00570	0.00660	0.00930	0.00830	0.00970	0.00670	0.0114	0.0102	0.0114	0.00710	-	0.0103	12	0.0086	0.0021	0.0057	0.011	0%	-	-
Total Phosphorus	mg/L	-	-	0.0113	0.00780	0.00830	0.0110	0.0104	0.0174	0.0115	0.0107	0.0136	0.0212	0.00910	-	0.0112	12	0.012	0.0038	0.0078	0.021	0%	-	-
Sulphate	mg/L	309	-	33.0	31.7	33.4	34.8	43.0	78.7	61.0	49.5	41.8	50.0	35.5	-	34.5	12	44	14	32	79	0%	0%	-
Temperature (*in situ*)	°C	-	-	13.4	12.1	3.64	1.69	1.31	1.30	2.63	4.51	8.24	13.8	17.0	22.3	13.4	13	8.9	6.9	1.3	22	0%	-	-
Total Dissolved Solids	mg/L	-	-	178	157	165	170	195	271	247	194	190	225	182	-	170	12	195	35	157	271	0%	-	-
Total Nitrogen	mg/L	-	-	0.237	0.249	0.236	0.231	0.260	0.302	0.281	0.263	0.296	0.406	0.267	-	0.260	12	0.27	0.047	0.23	0.41	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	1.40	<1	<1	<1	<1	<1	1.10	1.90	<1	3.50	1.40	-	<1	12	1.4	0.75	<1	3.5	58%	-	-
Turbidity (*in situ*)	NTU	-	-	0.660	1.22	0.700	0.820	0.560	2.50	1.13	0.890	0.750	1.46	1.12	-	1.02	12	1.1	0.52	0.56	2.5	0%	-	-
Turbidity	NTU	-	-	0.700	0.440	0.600	0.490	0.280	1.69	0.960	0.610	0.630	1.37	0.590	-	0.790	12	0.76	0.40	0.28	1.7	0%	-	-
Total Metals																								
Aluminum	mg/L	0.302 - 0.603	-	0.0164	0.0167	0.0288	0.0181	0.00710	0.0784	0.0287	0.0267	0.0262	0.0582	0.0102	-	0.0281	12	0.029	0.020	0.0071	0.078	0%	0%	-
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	0.000120	<0.0001	0.000100	0.000140	<0.0001	<0.0001	<0.0001	0.000100	<0.0001	-	<0.0001	12	0.00010	0.000014	<0.0001	0.00014	67%	0%	0%
Arsenic	mg/L	0.00500	-	0.000550	0.000540	0.000540	0.000560	0.000530	0.000370	0.000420	0.000420	0.000490	0.000560	0.000520	-	0.000600	12	0.00051	0.000070	0.00037	0.00060	0%	0%	-
Barium	mg/L	1.00	-	0.00982	0.0108	0.0120	0.0105	0.0118	0.0210	0.0162	0.0144	0.0124	0.0171	0.00982	-	0.0113	12	0.013	0.0034	0.0098	0.021	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0210	0.0190	0.0210	0.0200	0.0210	0.0150	0.0190	0.0160	0.0200	0.0180	0.0190	-	0.0200	12	0.019	0.0019	0.015	0.021	0%	0%	-
Cadmium	mg/L	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000124	0.00000640	<0.000005	<0.000005	<0.00001	<0.000005	-	<0.000005	12	0.0000057	0.0000023	<0.000005	0.000012	83%	-	-
Calcium	mg/L	-	-	33.8	34.9	36.9	35.4	39.8	60.6	52.8	43.6	40.0	50.0	35.5	-	37.6	12	42	8.5	34	61	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000120	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	0.00010	-	<0.0001	0.00012	92%	0%	0%
Copper	mg/L	-	-	0.00412	0.00410	0.00510	0.00466	0.00586	0.0152	0.00924	0.00917	0.00614	0.0197	0.00440	-	0.00551	12	0.0078	0.0049	0.0041	0.020	0%	-	-
Iron	mg/L	-	1.00	<0.03	<0.03	0.0320	<0.03	<0.03	0.175	0.0740	0.0710	0.0440	0.108	<0.03	-	0.0330	12	0.057	0.046	<0.03	0.18	42%	-	0%
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	12	<0.001	-	<0.001	<0.001	100%	-	-
Magnesium	mg/L	-	-	4.96	5.45	5.53	5.69	6.39	9.31	7.85	6.62	5.98	7.16	5.52	-	5.73	12	6.3	1.2	5.0	9.3	0%	-	-
Manganese	mg/L	1.09 - 1.36	1.75 - 2.42	0.0164	0.00834	0.00585	0.00482	0.0211	0.194	0.0745	0.0144	0.0187	0.0412	0.0124	-	0.0189	12	0.036	0.053	0.0048	0.19	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00631	0.00648	0.00639	0.00631	0.00654	0.00880	0.00708	0.00613	0.00620	0.00698	0.00628	-	0.00622	12	0.0066	0.00074	0.0061	0.0088	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	-	-
Potassium	mg/L	-	-	0.879	0.945	1.04	0.970	0.986	1.53	1.09	1.02	0.991	1.08	0.902	-	0.949	12	1.0	0.17	0.88	1.5	0%	-	-
Selenium	mg/L	0.00200	-	0.000525	0.000572	0.000466	0.000499	0.000654	0.00271	0.00117	0.000817	0.000479	0.000887	0.000486	-	0.000446	12	0.00081	0.00064	0.00045	0.0027	0%	8.3%	-
Silicon	mg/L	-	-	3.10	3.10	2.90	3.31	3.43	3.33	3.19	2.62	2.91	3.38	2.93	-	3.10	12	3.1	0.24	2.6	3.4	0%	-	-
Silver	mg/L	0.00150	0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000160	<0.00001	-	<0.00001	12	0.000010	-	<0.00001	0.000016	92%	0%	0%
Sodium	mg/L	-	-	6.73	7.22	7.36	7.45	7.89	6.63	7.01	6.67	7.48	7.01	7.09	-	7.36	12	7.2	0.38	6.6	7.9	0%	-	-
Strontium	mg/L	-	-	0.230	0.258	0.251	0.242	0.289	0.414	0.350	0.307	0.270	0.314	0.236	-	0.247	12	0.28	0.055	0.23	0.41	0%	-	-
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	12	<0.00001	-	<0.00001	<0.00001	100%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	12	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	0.00750	0.0165	0.000187	0.000190	0.000231	0.000211	0.000263	0.000735	0.000511	0.000443	0.000268	0.000421	0.000215	-	0.000193	12	0.00032	0.00017	0.00019	0.00074	0%	0%	0%
Vanadium	mg/L	0.0600	-	0.00147	0.00144	0.00130	0.00128	0.00120	0.000830	0.000890	0.000900	0.00111	0.00128	0.00137	-	0.00136	12	0.0012	0.00022	0.00083	0.0015	0%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	12	<0.003	-	<0.003	<0.003	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.3: Surface Water Quality Data Collected Routinely at HAC-13 in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date													Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	2-Jul-24	9-Jul-24	6-Aug-24								
Dissolved Metals																								
Aluminum	mg/L	-	-	0.00360	0.00770	0.00370	<0.003	0.00380	0.0196	0.00680	0.00960	0.00430	0.0260	0.00460	-	0.00520	12	0.0082	0.0072	<0.003	0.026	8.3%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Arsenic	mg/L	-	-	0.000510	0.000510	0.000450	0.000480	0.000510	0.000340	0.000420	0.000420	0.000450	0.000510	0.000520	-	0.000490	12	0.00047	0.000054	0.00034	0.00052	0%	-	-
Barium	mg/L	-	-	0.0103	0.0107	0.0105	0.0102	0.0117	0.0195	0.0155	0.0135	0.0114	0.0166	0.0109	-	0.0102	12	0.013	0.0031	0.010	0.020	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0190	0.0180	0.0200	0.0190	0.0200	0.0140	0.0160	0.0160	0.0180	0.0170	0.0180	-	0.0180	12	0.018	0.0018	0.014	0.020	0%	-	-
Cadmium	mg/L	0.000227 - 0.000314	0.000649 - 0.00102	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00000950	<0.000005	<0.000005	<0.000005	<0.00001	<0.000005	-	<0.000005	12	0.0000054	-	<0.000005	0.0000095	92%	0%	0%
Calcium	mg/L	-	-	35.5	36.2	36.6	35.6	38.7	54.5	47.4	45.0	36.6	43.4	35.9	-	35.0	12	40	6.2	35	54	0%	-	-
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00200 - 0.00690	0.0119 - 0.0406	0.00359	0.00386	0.00394	0.00392	0.00525	0.0122	0.00780	0.00797	0.00531	0.0174	0.00414	-	0.00417	12	0.0066	0.0042	0.0036	0.017	0%	92%	8.3%
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	0.105	0.0360	0.0370	<0.03	0.0570	<0.03	-	<0.03	12	0.040	0.022	<0.03	0.10	67%	-	0%
Lead	mg/L	0.00521 - 0.00830	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	12	<0.001	-	<0.001	<0.001	100%	-	-
Magnesium	mg/L	-	-	5.37	5.24	5.16	5.48	5.98	8.55	7.64	6.68	5.78	6.71	5.40	-	5.42	12	6.1	1.1	5.2	8.6	0%	-	-
Manganese	mg/L	-	-	0.0130	0.00518	0.00362	0.00312	0.0200	0.183	0.0739	0.0128	0.0150	0.0252	0.0106	-	0.0131	12	0.032	0.051	0.0031	0.18	0%	-	-
Molybdenum	mg/L	-	-	0.00594	0.00604	0.00612	0.00615	0.00620	0.00894	0.00707	0.00564	0.00570	0.00686	0.00623	-	0.00569	12	0.0064	0.00092	0.0056	0.0089	0%	-	-
Nickel	mg/L	0.00310 - 0.00620	0.0408 - 0.0704	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	0%	0%
Potassium	mg/L	-	-	0.957	0.956	1.01	0.985	1.05	1.54	1.06	0.966	1.07	1.20	0.937	-	0.953	12	1.1	0.17	0.94	1.5	0%	-	-
Selenium	mg/L	-	-	0.000435	0.000468	0.000474	0.000461	0.000602	0.00245	0.00122	0.000791	0.000481	0.000784	0.000368	-	0.000374	12	0.00074	0.00059	0.00037	0.0024	0%	-	-
Silicon	mg/L	-	-	2.92	2.96	2.96	3.18	3.10	2.98	3.01	2.42	2.82	3.24	2.52	-	2.88	12	2.9	0.24	2.4	3.2	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000130	<0.00001	-	<0.00001	12	0.000010	-	<0.00001	0.000013	92%	-	-
Sodium	mg/L	-	-	7.83	7.38	7.21	7.24	7.47	6.22	6.89	6.55	7.16	6.72	7.06	-	7.05	12	7.1	0.43	6.2	7.8	0%	-	-
Strontium	mg/L	1.25	-	0.253	0.232	0.242	0.245	0.280	0.392	0.346	0.302	0.280	0.318	0.244	-	0.230	12	0.28	0.051	0.23	0.39	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	12	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	12	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000201	0.000174	0.000224	0.000207	0.000264	0.000655	0.000516	0.000416	0.000271	0.000382	0.000214	-	0.000194	12	0.00031	0.00015	0.00017	0.00066	0%	-	-
Vanadium	mg/L	-	-	0.00132	0.00129	0.00111	0.00114	0.00112	0.000640	0.000940	0.000810	0.000980	0.00111	0.00126	-	0.00114	12	0.0011	0.00020	0.00064	0.0013	0%	-	-
Zinc	mg/L	0.0119 - 0.0414	0.0647 - 0.0983	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	12	<0.003	-	<0.003	<0.003	100%	0%	0%
Selenium Speciation																								
Selenate (SeVI)	µg/L	-	-	-	-	-	-	-	-	-	0.410	<0.1	0.370	0.110	-	0.160	5	0.22	0.16	<0.1	0.41	20%	-	-
Selenite (SeIV)	µg/L	-	-	-	-	-	-	-	-	0.180	0.170	0.160	0.180	0.180	-	<0.1	6	0.17	0.0098	0.16	0.18	0%	-	-
Selenocyanate (SeCN)	µg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.2	6	<0.1	-	<0.1	<0.1	100%	-	-
Selenium species, unknown	µg/L	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	-	-	5	<0.2	-	<0.2	<0.2	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.4: Surface Water Quality Data Collected Routinely at HAC-05a in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	2-Jul-24	6-Aug-24								
Anions, Organics, Nutrients, and Physical Properties																							
Alkalinity (as $CaCO_3$)	mg/L	>20	-	98.9	104	111	108	115	118	128	117	116	138	99.1	108	12	113	11	99	138	0%	0%	-
Ammonia (as N)	mg/L	0.639 - 2.05	2.98 - 12.8	0.00710	0.00560	0.00640	<0.005	0.00590	0.00630	0.00670	0.00860	0.0171	0.00890	0.00980	0.00550	12	0.0077	0.0033	<0.005	0.017	8.3%	0%	0%
Chloride	mg/L	150	600	0.980	1.04	1.35	1.33	1.26	0.630	1.01	1.05	1.31	0.560	0.860	1.23	12	1.1	0.26	0.56	1.4	0%	0%	0%
Conductivity	µS/cm	-	-	277	297	333	333	356	395	428	397	360	446	285	323	12	352	55	277	446	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	272	288	327	328	345	394	422	396	366	427	275	318	12	346	54	272	427	0%	-	-
Dissolved Organic Carbon [c]	mg/L	-	-	6.29	5.44	5.39	5.60	6.54	6.72	6.27	6.34	6.16	13.8	5.75	5.27	12	6.6	2.3	5.3	14	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	93.3	98.7	87.2	92.2	-	-	94.3	98.5	92.5	102	102	104	10	96	5.3	87	104	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	9.81	11.0	11.8	13.2	-	-	12.7	12.7	11.1	10.5	9.94	10.7	10	11	1.2	9.8	13	0%	0%	0%
Fluoride	mg/L	-	1.40 - 1.61	0.0750	0.0630	0.0720	0.0700	0.0800	0.104	0.0950	0.0910	0.0760	0.113	0.0720	0.0740	12	0.082	0.015	0.063	0.11	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	122	132	148	146	152	183	198	192	158	200	119	140	12	158	29	119	200	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	0.0172	0.0238	0.0652	0.0697	0.0511	0.0326	0.0433	0.0423	0.0846	<0.005	0.00600	<0.005	12	0.037	0.027	<0.005	0.085	17%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	0.0172	0.0238	0.0663	0.0697	0.0511	0.0340	0.0433	0.0423	0.0846	<0.0051	0.00600	<0.0051	12	0.037	0.027	<0.0051	0.085	17%	-	-
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	0.00110	<0.001	<0.001	0.00140	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	12	0.0010	0.00012	<0.001	0.0014	83%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	0.00120	<0.001	<0.001	0.00300	0.00240	0.00210	0.00190	0.00160	0.00440	<0.001	<0.001	0.00100	12	0.0018	0.0011	<0.001	0.0044	33%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	8.05	8.15	7.66	8.13	8.12	7.57	7.77	7.77	8.02	8.22	8.29	8.19	12	8.0	0.24	7.6	8.3	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.21	8.23	8.21	8.29	8.29	8.22	8.22	8.30	8.22	8.45	8.27	8.32	12	8.3	0.069	8.2	8.4	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00750	0.00650	0.00780	0.00790	0.00810	0.0108	0.00760	0.00830	0.0118	0.00920	0.00840	0.00740	12	0.0084	0.0015	0.0065	0.012	0%	-	-
Total Phosphorus	mg/L	-	-	0.0110	0.00850	0.00900	0.00910	0.00930	0.0194	0.0116	0.0153	0.0138	0.0149	0.00920	0.0154	12	0.012	0.0035	0.0085	0.019	0%	-	-
Sulphate	mg/L	309 - 429	-	42.2	46.0	59.2	60.9	66.4	87.2	93.1	88.9	76.9	89.8	44.4	57.6	12	68	19	42	93	0%	0%	-
Temperature (*in situ*)	°C	-	-	13.1	10.7	2.82	0.746	0.909	1.22	2.93	4.56	7.40	13.9	16.5	13.7	12	7.4	5.9	0.75	16	0%	-	-
Total Dissolved Solids	mg/L	-	-	192	254	219	218	234	285	296	271	262	311	197	223	12	247	39	192	311	0%	-	-
Total Nitrogen	mg/L	-	-	0.241	0.262	0.290	0.263	0.272	0.305	0.278	0.292	0.343	0.398	0.260	0.238	12	0.29	0.045	0.24	0.40	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	1.50	<1	1.10	<1	<1	1.10	<1	<1	<1	3.60	<1	<1	12	1.3	0.80	<1	3.6	67%	-	-
Turbidity (*in situ*)	NTU	-	-	0.420	0.880	1.47	0.400	0.290	2.80	1.04	0.640	0.760	1.04	1.16	0.710	12	0.97	0.67	0.29	2.8	0%	-	-
Turbidity	NTU	-	-	0.520	0.330	0.590	0.240	0.210	1.98	0.780	11.5	0.420	0.900	0.330	0.560	12	1.5	3.2	0.21	12	0%	-	-
Total Metals																							
Aluminum	mg/L	0.320 - 0.735	-	0.0165	0.0117	0.0325	0.00800	0.00800	0.106	0.0270	0.0186	0.0171	0.0399	0.00880	0.00940	12	0.025	0.027	0.0080	0.11	0%	0%	-
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	0.000110	<0.0001	<0.0001	0.000120	0.000100	0.000100	<0.0001	0.000110	<0.0001	<0.0001	12	0.00010	0.0000070	<0.0001	0.00012	58%	0%	0%
Arsenic	mg/L	0.00500	-	0.000580	0.000550	0.000590	0.000600	0.000600	0.000450	0.000480	0.000510	0.000560	0.000620	0.000580	0.000610	12	0.00056	0.000054	0.00045	0.00062	0%	0%	-
Barium	mg/L	1.00	-	0.0114	0.0118	0.0140	0.0127	0.0145	0.0227	0.0203	0.0196	0.0156	0.0238	0.0112	0.0124	12	0.016	0.0046	0.011	0.024	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0210	0.0200	0.0230	0.0210	0.0220	0.0130	0.0190	0.0180	0.0200	0.0170	0.0190	0.0240	12	0.020	0.0029	0.013	0.024	0%	0%	-
Cadmium	mg/L	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000116	<0.00001	0.00000630	<0.000005	<0.00001	<0.000005	<0.000005	12	0.0000057	0.0000021	<0.000005	0.000012	83%	-	-
Calcium	mg/L	-	-	39.1	38.9	47.2	45.2	51.2	62.9	66.5	60.2	53.4	70.7	40.0	48.5	12	52	11	39	71	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000100	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	0.00010	-	0.00010	0.00010	92%	0%	0%
Copper	mg/L	-	-	0.00446	0.00414	0.00475	0.00419	0.00566	0.0152	0.00897	0.00874	0.00621	0.0220	0.00462	0.00485	12	0.0078	0.0055	0.0041	0.022	0%	-	-
Iron	mg/L	-	1.00	<0.03	<0.03	0.0360	<0.03	<0.03	0.150	0.0580	0.0470	0.0340	0.0870	<0.03	<0.03	12	0.049	0.037	<0.03	0.15	50%	-	0%
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	12	<0.001	-	<0.001	<0.001	100%	-	-
Magnesium	mg/L	-	-	6.23	6.92	8.00	8.46	9.17	10.5	10.9	10.3	9.16	10.4	6.64	8.68	12	8.8	1.6	6.2	11	0%	-	-
Manganese	mg/L	1.13 - 1.48	1.85 - 2.74	0.0269	0.0180	0.0207	0.0146	0.0189	0.0837	0.0421	0.0256	0.0380	0.0625	0.0258	0.0223	12	0.033	0.021	0.015	0.084	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00629	0.00646	0.00672	0.00657	0.00676	0.00776	0.00707	0.00668	0.00679	0.00831	0.00672	0.00640	12	0.0069	0.00059	0.0063	0.0083	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	-	-
Potassium	mg/L	-	-	0.961	0.946	1.05	1.01	1.05	1.45	1.20	1.16	1.08	1.36	0.899	0.990	12	1.1	0.17	0.90	1.4	0%	-	-
Selenium	mg/L	0.00200	-	0.00108	0.00137	0.00197	0.00193	0.00206	0.00338	0.00262	0.00254	0.00191	0.00192	0.000900	0.00178	12	0.0020	0.00068	0.00090	0.0034	0%	33%	-
Silicon	mg/L	-	-	3.33	3.44	3.64	3.83	4.01	3.72	3.74	3.40	3.62	4.18	3.24	3.42	12	3.6	0.28	3.2	4.2	0%	-	-
Silver	mg/L	0.00150	0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000220	<0.00001	<0.00001	12	0.000011	-	<0.00001	0.000022	92%	0%	0%
Sodium	mg/L	-	-	7.33	7.81	7.97	8.14	8.69	6.49	7.68	7.69	8.55	7.25	7.07	8.24	12	7.7	0.64	6.5	8.7	0%	-	-
Strontium	mg/L	-	-	0.255	0.288	0.315	0.311	0.346	0.400	0.416	0.399	0.355	0.425	0.268	0.306	12	0.34	0.059	0.26	0.42	0%	-	-
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	12	<0.00001	-	<0.00001	<0.00001	100%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	12	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	0.00750	0.0165	0.000241	0.000264	0.000394	0.000359	0.000411	0.000815	0.000732	0.000693	0.000437	0.000747	0.000267	0.000291	12	0.00047	0.00021	0.00024	0.00082	0%	0%	0%
Vanadium	mg/L	0.0600	-	0.00139	0.00126	0.00116	0.00107	0.00109	0.000920	0.000790	0.000870	0.00104	0.00113	0.00135	0.00105	12	0.0011	0.00018	0.00079	0.0014	0%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	12	<0.003	-	<0.003	<0.003	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.4: Surface Water Quality Data Collected Routinely at HAC-05a in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	2-Jul-24	6-Aug-24								
Dissolved Metals																							
Aluminum	mg/L	-	-	0.00360	0.00370	0.00530	<0.003	<0.003	0.0185	0.00510	0.0104	0.00330	0.0218	0.00370	0.00690	12	0.0074	0.0064	<0.003	0.022	17%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000110	<0.0001	<0.0001	12	0.00010	-	<0.0001	0.00011	92%	-	-
Arsenic	mg/L	-	-	0.000520	0.000510	0.000530	0.000600	0.000550	0.000370	0.000470	0.000470	0.000530	0.000560	0.000560	0.000570	12	0.00052	0.000061	0.00037	0.00060	0%	-	-
Barium	mg/L	-	-	0.0116	0.0118	0.0134	0.0123	0.0142	0.0207	0.0195	0.0190	0.0141	0.0237	0.0117	0.0116	12	0.015	0.0043	0.012	0.024	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0190	0.0190	0.0220	0.0210	0.0210	0.0130	0.0170	0.0160	0.0190	0.0160	0.0180	0.0200	12	0.018	0.0026	0.013	0.022	0%	-	-
Cadmium	mg/L	0.000240 - 0.000352	0.000704 - 0.00120	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00000860	0.00000760	<0.000005	<0.000005	<0.00001	<0.000005	<0.000005	12	0.0000056	0.00000042	<0.000005	0.0000086	83%	0%	0%
Calcium	mg/L	-	-	38.0	41.7	46.3	45.0	47.0	57.6	61.5	60.4	48.8	63.9	37.4	43.5	12	49	9.3	37	64	0%	-	-
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00270 - 0.0115	0.0160 - 0.0654	0.00394	0.00388	0.00375	0.00384	0.00496	0.0116	0.00754	0.00771	0.00562	0.0213	0.00437	0.00440	12	0.0069	0.0051	0.0038	0.021	0%	75%	0%
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	0.0680	<0.03	<0.03	<0.03	0.0590	<0.03	<0.03	12	0.036	0.0035	<0.03	0.068	83%	-	0%
Lead	mg/L	0.00523 - 0.00926	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	12	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	12	<0.001	-	<0.001	<0.001	100%	-	-
Magnesium	mg/L	-	-	6.67	6.90	7.92	8.18	8.44	9.62	10.8	10.0	8.84	9.82	6.28	7.75	12	8.4	1.4	6.3	11	0%	-	-
Manganese	mg/L	-	-	0.0178	0.0124	0.0136	0.0120	0.0159	0.0761	0.0392	0.0196	0.0278	0.0392	0.0195	0.0157	12	0.026	0.018	0.012	0.076	0%	-	-
Molybdenum	mg/L	-	-	0.00604	0.00601	0.00643	0.00637	0.00651	0.00783	0.00697	0.00619	0.00593	0.00811	0.00646	0.00568	12	0.0065	0.00075	0.0057	0.0081	0%	-	-
Nickel	mg/L	0.00350 - 0.00930	0.0460 - 0.0946	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	12	<0.0005	-	<0.0005	<0.0005	100%	0%	0%
Potassium	mg/L	-	-	0.986	0.994	1.07	0.995	1.12	1.47	1.17	1.11	1.14	1.52	0.938	0.979	12	1.1	0.19	0.94	1.5	0%	-	-
Selenium	mg/L	-	-	0.000975	0.00124	0.00188	0.00186	0.00179	0.00320	0.00279	0.00234	0.00201	0.00202	0.000818	0.00163	12	0.0019	0.00069	0.00082	0.0032	0%	-	-
Silicon	mg/L	-	-	3.16	3.30	3.65	3.83	3.59	3.47	3.50	3.18	3.54	4.12	2.82	3.34	12	3.5	0.34	2.8	4.1	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000170	<0.00001	<0.00001	12	0.000011	-	<0.00001	0.000017	92%	-	-
Sodium	mg/L	-	-	8.17	7.81	8.19	8.00	8.31	6.02	7.62	7.56	8.06	6.86	7.27	7.92	12	7.6	0.66	6.0	8.3	0%	-	-
Strontium	mg/L	1.25	-	0.280	0.264	0.303	0.306	0.333	0.374	0.405	0.386	0.350	0.430	0.268	0.278	12	0.33	0.057	0.26	0.43	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	12	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	12	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	12	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000250	0.000248	0.000374	0.000350	0.000406	0.000731	0.000741	0.000659	0.000445	0.000718	0.000256	0.000296	12	0.00046	0.00020	0.00025	0.00074	0%	-	-
Vanadium	mg/L	-	-	0.00123	0.00112	0.00102	0.000990	0.00101	0.000670	0.000840	0.000800	0.000890	0.000990	0.00130	0.000900	12	0.00098	0.00018	0.00067	0.0013	0%	-	-
Zinc	mg/L	0.0125 - 0.0316	0.0690 - 0.131	<0.003	<0.003	<0.003	<0.003	<0.003	0.00360	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	12	0.0031	-	<0.003	0.0036	92%	0%	0%
Selenium Speciation																							
Selenate (SeVI)	µg/L	-	-	-	-	-	-	-	-	-	1.89	1.49	1.39	0.470	1.25	5	1.3	0.52	0.47	1.9	0%	-	-
Selenite (SeIV)	µg/L	-	-	-	-	-	-	-	-	0.210	0.270	0.280	0.270	0.240	0.230	6	0.25	0.028	0.21	0.28	0%	-	-
Selenocyanate (SeCN)	µg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6	<0.1	-	<0.1	<0.1	100%	-	-
Selenium species, unknown	µg/L	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	5	<0.2	-	<0.2	<0.2	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.5: Surface Water Quality Data Collected Routinely at HAC-14 in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% >Chronic GL[b]	% >Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Anions, Organics, Nutrients, and Physical Properties																								
Alkalinity (as $CaCO_3$)	mg/L	>20	-	107	112	120	119	127	121	130	114	126	114	111	107	116	13	117	7.4	107	130	0%	0%	-
Ammonia (as N)	mg/L	0.845 - 1.67	3.95 - 8.70	0.00520	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00560	0.00830	0.00950	0.00530	0.00850	0.00730	13	0.0061	0.0016	<0.005	0.0095	46%	0%	0%
Chloride	mg/L	150	600	0.950	1.01	1.23	1.23	1.18	0.520	0.800	0.830	1.16	<0.5	0.820	0.820	1.15	13	0.94	0.25	<0.5	1.2	7.7%	0%	0%
Conductivity	µS/cm	-	-	287	309	346	349	371	373	400	348	361	324	307	297	335	13	339	33	287	400	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	282	303	339	344	362	371	394	349	371	310	292	286	331	13	333	36	282	394	0%	-	-
Dissolved Organic Carbon [c]	mg/L	-	-	5.45	4.92	4.53	4.76	5.26	5.95	6.77	8.90	6.07	17.8	7.44	5.89	4.60	13	6.8	3.5	4.5	18	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	91.0	93.6	91.7	91.2	-	-	93.7	95.5	93.3	88.3	94.8	92.4	96.4	11	93	2.3	88	96	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	9.46	10.2	12.7	13.0	-	-	12.5	11.9	10.6	9.42	9.87	9.00	9.20	11	11	1.5	9.0	13	0%	0%	0%
Fluoride	mg/L	-	1.43 - 1.60	0.0750	0.0720	0.0790	0.0780	0.0870	0.100	0.0970	0.0880	0.0850	0.0900	0.0760	0.0750	0.0810	13	0.083	0.0088	0.072	0.10	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	128	138	154	153	160	172	195	167	160	146	137	130	152	13	153	18	128	195	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	0.0153	0.0229	0.0719	0.0803	0.0521	0.0326	0.0416	0.0456	0.122	<0.005	0.0134	0.00620	0.0320	13	0.042	0.034	<0.005	0.12	7.7%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	0.0153	0.0229	0.0719	0.0803	0.0521	0.0336	0.0416	0.0456	0.122	<0.0051	0.0134	0.00620	0.0320	13	0.042	0.034	<0.0051	0.12	7.7%	-	-
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	0.00100	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	13	0.0010	-	0.0010	0.0010	92%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	0.00150	0.00110	<0.001	0.00220	<0.001	0.00300	0.00230	0.00210	0.00410	0.00200	<0.001	0.00130	0.00310	13	0.0020	0.00096	<0.001	0.0041	23%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	8.07	8.08	7.82	8.09	8.13	7.91	8.05	8.04	8.10	8.11	7.92	8.16	8.09	13	8.0	0.099	7.8	8.2	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.23	8.25	8.27	8.34	8.33	8.25	8.26	8.32	8.29	8.32	8.24	8.30	8.35	13	8.3	0.041	8.2	8.4	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00750	0.00570	0.00580	0.00670	0.00640	0.0100	0.00850	0.0125	0.0104	0.0132	0.00720	0.00670	0.00730	13	0.0083	0.0025	0.0057	0.013	0%	-	-
Total Phosphorus	mg/L	-	-	0.00940	0.00670	0.00690	0.00700	0.00660	0.0149	0.0108	0.0175	0.0123	0.0238	0.00960	0.00820	0.00770	13	0.011	0.0051	0.0066	0.024	0%	-	-
Sulphate	mg/L	309 - 429	-	41.5	45.4	56.6	58.7	65.8	72.5	78.6	68.8	73.1	55.0	47.9	44.1	56.5	13	59	12	42	79	0%	0%	-
Temperature (*in situ*)	°C	-	-	13.5	11.3	1.99	0.858	0.848	1.22	3.38	5.86	9.76	12.4	13.4	16.6	17.6	13	8.4	6.2	0.85	18	0%	-	-
Total Dissolved Solids	mg/L	-	-	195	197	212	214	239	265	276	233	258	244	209	201	228	13	229	27	195	276	0%	-	-
Total Nitrogen	mg/L	-	-	0.208	0.220	0.248	0.233	0.239	0.250	0.256	0.323	0.342	0.473	0.291	0.243	0.212	13	0.27	0.073	0.21	0.47	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	1.00	<1	<1	<1	<1	1.00	<1	1.20	<1	2.20	1.40	<1	<1	13	1.1	0.37	1.0	2.2	62%	-	-
Turbidity (*in situ*)	NTU	-	-	0.490	0.540	0.0700	0.340	0.400	2.50	0.880	4.47	1.34	5.95	1.34	0.820	0.610	13	1.5	1.8	0.070	6.0	0%	-	-
Turbidity	NTU	-	-	0.360	0.270	0.260	0.240	0.170	2.18	1.08	4.96	1.10	6.79	0.680	0.400	0.190	13	1.4	2.1	0.17	6.8	0%	-	-
Total Metals																								
Aluminum	mg/L	0.314 - 0.707	-	0.0152	0.0140	0.00720	0.0102	0.00640	0.134	0.0670	0.422	0.0813	0.505	0.0397	0.0256	0.00900	13	0.10	0.17	0.0064	0.50	0%	0%	-
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	0.000100	<0.0001	<0.0001	0.000100	<0.0001	0.000100	<0.0001	0.000100	<0.0001	<0.0001	<0.0001	13	0.00010	0	0.00010	0.00010	69%	0%	0%
Arsenic	mg/L	0.00500	-	0.000610	0.000600	0.000640	0.000670	0.000680	0.000500	0.000590	0.000620	0.000650	0.000700	0.000580	0.000630	0.000800	13	0.00064	0.000071	0.00050	0.00080	0%	0%	-
Barium	mg/L	1.00	-	0.0136	0.0151	0.0150	0.0165	0.0175	0.0209	0.0213	0.0221	0.0216	0.0236	0.0168	0.0146	0.0189	13	0.018	0.0033	0.014	0.024	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0220	0.0210	0.0240	0.0220	0.0220	0.0130	0.0180	0.0160	0.0220	0.0140	0.0210	0.0190	0.0240	13	0.020	0.0036	0.013	0.024	0%	0%	-
Cadmium	mg/L	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00000800	<0.000005	0.00000830	<0.000005	0.0000148	0.00000820	0.00000600	<0.000005	13	0.0000066	0.0000027	<0.000005	0.000015	62%	-	-
Calcium	mg/L	-	-	39.6	41.8	45.2	46.9	50.2	57.6	59.7	50.9	54.1	50.9	46.0	41.2	50.6	13	49	6.2	40	60	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000530	<0.0005	0.000870	<0.0005	0.00113	<0.0005	<0.0005	<0.0005	13	0.00058	0.00022	<0.0005	0.0011	77%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000170	<0.0001	0.000210	<0.0001	<0.0001	<0.0001	13	0.00011	0.000015	<0.0001	0.00021	85%	0%	0%
Copper	mg/L	-	-	0.00646	0.00638	0.00579	0.00620	0.00699	0.0149	0.0116	0.0148	0.0104	0.0268	0.00958	0.00778	0.00800	13	0.010	0.0058	0.0058	0.027	0%	-	-
Iron	mg/L	-	1.00	<0.03	<0.03	<0.03	<0.03	<0.03	0.206	0.0900	0.423	0.0970	0.463	0.0470	<0.03	<0.03	13	0.12	0.15	<0.03	0.46	54%	-	0%
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000110	<0.00005	0.000125	<0.00005	<0.00005	<0.00005	13	0.000060	0.0000057	<0.00005	0.00012	85%	-	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	0.00100	<0.001	<0.001	<0.001	0.00120	0.00100	0.00110	<0.001	<0.001	0.00110	13	0.0010	0.000068	<0.001	0.0012	62%	-	-
Magnesium	mg/L	-	-	6.63	7.89	8.26	9.65	10.2	10.4	11.2	9.80	10.1	8.24	7.36	7.12	9.40	13	8.9	1.4	6.6	11	0%	-	-
Manganese	mg/L	1.17 - 1.46	1.95 - 2.69	0.0120	0.00734	0.00614	0.00832	0.00762	0.0135	0.00919	0.0134	0.00983	0.0226	0.0129	0.00698	0.00750	13	0.011	0.0044	0.0061	0.023	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00638	0.00632	0.00660	0.00642	0.00669	0.00695	0.00669	0.00588	0.00651	0.00562	0.00632	0.00666	0.00686	13	0.0065	0.00037	0.0056	0.0070	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000900	<0.0005	0.00124	<0.0005	<0.0005	<0.0005	13	0.00059	0.00013	<0.0005	0.0012	85%	-	-
Potassium	mg/L	-	-	0.988	1.03	0.918	1.02	1.03	1.26	1.16	1.10	1.15	1.15	1.07	0.974	1.10	13	1.1	0.093	0.92	1.3	0%	-	-
Selenium	mg/L	0.00200	-	0.00101	0.00128	0.00186	0.00184	0.00198	0.00273	0.00230	0.00198	0.00176	0.00127	0.00105	0.000896	0.00157	13	0.0017	0.00054	0.00090	0.0027	0%	15%	-
Silicon	mg/L	-	-	3.61	3.76	3.91	4.31	4.35	3.89	4.25	4.40	4.01	5.00	3.63	3.34	3.90	13	4.0	0.43	3.3	5.0	0%	-	-
Silver	mg/L	0.00150	0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000120	<0.00001	0.0000200	<0.00001	<0.00001	<0.00001	13	0.000011	0.0000030	<0.00001	0.000020	85%	0%	0%
Sodium	mg/L	-	-	7.44	8.17	7.81	8.82	8.97	6.29	7.55	6.84	8.57	5.44	7.48	7.30	8.62	13	7.6	1.0	5.4	9.0	0%	-	-
Strontium	mg/L	-	-	0.278	0.313	0.328	0.348	0.379	0.394	0.421	0.372	0.384	0.327	0.299	0.291	0.350	13	0.34	0.044	0.28	0.42	0%	-	-
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0144	<0.01	0.0158	<0.01	<0.01	<0.01	13	0.011	0.00053	<0.01	0.016	85%	-	-
Uranium	mg/L	0.00750	0.0165	0.000258	0.000297	0.000443	0.000445	0.000498	0.000844	0.000758	0.000706	0.000513	0.000617	0.000366	0.000301	0.000346	13	0.00049	0.00019	0.00026	0.00084	0%	0%	0%
Vanadium	mg/L	0.0600	-	0.00122	0.00115	0.000730	0.000820	0.000820	0.000970	0.000910	0.00153	0.00106	0.00181	0.00112	0.00124	0.00124	13	0.0011	0.00030	0.00073	0.0018	0%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	13	<0.003	-	<0.003	<0.003	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.5: Surface Water Quality Data Collected Routinely at HAC-14 in Upper Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% >Chronic GL[b]	% >Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Dissolved Metals																								
Aluminum	mg/L	-	-	0.00730	0.00310	<0.003	<0.003	0.00300	0.0223	0.0258	0.134	0.0285	0.185	0.0126	0.0133	0.00520	13	0.034	0.058	<0.003	0.18	15%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Arsenic	mg/L	-	-	0.000580	0.000570	0.000590	0.000610	0.000610	0.000450	0.000560	0.000570	0.000660	0.000640	0.000560	0.000610	0.000720	13	0.00059	0.000063	0.00045	0.00072	0%	-	-
Barium	mg/L	-	-	0.0144	0.0147	0.0154	0.0160	0.0173	0.0188	0.0205	0.0200	0.0202	0.0211	0.0169	0.0159	0.0175	13	0.018	0.0023	0.014	0.021	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0200	0.0200	0.0230	0.0210	0.0220	0.0130	0.0170	0.0160	0.0200	0.0130	0.0200	0.0200	0.0200	13	0.019	0.0032	0.013	0.023	0%	-	-
Cadmium	mg/L	0.000254 - 0.000346	0.000759 - 0.00117	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00000960	<0.00001	<0.000005	0.00000560	13	0.0000054	0.0000016	<0.000005	0.0000096	85%	0%	0%
Calcium	mg/L	-	-	39.4	42.9	47.3	46.2	48.5	53.2	60.1	50.6	48.1	45.7	43.4	40.8	46.8	13	47	5.4	39	60	0%	-	-
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000600	<0.0005	<0.0005	<0.0005	13	0.00051	-	<0.0005	0.00060	92%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00240 - 0.0125	0.0144 - 0.0723	0.00624	0.00571	0.00599	0.00938	0.00659	0.0119	0.0106	0.0128	0.00936	0.0248	0.00896	0.00735	0.00725	13	0.0098	0.0051	0.0057	0.025	0%	100%	0%
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	0.0580	0.0510	0.138	0.0430	0.178	<0.03	<0.03	<0.03	13	0.054	0.047	<0.03	0.18	62%	-	0%
Lead	mg/L	0.00494 - 0.00986	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00100	<0.001	<0.001	<0.001	<0.001	13	0.0010	-	<0.001	0.0010	92%	-	-
Magnesium	mg/L	-	-	7.26	7.61	8.62	9.24	9.44	9.50	11.0	9.86	9.70	7.88	6.94	6.86	8.79	13	8.7	1.3	6.9	11	0%	-	-
Manganese	mg/L	-	-	0.00424	0.00338	0.00523	0.00602	0.00679	0.00828	0.00754	0.00880	0.00608	0.0118	0.00681	0.00425	0.00778	13	0.0067	0.0023	0.0034	0.012	0%	-	-
Molybdenum	mg/L	-	-	0.00594	0.00616	0.00636	0.00618	0.00642	0.00727	0.00637	0.00551	0.00594	0.00551	0.00618	0.00656	0.00632	13	0.0062	0.00045	0.0055	0.0073	0%	-	-
Nickel	mg/L	0.00350 - 0.00920	0.0464 - 0.0927	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000780	<0.0005	<0.0005	<0.0005	13	0.00052	-	<0.0005	0.00078	92%	0%	0%
Potassium	mg/L	-	-	1.03	1.04	1.01	0.996	1.11	1.28	1.12	1.08	1.27	1.24	1.15	0.991	1.11	13	1.1	0.10	0.99	1.3	0%	-	-
Selenium	mg/L	-	-	0.00100	0.00116	0.00170	0.00171	0.00171	0.00268	0.00215	0.00208	0.00178	0.00138	0.00103	0.000942	0.00148	13	0.0016	0.00051	0.00094	0.0027	0%	-	-
Silicon	mg/L	-	-	3.36	3.58	3.83	4.16	3.93	3.60	3.93	3.86	4.04	4.51	3.29	2.92	3.68	13	3.7	0.41	2.9	4.5	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000170	<0.00001	<0.00001	<0.00001	13	0.000011	-	<0.00001	0.000017	92%	-	-
Sodium	mg/L	-	-	8.52	8.17	8.48	8.50	8.67	5.93	7.32	7.01	8.26	5.12	7.28	7.28	8.32	13	7.6	1.1	5.1	8.7	0%	-	-
Strontium	mg/L	1.25	-	0.298	0.300	0.332	0.341	0.364	0.376	0.402	0.365	0.400	0.319	0.292	0.300	0.323	13	0.34	0.039	0.29	0.40	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	13	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000275	0.000303	0.000444	0.000426	0.000504	0.000739	0.000787	0.000668	0.000516	0.000579	0.000357	0.000301	0.000366	13	0.00048	0.00017	0.00028	0.00079	0%	-	-
Vanadium	mg/L	-	-	0.00112	0.000980	0.000720	0.000720	0.000770	0.000690	0.000880	0.00102	0.000860	0.00118	0.00104	0.00118	0.00110	13	0.00094	0.00018	0.00069	0.0012	0%	-	-
Zinc	mg/L	0.0138 - 0.0242	0.0724 - 0.108	0.00380	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	13	0.0031	-	<0.003	0.0038	92%	0%	0%
Selenium Speciation																								
Selenate (SeVI)	µg/L	-	-	-	-	-	-	-	-	-	1.49	1.18	0.860	-	0.380	0.950	5	0.97	0.41	0.38	1.5	0%	-	-
Selenite (SeIV)	µg/L	-	-	-	-	-	-	-	-	0.200	0.250	0.370	0.240	-	0.300	0.340	6	0.28	0.065	0.20	0.37	0%	-	-
Selenocyanate (SeCN)	µg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	6	<0.1	-	<0.1	<0.1	100%	-	-
Selenium species, unknown	µg/L	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	5	<0.2	-	<0.2	<0.2	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.6: Surface Water Quality Data Collected Routinely at HAC-08 in Lower Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Anions, Organics, Nutrients, and Physical Properties																								
Alkalinity (as $CaCO_3$)	mg/L	>20	-	109	115	120	122	130	116	122	109	127	99.9	113	108	119	13	116	8.4	100	130	0%	0%	-
Ammonia (as N)	mg/L	0.459 - 1.13	2.40 - 5.86	0.00550	0.00540	<0.005	<0.005	<0.005	<0.005	0.0105	0.00740	0.00820	0.0119	0.00790	0.00820	0.00580	13	0.0070	0.0022	<0.005	0.012	31%	0%	0%
Chloride	mg/L	150	600	0.960	1.00	1.24	1.18	1.14	<5	0.710	0.730	1.08	<0.5	0.760	0.780	1.10	13	0.93	0.21	<0.5	1.2	15%	0%	0%
Conductivity	µS/cm	-	-	291	319	341	352	374	347	365	317	357	278	308	297	340	13	330	30	278	374	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	286	305	335	345	356	344	356	319	359	265	299	286	336	13	322	31	265	359	0%	-	-
Dissolved Organic Carbon[c]	mg/L	-	-	5.54	4.74	4.55	4.57	5.09	6.27	7.67	9.61	6.70	17.8	7.96	6.33	4.24	13	7.0	3.6	4.2	18	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	92.5	95.4	94.7	92.1	-	-	93.8	94.3	93.3	91.4	96.9	92.2	95.7	11	94	1.7	91	97	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	9.58	10.6	13.6	13.5	-	-	12.6	191	10.4	9.76	10.1	9.01	9.01	11	27	54	9.0	191	0%	0%	0%
Fluoride	mg/L	-	1.42 - 1.54	0.0780	0.0770	0.0790	0.0790	0.0880	0.0930	0.0860	0.0820	0.0850	0.0830	0.0800	0.0740	0.0860	13	0.082	0.0052	0.074	0.093	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	132	143	151	154	160	161	167	154	165	124	137	129	149	13	148	14	124	167	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	<0.005	0.00510	0.0514	0.0695	0.0292	0.0965	0.0692	0.0334	0.0666	<0.005	<0.005	<0.005	<0.005	13	0.034	0.034	<0.005	0.096	38%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0051	0.00510	0.0514	0.0695	0.0292	0.0965	0.0692	0.0334	0.0666	<0.0051	<0.0051	<0.0051	<0.0051	13	0.034	0.034	<0.0051	0.096	38%	-	-
Nitrite (as N)	mg/L	0.0200 - 0.0600	0.0600 - 0.180	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	13	<0.001	-	<0.001	<0.01	100%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	<0.001	<0.001	<0.001	0.00100	<0.001	0.00290	0.00140	<0.001	0.00110	0.00140	0.00120	<0.001	<0.001	13	0.0012	0.00055	<0.001	0.0029	54%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	8.29	8.27	8.06	8.27	8.26	8.04	8.18	8.19	8.36	8.21	8.20	8.30	8.39	13	8.2	0.10	8.0	8.4	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.31	8.30	8.31	8.36	8.35	8.24	8.24	8.32	8.33	8.29	8.34	8.31	8.41	13	8.3	0.046	8.2	8.4	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00590	0.00500	0.00580	0.00550	0.00570	0.0102	0.00760	0.0122	0.00740	0.0125	0.00530	0.00570	0.00420	13	0.0072	0.0028	0.0042	0.012	0%	-	-
Total Phosphorus	mg/L	-	-	0.00970	0.00560	0.00790	0.00830	0.00790	0.0232	0.0114	0.0178	0.00920	0.0964	0.0102	0.0116	0.00740	13	0.017	0.024	0.0056	0.096	0%	-	-
Sulphate	mg/L	309	-	42.0	45.3	53.7	57.4	64.8	63.1	66.7	58.0	69.4	40.5	46.9	42.4	56.2	13	54	10	40	69	0%	0%	-
Temperature (*in situ*)	°C	-	-	13.8	10.4	0.607	0	1.10	1.43	3.22	5.08	10.6	12.4	13.4	16.4	18.2	13	8.2	6.5	0	18	0%	-	-
Total Dissolved Solids	mg/L	-	-	196	209	224	226	239	239	262	228	249	234	205	205	224	13	226	19	196	262	0%	-	-
Total Nitrogen	mg/L	-	-	0.192	0.193	0.234	0.226	0.222	0.326	0.300	0.343	0.314	0.511	0.252	0.240	0.188	13	0.27	0.089	0.19	0.51	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	1.70	<1	1.80	2.50	2.30	169	2.60	2.50	1.30	49.6	3.60	4.90	1.00	13	19	47	<1	169	7.7%	-	-
Turbidity (*in situ*)	NTU	-	-	0.780	1.13	0.250	0.560	0.210	6.45	1.98	4.12	1.02	27.2	1.86	3.41	0.640	13	3.8	7.3	0.21	27	0%	-	-
Turbidity	NTU	-	-	0.340	0.200	0.260	0.730	0.410	6.22	1.58	4.77	0.880	43.6	2.34	3.14	0.360	13	5.0	12	0.20	44	0%	-	-
Total Metals																								
Aluminum	mg/L	0.361 - 0.759	-	0.0153	0.0187	0.0293	0.0669	0.0494	0.377	0.0834	0.388	0.0695	0.880	0.104	0.0768	0.0225	13	0.17	0.25	0.015	0.88	0%	7.7%	-
Antimony	mg/L	0.0740	0.250	0.000120	0.000140	<0.0001	<0.0001	<0.0001	0.000110	<0.0001	0.000100	<0.0001	0.000110	<0.0001	0.000130	<0.0001	13	0.00011	0.000014	<0.0001	0.00014	54%	0%	0%
Arsenic	mg/L	0.00500	-	0.000660	0.000750	0.000800	0.000910	0.000830	0.000900	0.000710	0.000770	0.000800	0.00141	0.000670	0.000700	0.000940	13	0.00083	0.00020	0.00066	0.0014	0%	0%	-
Barium	mg/L	1.00	-	0.0150	0.0162	0.0180	0.0191	0.0205	0.0270	0.0231	0.0233	0.0227	0.0363	0.0191	0.0176	0.0206	13	0.021	0.0055	0.015	0.036	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0220	0.0220	0.0230	0.0230	0.0220	0.0130	0.0170	0.0150	0.0210	0.0130	0.0220	0.0190	0.0240	13	0.020	0.0039	0.013	0.024	0%	0%	-
Cadmium	mg/L	-	-	<0.000005	<0.00001	0.00000590	<0.000005	<0.000005	0.0000226	0.00000550	0.00000860	<0.000005	0.0000321	<0.000005	0.00000600	<0.00001	13	0.0000090	0.0000088	<0.000005	0.000032	54%	-	-
Calcium	mg/L	-	-	40.5	44.6	45.9	46.9	51.3	52.7	53.6	46.5	53.4	44.6	46.0	39.3	49.1	13	47	4.6	39	54	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000630	<0.0005	0.00104	<0.0005	0.00221	<0.0005	<0.0005	<0.0005	13	0.00068	0.00052	<0.0005	0.0022	77%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000350	<0.0001	0.000190	<0.0001	0.000970	<0.0001	<0.0001	<0.0001	13	0.00019	0.00026	<0.0001	0.00097	77%	0%	0%
Copper	mg/L	-	-	0.00645	0.00655	0.00791	0.00741	0.00752	0.0155	0.0106	0.0145	0.0101	0.0251	0.00970	0.00789	0.00717	13	0.010	0.0052	0.0064	0.025	0%	-	-
Iron	mg/L	-	1.00	<0.03	<0.03	0.0550	0.119	0.0780	0.535	0.121	0.426	0.0840	3.48	0.144	0.107	0.0410	13	0.40	0.94	<0.03	3.5	15%	-	7.7%
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	0.0000690	<0.00005	0.000249	<0.00005	0.000136	<0.00005	0.000720	0.0000500	<0.00005	<0.00005	13	0.00012	0.00020	<0.00005	0.00072	62%	-	-
Lithium	mg/L	-	-	0.00110	<0.001	0.00130	0.00140	0.00110	0.00130	0.00120	0.00140	0.00120	0.00190	0.00100	<0.001	0.00130	13	0.0012	0.00025	<0.001	0.0019	15%	-	-
Magnesium	mg/L	-	-	6.93	8.52	8.90	9.92	10.1	9.91	10.1	9.41	9.96	8.11	7.36	7.28	9.52	13	8.9	1.2	6.9	10	0%	-	-
Manganese	mg/L	1.15 - 1.34	1.91 - 2.38	0.00865	0.00620	0.0119	0.0177	0.0103	0.0271	0.00972	0.0152	0.0103	0.0619	0.0133	0.00874	0.00608	13	0.016	0.015	0.0061	0.062	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00646	0.00641	0.00629	0.00624	0.00666	0.00628	0.00567	0.00528	0.00640	0.00397	0.00617	0.00637	0.00709	13	0.0061	0.00077	0.0040	0.0071	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00102	0.000580	0.00108	<0.0005	0.00308	<0.0005	<0.0005	<0.0005	13	0.00079	0.00077	<0.0005	0.0031	69%	-	-
Potassium	mg/L	-	-	0.985	1.07	1.04	1.04	1.02	1.25	1.06	1.08	1.12	1.10	1.10	0.971	1.10	13	1.1	0.070	0.97	1.2	0%	-	-
Selenium	mg/L	0.00200	-	0.00106	0.00125	0.00169	0.00176	0.00197	0.00263	0.00188	0.00193	0.00157	0.00102	0.00104	0.000944	0.00149	13	0.0016	0.00049	0.00094	0.0026	0%	7.7%	-
Silicon	mg/L	-	-	3.61	3.75	3.79	4.39	4.48	4.40	4.26	4.67	4.07	5.74	3.81	3.66	3.72	13	4.2	0.59	3.6	5.7	0%	-	-
Silver	mg/L	0.00150	0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000200	<0.00001	<0.00001	<0.00001	13	0.000011	-	<0.00001	0.000020	92%	0%	0%
Sodium	mg/L	-	-	7.63	8.58	8.48	9.11	9.04	6.14	7.01	6.74	8.58	5.06	7.57	7.51	8.84	13	7.7	1.2	5.1	9.1	0%	-	-
Strontium	mg/L	-	-	0.286	0.328	0.340	0.360	0.397	0.375	0.378	0.352	0.389	0.281	0.326	0.289	0.349	13	0.34	0.039	0.28	0.40	0%	-	-
Thallium	mg/L	0.0003	-	<0.00001	0.0000160	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000120	<0.00001	<0.00001	<0.00001	13	0.000011	0.0000015	<0.00001	0.000016	85%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.0133	<0.01	0.0135	<0.01	0.0273	<0.01	<0.01	<0.01	13	0.012	0.0046	<0.01	0.027	77%	-	-
Uranium	mg/L	0.00750	0.0165	0.000291	0.000334	0.000524	0.000525	0.000550	0.000878	0.000719	0.000684	0.000556	0.000601	0.000413	0.000321	0.000396	13	0.00052	0.00017	0.00029	0.00088	0%	0%	0%
Vanadium	mg/L	0.0600	-	0.00123	0.00118	0.000790	0.000940	0.000900	0.00160	0.000880	0.00150	0.000990	0.00346	0.00129	0.00134	0.00125	13	0.0013	0.00068	0.00079	0.0035	0%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00500	<0.003	<0.003	<0.003	13	0.0032	-	<0.003	0.0050	92%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.6: Surface Water Quality Data Collected Routinely at HAC-08 in Lower Hazeltine Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date													Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% > Chronic GL[b]	% > Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Dissolved Metals																								
Aluminum	mg/L	-	-	0.00420	0.00430	<0.003	0.00440	0.00470	0.0224	0.0223	0.109	0.0268	0.124	0.0139	0.0133	0.00640	13	0.028	0.040	<0.003	0.12	7.7%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000100	<0.0001	13	0.00010	-	<0.0001	0.00010	92%	-	-
Arsenic	mg/L	-	-	0.000630	0.000640	0.000700	0.000710	0.000650	0.000530	0.000620	0.000640	0.000750	0.000640	0.000580	0.000640	0.000840	13	0.00066	0.000078	0.00053	0.00084	0%	-	-
Barium	mg/L	-	-	0.0150	0.0158	0.0171	0.0176	0.0187	0.0201	0.0209	0.0198	0.0212	0.0250	0.0186	0.0181	0.0186	13	0.019	0.0026	0.015	0.025	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0200	0.0200	0.0220	0.0220	0.0210	0.0120	0.0150	0.0150	0.0200	0.0120	0.0190	0.0200	0.0200	13	0.018	0.0035	0.012	0.022	0%	-	-
Cadmium	mg/L	0.000248 - 0.000308	0.000734 - 0.000998	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00000880	<0.000005	<0.000005	0.00000560	13	0.0000053	0.0000012	<0.000005	0.0000088	85%	0%	0%
Calcium	mg/L	-	-	40.8	44.0	46.1	46.0	48.4	49.8	50.2	46.6	49.9	37.4	43.0	39.8	44.8	13	45	4.1	37	50	0%	-	-
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000560	<0.0005	<0.0005	<0.0005	13	0.00050	-	<0.0005	0.00056	92%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00320 - 0.0124	0.0183 - 0.0724	0.00592	0.00579	0.00567	0.00555	0.00607	0.0105	0.00929	0.0118	0.00910	0.0198	0.00848	0.00761	0.00637	13	0.0086	0.0039	0.0056	0.020	0%	100%	0%
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	<0.03	0.0520	0.0410	0.118	0.0330	0.121	<0.03	<0.03	0.0570	13	0.049	0.033	<0.03	0.12	54%	-	0%
Lead	mg/L	0.00474 - 0.00952	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	<0.001	<0.001	0.00120	0.00130	0.00120	<0.001	0.00110	0.00100	0.00120	0.00120	<0.001	<0.001	0.00120	13	0.0011	0.00011	<0.001	0.0013	38%	-	-
Magnesium	mg/L	-	-	7.41	8.10	8.82	9.83	9.50	9.09	10.1	9.12	9.77	7.45	7.24	7.20	8.95	13	8.7	1.1	7.2	10	0%	-	-
Manganese	mg/L	-	-	0.00275	0.00245	0.00410	0.00454	0.00433	0.00634	0.00546	0.00767	0.00623	0.00946	0.00479	0.00363	0.00431	13	0.0051	0.0020	0.0024	0.0095	0%	-	-
Molybdenum	mg/L	-	-	0.00590	0.00620	0.00610	0.00610	0.00627	0.00658	0.00554	0.00478	0.00565	0.00422	0.00605	0.00644	0.00664	13	0.0059	0.00070	0.0042	0.0066	0%	-	-
Nickel	mg/L	0.00330 - 0.00960	0.0454 - 0.0880	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000630	<0.0005	0.000970	<0.0005	0.000550	<0.0005	13	0.00055	0.00014	<0.0005	0.00097	77%	0%	0%
Potassium	mg/L	-	-	1.03	1.08	1.07	1.02	1.08	1.18	1.04	0.990	1.28	1.18	1.11	1.03	1.14	13	1.1	0.082	0.99	1.3	0%	-	-
Selenium	mg/L	-	-	0.000936	0.00126	0.00153	0.00167	0.00167	0.00240	0.00185	0.00178	0.00175	0.00107	0.000932	0.000863	0.00140	13	0.0015	0.00045	0.00086	0.0024	0%	-	-
Silicon	mg/L	-	-	3.44	3.60	3.81	4.15	3.96	3.57	4.08	3.97	4.04	4.52	3.29	3.12	3.52	13	3.8	0.39	3.1	4.5	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000120	<0.00001	<0.00001	<0.00001	13	0.000010	-	<0.00001	0.000012	92%	-	-
Sodium	mg/L	-	-	8.44	8.52	8.67	9.02	8.71	5.88	6.97	6.56	8.51	5.04	7.22	7.56	8.64	13	7.7	1.3	5.0	9.0	0%	-	-
Strontium	mg/L	1.25	-	0.309	0.306	0.338	0.350	0.371	0.362	0.364	0.333	0.389	0.278	0.302	0.310	0.325	13	0.33	0.032	0.28	0.39	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	13	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000306	0.000326	0.000510	0.000514	0.000568	0.000770	0.000739	0.000633	0.000563	0.000539	0.000403	0.000331	0.000398	13	0.00051	0.00015	0.00031	0.00077	0%	-	-
Vanadium	mg/L	-	-	0.00108	0.000980	0.000640	0.000640	0.000690	0.000660	0.000880	0.000940	0.000850	0.00102	0.00100	0.00111	0.00115	13	0.00090	0.00019	0.00064	0.0012	0%	-	-
Zinc	mg/L	0.0136 - 0.0204	0.0745 - 0.0980	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.00390	<0.003	<0.003	<0.003	<0.003	13	0.0031	-	<0.003	0.0039	92%	0%	0%
Selenium Speciation																								
Selenate (SeVI)	mg/L	-	-	-	-	-	-	-	-	-	1.32	1.04	0.670	-	0.340	0.760	5	0.83	0.37	0.34	1.3	0%	-	-
Selenite (SeIV)	mg/L	-	-	-	-	-	-	-	-	0.180	0.230	0.330	0.150	-	0.320	0.380	6	0.26	0.092	0.15	0.38	0%	-	-
Selenocyanate (SeCN)	mg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	6	<0.1	-	<0.1	<0.1	100%	-	-
Selenium species, unknown	mg/L	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	5	<0.2	-	<0.2	<0.2	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.7: Surface Water Quality Data Collected Routinely at W10 in Lower Edney Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date		Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% >Chronic GL[b]	% >Acute GL[b]
		Long-term Average	Short-term Maximum	23-Oct-23	12-Jun-24								
Anions, Organics, Nutrients, and Physical Properties													
Alkalinity (as $CaCO_3$)	mg/L	>20	-	212	62.3	2	137	106	62	212	0%	0%	-
Ammonia (as N)	mg/L	1.32 - 1.56	6.88 - 8.11	<0.005	0.0115	2	0.0082	-	<0.005	0.012	50%	0%	0%
Chloride	mg/L	150	600	1.92	<0.5	2	1.2	-	<0.5	1.9	50%	0%	0%
Conductivity	µS/cm	-	-	403	123	2	263	198	123	403	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	411	121	2	266	205	121	411	0%	-	-
Dissolved Organic Carbon [c]	mg/L	-	-	3.87	25.3	2	15	15	3.9	25	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	-	95.9	1	96	-	96	96	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	-	10.3	1	10	-	10	10	0%	0%	0%
Fluoride	mg/L	-	1.15 - 1.64	0.111	0.0400	2	0.076	0.050	0.040	0.11	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	215	63.1	2	139	107	63	215	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	<0.005	0.0121	2	0.0086	-	<0.005	0.012	50%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0051	0.0121	2	0.0086	-	<0.0051	0.012	50%	-	-
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	2	<0.001	-	<0.001	<0.001	100%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	0.00110	<0.001	2	0.0010	-	<0.001	0.0011	50%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	7.95	7.80	2	7.9	0.11	7.8	8.0	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.21	7.99	2	8.1	0.16	8.0	8.2	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00480	0.0110	2	0.0079	0.0044	0.0048	0.011	0%	-	-
Total Phosphorus	mg/L	-	-	0.00560	0.0176	2	0.012	0.0085	0.0056	0.018	0%	-	-
Sulphate	mg/L	218 - 429	-	16.0	1.69	2	8.8	10	1.7	16	0%	0%	-
Temperature (*in situ*)	°C	-	-	2.92	12.0	2	7.5	6.4	2.9	12	0%	-	-
Total Dissolved Solids	mg/L	-	-	253	121	2	187	93	121	253	0%	-	-
Total Nitrogen	mg/L	-	-	0.111	0.688	2	0.40	0.41	0.11	0.69	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	<1	2.50	2	1.8	-	<1	2.5	50%	-	-
Turbidity (*in situ*)	NTU	-	-	-	1.99	1	2.0	-	2.0	2.0	0%	-	-
Turbidity	NTU	-	-	<0.1	2.02	2	1.1	-	<0.1	2.0	50%	-	-
Total Metals													
Aluminum	mg/L	0.305 - 0.571	-	0.00720	0.161	2	0.084	0.11	0.0072	0.16	0%	0%	-
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	0%	0%
Arsenic	mg/L	0.00500	-	0.00284	0.000780	2	0.0018	0.0015	0.00078	0.0028	0%	0%	-
Barium	mg/L	1.00	-	0.0294	0.0115	2	0.020	0.013	0.012	0.029	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	2	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0270	<0.01	2	0.018	-	<0.01	0.027	50%	0%	-
Cadmium	mg/L	-	-	<0.000005	0.0000118	2	0.0000084	-	<0.000005	0.000012	50%	-	-
Calcium	mg/L	-	-	44.7	18.2	2	31	19	18	45	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	0.00102	2	0.00076	-	<0.0005	0.0010	50%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	0.000120	2	0.00011	-	<0.0001	0.00012	50%	0%	0%
Copper	mg/L	-	-	0.000930	0.00428	2	0.0026	0.0024	0.00093	0.0043	0%	-	-
Iron	mg/L	-	1.00	<0.03	0.290	2	0.16	-	<0.03	0.29	50%	-	0%
Lead	mg/L	-	-	<0.00005	0.0000530	2	0.000052	-	<0.00005	0.000053	50%	-	-
Lithium	mg/L	-	-	0.00130	<0.001	2	0.0012	-	<0.001	0.0013	50%	-	-
Magnesium	mg/L	-	-	18.1	5.25	2	12	9.1	5.2	18	0%	-	-
Manganese	mg/L	0.883 - 1.55	1.24 - 2.91	0.00307	0.0100	2	0.0065	0.0049	0.0031	0.010	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00209	0.000427	2	0.0013	0.0012	0.00043	0.0021	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	0.00168	2	0.0011	-	<0.0005	0.0017	50%	-	-
Potassium	mg/L	-	-	1.41	0.650	2	1.0	0.54	0.65	1.4	0%	-	-
Selenium	mg/L	0.00200	-	0.0000930	0.000161	2	0.00013	0.000048	0.000093	0.00016	0%	0%	-
Silicon	mg/L	-	-	6.34	4.50	2	5.4	1.3	4.5	6.3	0%	-	-
Silver	mg/L	0.0000500 - 0.00150	0.000100 - 0.00300	<0.00001	<0.00001	2	<0.00001	-	<0.00001	<0.00001	100%	0%	0%
Sodium	mg/L	-	-	13.5	3.25	2	8.4	7.2	3.2	14	0%	-	-
Strontium	mg/L	-	-	0.359	0.117	2	0.24	0.17	0.12	0.36	0%	-	-
Thallium	mg/L	0.0003	-	<0.00001	<0.00001	2	<0.00001	-	<0.00001	<0.00001	100%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	2	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	0.00750	0.0165	0.000687	0.000100	2	0.00039	0.00042	0.00010	0.00069	0%	0%	0%
Vanadium	mg/L	0.0600	-	<0.0005	0.000980	2	0.00074	-	<0.0005	0.00098	50%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	2	<0.003	-	<0.003	<0.003	100%	-	-
Dissolved Metals													
Aluminum	mg/L	-	-	0.00360	0.0854	2	0.044	0.058	0.0036	0.085	0%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	-	-
Arsenic	mg/L	-	-	0.00275	0.000730	2	0.0017	0.0014	0.00073	0.0028	0%	-	-
Barium	mg/L	-	-	0.0304	0.0107	2	0.021	0.014	0.011	0.030	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	2	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0280	<0.01	2	0.019	-	<0.01	0.028	50%	-	-
Cadmium	mg/L	0.000151 - 0.000371	0.000366 - 0.00129	<0.000005	0.00000830	2	0.0000066	-	<0.000005	0.0000083	50%	0%	0%
Calcium	mg/L	-	-	52.6	17.2	2	35	25	17	53	0%	-	-
Chromium	mg/L	-	-	<0.0005	0.000810	2	0.00066	-	<0.0005	0.00081	50%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00270 - 0.00830	0.0154 - 0.0491	0.000750	0.00363	2	0.0022	0.0020	0.00075	0.0036	0%	0%	0%
Iron	mg/L	-	0.350	<0.03	0.192	2	0.11	-	<0.03	0.19	50%	-	0%
Lead	mg/L	0.00489 - 0.00987	-	<0.00005	<0.00005	2	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	0.00130	<0.001	2	0.0012	-	<0.001	0.0013	50%	-	-
Magnesium	mg/L	-	-	20.4	4.90	2	13	11	4.9	20	0%	-	-
Manganese	mg/L	-	-	0.00273	0.00383	2	0.0033	0.00078	0.0027	0.0038	0%	-	-
Molybdenum	mg/L	-	-	0.00232	0.000420	2	0.0014	0.0013	0.00042	0.0023	0%	-	-
Nickel	mg/L	0.00390 - 0.00770	0.0614 - 0.0887	<0.0005	0.00138	2	0.00094	-	<0.0005	0.0014	50%	0%	0%
Potassium	mg/L	-	-	1.41	0.625	2	1.0	0.56	0.62	1.4	0%	-	-
Selenium	mg/L	-	-	0.0000920	0.000157	2	0.00012	0.000046	0.000092	0.00016	0%	-	-
Silicon	mg/L	-	-	6.75	3.88	2	5.3	2.0	3.9	6.8	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	2	<0.00001	-	<0.00001	<0.00001	100%	-	-
Sodium	mg/L	-	-	14.8	2.79	2	8.8	8.5	2.8	15	0%	-	-
Strontium	mg/L	1.25	-	0.368	0.115	2	0.24	0.18	0.12	0.37	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	2	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	2	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	2	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000702	0.0000900	2	0.00040	0.00043	0.000090	0.00070	0%	-	-
Vanadium	mg/L	-	-	<0.0005	0.000730	2	0.00062	-	<0.0005	0.00073	50%	-	-
Zinc	mg/L	0.0156 - 0.0217	0.0530 - 0.103	<0.003	<0.003	2	<0.003	-	<0.003	<0.003	100%	0%	0%
Selenium Speciation													
Selenate (SeVI)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenite (SeIV)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenocyanate (SeCN)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium species, unknown	mg/L	-	-	-	-	-	-	-	-	-	-	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.8: Surface Water Quality Data Collected Routinely at EDC-01a in Lower Edney Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date												Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% >Chronic GL[b]	% >Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Anions, Organics, Nutrients, and Physical Properties																								
Alkalinity (as $CaCO_3$)	mg/L	>20	-	115	126	142	138	136	110	97.1	68.2	72.8	63.9	93.5	93.5	134	13	107	28	64	142	0%	0%	-
Ammonia (as N)	mg/L	0.558 - 1.64	2.90 - 8.53	0.00560	0.00620	0.00560	<0.005	0.00590	0.00590	0.0148	0.0114	0.0115	0.0134	0.00820	0.0117	0.00740	13	0.0087	0.0034	<0.005	0.015	7.7%	0%	0%
Chloride	mg/L	150	600	0.970	1.01	1.21	1.16	0.930	0.560	0.560	<0.5	<0.5	<0.5	<0.5	<0.5	0.920	13	0.76	0.27	<0.5	1.2	38%	0%	0%
Conductivity	µS/cm	-	-	302	329	368	355	332	273	238	159	167	147	234	227	348	13	268	78	147	368	0%	-	-
Specific Conductance (*in situ*)	µS/cm	-	-	297	318	360	348	325	271	234	160	168	140	234	220	346	13	263	76	140	360	0%	-	-
Dissolved Organic Carbon[c]	mg/L	-	-	5.46	4.53	4.38	5.03	8.02	10.0	14.7	17.4	17.7	25.4	15.8	15.2	5.26	13	11	6.7	4.4	25	0%	-	-
Dissolved Oxygen (*in situ*)	%	-	-	98.3	106	94.4	95.3	-	-	98.0	96.4	98.0	91.8	99.2	94.5	104	11	98	4.2	92	106	0%	-	-
Dissolved Oxygen (*in situ*)[b]	mg/L	>8	>5	10.1	11.6	13.4	13.6	-	-	13.4	12.8	11.5	9.84	10.4	9.31	10.0	11	11	1.6	9.3	14	0%	0%	0%
Fluoride	mg/L	-	1.19 - 1.54	0.0820	0.0760	0.0830	0.0840	0.0850	0.0720	0.0610	0.0560	0.0440	0.0430	0.0600	0.0650	0.0900	13	0.069	0.016	0.043	0.090	0%	-	0%
Hardness (as $CaCO_3$)	mg/L	-	-	135	148	165	160	148	129	114	81.2	77.0	69.2	109	102	160	13	123	33	69	165	0%	-	-
Nitrate (as N)	mg/L	3.00	32.8	<0.005	<0.005	0.0543	0.0539	0.150	0.169	0.250	0.200	0.0112	<0.005	0.00620	<0.005	<0.005	13	0.071	0.091	<0.005	0.25	38%	0%	0%
Nitrate and Nitrite (as N)	mg/L	-	-	<0.0051	<0.0051	0.0543	0.0539	0.150	0.171	0.250	0.201	0.0112	<0.0051	0.00620	<0.0051	<0.0051	13	0.071	0.091	<0.0051	0.25	38%	-	-
Nitrite (as N)	mg/L	0.0200	0.0600	<0.001	<0.001	<0.001	<0.001	<0.001	0.00170	<0.001	0.00100	<0.001	<0.001	<0.001	<0.001	<0.001	13	0.0011	0.00026	<0.001	0.0017	85%	0%	0%
Dissolved Orthophosphate	mg/L	-	-	<0.001	0.00110	<0.001	<0.001	<0.001	0.00320	0.00240	0.00180	<0.001	<0.001	<0.001	<0.001	<0.001	13	0.0013	0.00074	<0.001	0.0032	69%	-	-
pH (*in situ*)[b]	pH units	6.5 - 9.0	-	8.22	8.31	7.84	8.22	8.25	8.00	8.02	7.99	8.17	8.01	8.03	8.12	8.07	13	8.1	0.13	7.8	8.3	0%	0%	-
pH (laboratory)[b]	pH units	6.5 - 9.0	-	8.31	8.33	8.31	8.40	8.36	8.21	8.12	8.08	8.03	8.08	8.17	8.22	8.43	13	8.2	0.13	8.0	8.4	0%	-	-
Dissolved Phosphorus	mg/L	-	-	0.00590	0.00570	0.00460	0.00460	0.00600	0.0106	0.0140	0.0204	0.0137	0.0164	0.00800	0.00890	0.00410	13	0.0095	0.0052	0.0041	0.020	0%	-	-
Total Phosphorus	mg/L	-	-	0.00790	0.00680	0.00640	0.00530	0.00630	0.0208	0.0211	0.0269	0.0175	0.0388	0.0125	0.0116	0.00580	13	0.014	0.010	0.0053	0.039	0%	-	-
Sulphate	mg/L	218 - 309	-	41.6	42.5	49.8	45.6	39.6	32.3	24.5	13.3	14.2	9.49	28.0	21.8	48.0	13	32	14	9.5	50	0%	0%	-
Temperature (*in situ*)	°C	-	-	14.1	11.2	1.03	0.792	0.837	1.19	2.46	3.54	8.50	12.2	13.1	16.0	17.3	13	7.9	6.4	0.79	17	0%	-	-
Total Dissolved Solids	mg/L	-	-	205	208	232	224	209	197	176	134	132	141	178	179	248	13	189	37	132	248	0%	-	-
Total Nitrogen	mg/L	-	-	0.180	0.191	0.207	0.213	0.416	0.520	0.686	0.750	0.551	0.697	0.425	0.448	0.219	13	0.42	0.21	0.18	0.75	0%	-	-
Total Suspended Solids[c]	mg/L	-	-	1.30	<1	<1	<1	<1	5.70	3.40	3.70	3.50	78.4	2.40	1.90	<1	13	8.1	22	<1	78	38%	-	-
Turbidity (*in situ*)	NTU	-	-	0.520	0.510	0.300	0.220	0.470	3.52	2.61	3.09	1.83	13.8	1.67	1.39	0.710	13	2.4	3.6	0.22	14	0%	-	-
Turbidity	NTU	-	-	0.270	0.290	0.330	0.230	0.250	3.78	2.82	4.02	1.11	14.2	1.62	1.60	0.480	13	2.4	3.8	0.23	14	0%	-	-
Total Metals																								
Aluminum	mg/L	0.312 - 0.763	-	0.0178	0.0182	0.00690	0.00680	0.00880	0.211	0.193	0.320	0.122	0.322	0.126	0.0704	0.0220	13	0.11	0.12	0.0068	0.32	0%	0%	-
Antimony	mg/L	0.0740	0.250	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	0%	0%
Arsenic	mg/L	0.00500	-	0.000730	0.000780	0.000800	0.00108	0.00111	0.000900	0.000860	0.000720	0.000650	0.000720	0.000730	0.000780	0.00100	13	0.00084	0.00015	0.00065	0.0011	0%	0%	-
Barium	mg/L	1.00	-	0.0166	0.0176	0.0198	0.0199	0.0182	0.0206	0.0196	0.0141	0.0132	0.0155	0.0182	0.0153	0.0242	13	0.018	0.0030	0.013	0.024	0%	0%	-
Beryllium	mg/L	0.000130	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	0%	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	1.20	-	0.0220	0.0210	0.0240	0.0210	0.0180	0.0110	0.0110	<0.01	<0.01	<0.01	0.0160	0.0140	0.0230	13	0.016	0.0053	<0.01	0.024	23%	0%	-
Cadmium	mg/L	-	-	<0.000005	0.00000660	0.00000560	<0.00001	0.00000640	0.0000116	0.0000104	0.00000920	0.00000630	0.0000165	0.00000960	0.0000129	0.00000660	13	0.0000087	0.0000034	<0.000005	0.000016	15%	-	-
Calcium	mg/L	-	-	42.3	44.2	48.9	45.4	42.9	40.1	33.3	22.0	22.5	21.4	34.5	33.7	50.9	13	37	10	21	51	0%	-	-
Chromium	mg/L	0.00250	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000540	0.000680	0.00110	0.000680	0.00118	0.000550	<0.0005	<0.0005	13	0.00063	0.00023	<0.0005	0.0012	54%	0%	-
Cobalt	mg/L	0.00400	0.110	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000190	0.000160	0.000190	0.000110	0.000270	0.000100	<0.0001	<0.0001	13	0.00013	0.000057	<0.0001	0.00027	54%	0%	0%
Copper	mg/L	-	-	0.00628	0.00609	0.00517	0.00492	0.00501	0.00876	0.00866	0.00628	0.00560	0.00807	0.00770	0.00659	0.00674	13	0.0066	0.0013	0.0049	0.0088	0%	-	-
Iron	mg/L	-	1.00	0.0320	0.0310	<0.03	<0.03	0.0540	0.388	0.368	0.515	0.264	0.461	0.202	0.155	0.0500	13	0.20	0.18	<0.03	0.52	15%	-	0%
Lead	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000104	0.0000900	0.000118	0.0000500	0.000179	0.0000510	<0.00005	<0.00005	13	0.000072	0.000042	0.000050	0.00018	54%	-	-
Lithium	mg/L	-	-	0.00110	<0.001	0.00110	0.00120	<0.001	0.00110	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00130	13	0.0011	0.000064	<0.001	0.0013	62%	-	-
Magnesium	mg/L	-	-	7.68	9.09	10.1	11.4	11.0	9.34	8.56	6.29	6.24	5.07	6.92	6.98	11.0	13	8.4	2.1	5.1	11	0%	-	-
Manganese	mg/L	0.909 - 1.33	1.30 - 2.36	0.0349	0.0362	0.0474	0.0451	0.0326	0.0355	0.0418	0.0242	0.0300	0.0269	0.0335	0.0316	0.0688	13	0.038	0.011	0.024	0.069	0%	0%	0%
Molybdenum	mg/L	7.60	46.0	0.00605	0.00615	0.00573	0.00484	0.00398	0.00340	0.00201	0.00125	0.00134	0.00108	0.00366	0.00323	0.00566	13	0.0037	0.0019	0.0011	0.0062	0%	0%	0%
Nickel	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000900	0.00105	0.00153	0.00109	0.00186	0.000960	0.00104	<0.0005	13	0.00088	0.00031	<0.0005	0.0019	46%	-	-
Potassium	mg/L	-	-	1.04	1.07	0.988	1.02	0.942	1.10	0.881	0.761	0.689	0.651	0.929	0.821	1.14	13	0.93	0.16	0.65	1.1	0%	-	-
Selenium	mg/L	0.00200	-	0.000996	0.00102	0.00138	0.00130	0.00110	0.00124	0.000748	0.000480	0.000469	0.000353	0.000644	0.000619	0.00111	13	0.00088	0.00035	0.00035	0.0014	0%	0%	-
Silicon	mg/L	-	-	3.82	4.04	4.18	4.58	4.86	4.82	5.09	5.03	3.39	4.36	4.24	4.08	4.25	13	4.4	0.50	3.4	5.1	0%	-	-
Silver	mg/L	0.0000500 - 0.00150	0.000100 - 0.00300	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	0%	0%
Sodium	mg/L	-	-	8.05	8.67	8.96	9.24	7.99	5.29	4.75	3.83	4.17	3.16	5.75	5.26	9.13	13	6.5	2.2	3.2	9.2	0%	-	-
Strontium	mg/L	-	-	0.292	0.339	0.353	0.338	0.321	0.267	0.219	0.154	0.154	0.130	0.234	0.217	0.347	13	0.26	0.080	0.13	0.35	0%	-	-
Thallium	mg/L	0.00003	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	0%	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0112	<0.01	<0.01	<0.01	<0.01	<0.01	13	0.010	-	<0.01	0.011	92%	-	-
Uranium	mg/L	0.00750	0.0165	0.000336	0.000390	0.000600	0.000535	0.000459	0.000494	0.000310	0.000217	0.000174	0.000192	0.000308	0.000219	0.000431	13	0.00036	0.00014	0.00017	0.00060	0%	0%	0%
Vanadium	mg/L	0.0600	-	0.00119	0.00107	0.000670	0.000660	0.000610	0.000990	0.00108	0.00132	0.000880	0.00141	0.00121	0.00107	0.00105	13	0.0010	0.00025	0.00061	0.0014	0%	0%	-
Zinc	mg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	13	<0.003	-	<0.003	<0.003	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

Table D.1.8: Surface Water Quality Data Collected Routinely at EDC-01a in Lower Edney Creek, September 2023 to August 2024

Analyte	Units	British Columbia Water Quality Guidelines[a]		Date													Sample Size	Mean	Standard Deviation	Minimum	Maximum	% <LRL	% >Chronic GL[b]	% >Acute GL[b]
		Long-term Average	Short-term Maximum	6-Sep-23	3-Oct-23	2-Nov-23	6-Dec-23	3-Jan-24	1-Feb-24	20-Mar-24	3-Apr-24	2-May-24	3-Jun-24	12-Jun-24	2-Jul-24	6-Aug-24								
Dissolved Metals																								
Aluminum	mg/L	-	-	0.00600	0.00340	0.00380	0.00310	0.00590	0.0204	0.0557	0.120	0.0598	0.133	0.0389	0.0317	0.00390	13	0.037	0.044	0.0031	0.13	0%	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Arsenic	mg/L	-	-	0.000670	0.000730	0.000770	0.00102	0.00106	0.000670	0.000770	0.000650	0.000630	0.000550	0.000720	0.000760	0.000900	13	0.00076	0.00015	0.00055	0.0011	0%	-	-
Barium	mg/L	-	-	0.0169	0.0174	0.0198	0.0200	0.0190	0.0164	0.0149	0.0118	0.0116	0.0138	0.0162	0.0162	0.0217	13	0.017	0.0031	0.012	0.022	0%	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	-	-
Boron	mg/L	-	-	0.0200	0.0200	0.0230	0.0210	0.0170	<0.01	0.0100	<0.01	<0.01	<0.01	0.0150	0.0140	0.0200	13	0.015	0.0051	<0.01	0.023	31%	-	-
Cadmium	mg/L	0.000161 - 0.000306	0.000403 - 0.000985	0.00000680	<0.000005	0.00000560	0.00000680	0.00000800	0.00000500	0.00000660	0.00000500	0.00000620	0.0000112	0.00000630	0.0000106	0.00000780	13	0.0000070	0.0000020	0.0000050	0.000011	7.7%	0%	0%
Calcium	mg/L	-	-	41.2	44.8	48.9	45.2	42.1	37.7	32.1	22.4	21.0	19.4	33.0	29.8	47.1	13	36	10	19	49	0%	-	-
Chromium	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000710	0.000550	0.000830	<0.0005	<0.0005	<0.0005	13	0.00055	0.00010	<0.0005	0.00083	77%	-	-
Cobalt	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Copper	mg/L	0.00250 - 0.0106	0.0147 - 0.0626	0.00585	0.00541	0.00505	0.00466	0.00476	0.00609	0.00519	0.00511	0.00459	0.00751	0.00658	0.00592	0.00595	13	0.0056	0.00084	0.0046	0.0075	0%	38%	0%
Iron	mg/L	-	0.350	<0.03	<0.03	<0.03	<0.03	0.0440	0.128	0.172	0.237	0.182	0.188	0.0900	0.0950	<0.03	13	0.099	0.071	<0.03	0.24	38%	-	0%
Lead	mg/L	0.00489 - 0.0101	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	13	<0.00005	-	<0.00005	<0.00005	100%	0%	-
Lithium	mg/L	-	-	<0.001	<0.001	0.00120	0.00110	0.00110	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00120	13	0.0010	0.000042	<0.001	0.0012	69%	-	-
Magnesium	mg/L	-	-	7.77	8.75	10.4	11.4	10.3	8.49	8.30	6.14	5.97	5.04	6.46	6.81	10.4	13	8.2	2.0	5.0	11	0%	-	-
Manganese	mg/L	-	-	0.0248	0.0331	0.0466	0.0421	0.0308	0.0170	0.0201	0.0132	0.0176	0.0102	0.0256	0.0229	0.0542	13	0.028	0.013	0.010	0.054	0%	-	-
Molybdenum	mg/L	-	-	0.00582	0.00574	0.00560	0.00482	0.00377	0.00325	0.00205	0.00121	0.00118	0.00116	0.00363	0.00321	0.00556	13	0.0036	0.0018	0.0012	0.0058	0%	-	-
Nickel	mg/L	0.00360 - 0.0103	0.0464 - 0.0987	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000560	0.000840	0.00111	0.000980	0.00144	0.000700	0.000840	<0.0005	13	0.00073	0.00029	<0.0005	0.0014	46%	0%	0%
Potassium	mg/L	-	-	1.04	1.10	1.07	1.02	1.02	1.10	0.849	0.718	0.751	0.759	0.907	0.851	1.16	13	0.95	0.15	0.72	1.2	0%	-	-
Selenium	mg/L	-	-	0.000868	0.00107	0.00134	0.00118	0.00104	0.00119	0.000716	0.000393	0.000403	0.000357	0.000590	0.000517	0.00107	13	0.00083	0.00035	0.00036	0.0013	0%	-	-
Silicon	mg/L	-	-	3.56	3.79	4.31	4.39	4.50	4.18	4.77	4.36	3.41	4.04	3.57	3.49	4.00	13	4.0	0.44	3.4	4.8	0%	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000140	<0.00001	<0.00001	<0.00001	13	0.000010	-	<0.00001	0.000014	92%	-	-
Sodium	mg/L	-	-	8.86	8.93	9.62	9.28	7.69	4.97	4.97	3.86	4.09	3.04	5.52	5.57	8.79	13	6.6	2.4	3.0	9.6	0%	-	-
Strontium	mg/L	1.25	-	0.312	0.309	0.346	0.336	0.306	0.253	0.218	0.152	0.155	0.134	0.229	0.221	0.329	13	0.25	0.075	0.13	0.35	0%	0%	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	13	<0.00001	-	<0.00001	<0.00001	100%	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	13	<0.0001	-	<0.0001	<0.0001	100%	-	-
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	13	<0.01	-	<0.01	<0.01	100%	-	-
Uranium	mg/L	-	-	0.000355	0.000388	0.000601	0.000525	0.000466	0.000422	0.000318	0.000205	0.000166	0.000188	0.000294	0.000228	0.000466	13	0.00036	0.00014	0.00017	0.00060	0%	-	-
Vanadium	mg/L	-	-	0.00104	0.000950	0.000640	0.000610	0.000580	<0.0005	0.000860	0.000900	0.000680	0.000820	0.000900	0.000970	0.000900	13	0.00080	0.00016	<0.0005	0.0010	7.7%	-	-
Zinc	mg/L	0.0130 - 0.0194	0.0572 - 0.0896	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	13	<0.003	-	<0.003	<0.003	100%	0%	0%
Selenium Speciation																								
Selenate (SeVI)	mg/L	-	-	-	-	-	-	-	-	-	0.250	0.170	0.140	-	0.190	0.590	5	0.27	0.18	0.14	0.59	0%	-	-
Selenite (SeIV)	mg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	0.140	0.260	6	0.13	0.063	<0.1	0.26	67%	-	-
Selenocyanate (SeCN)	mg/L	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	6	<0.1	-	<0.1	<0.1	100%	-	-
Selenium species, unknown	mg/L	-	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	5	<0.2	-	<0.2	<0.2	100%	-	-

Indicates value greater than the long-term average British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Indicates value greater than the short-term maximum British Columbia Water Quality Guideline (BCMOWLRS 2024, 2025).

Percent exceedance > 0%.

Notes: "-" = data not available or no applicable guideline exists. < LRL = below laboratory reporting limit. GL = guideline. Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

[a] Guidelines were derived from the British Columbia Water Quality Guidelines for the protection of aquatic life (BCMOWLRS 2024, 2025) outlined in Appendix Table D.1.1.

[b] % displayed for pH indicates results falling outside the guideline range. % displayed for dissolved oxygen indicates results below the guideline.

[c] Guidelines for these parameters (Total Suspended Solids, Turbidity, Dissolved Organic Carbon) are narrative and were not evaluated.

APPENDIX D.2
SEDIMENT QUALITY

Table D.2.1: Baseline Sediment Quality Data for the Upper and Lower Edney Creek Monitoring Areas, 1995 to 1999

Analyte	Units	1995 (HKP 1996)[a]																	
		WQ8						WQ8B						WQ9					
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
Physical Tests																			
Moisture	%	39.3	90.4	38.2	43.6	52	88.2	36.1	30.5	35.2	31.1	21.3	18.4	16.5	10.6	14.9	12.9	10.5	8.5
Physical Characteristics																			
Gravel (> 2mm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand (2.0 mm - 0.050 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt (0.050 mm - 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay (< 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																			
Aluminum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/kg dw	0.62	<0.050	<0.050	<0.050	<0.050	<0.050	0.52	0.53	0.99	0.46	0.56	0.27	1.54	<0.050	0.35	0.30	<0.050	0.13
Arsenic	mg/kg dw	5.52	6.73	6.72	4.53	3.43	11.5	2.7	4.91	3.86	5.31	5.53	6.36	5.73	3.23	1.95	8.81	5.22	5.16
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg dw	<0.10	8.7	<0.10	0.10	<0.10	0.60	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Calcium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg dw	38	71	43	43	28	101	44	48	20	21	33	29	32	10	7	22	9	8
Cobalt	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg dw	21	55	26	23	20	69	36	27	44	118	19	22	27	26	10	17	28	9
Iron	mg/kg dw	30,800	39,200	29,200	28,200	24,700	56,600	37,700	30,700	20,100	24,600	23,200	32,500	27,700	23,200	9,920	27,100	25,700	11,900
Lead	mg/kg dw	4	13	4	4	4	10	5	4	4	4	3	4	<2.0	4	<2.0	3	2.0	3
Magnesium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/kg dw	540	1,350	472	529	506	1,330	892	872	708	535	565	1,040	775	624	221	640	549	300
Mercury	mg/kg dw	0.040	0.071	0.064	0.036	0.032	0.078	0.036	0.033	0.015	0.022	0.023	0.024	0.019	0.013	0.012	0.014	0.014	0.015
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg dw	24	52	24	25	19	61	40	26	15	16	19	19	15	13	4	14	9	6
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg dw	0.20	1.3	0.10	0.20	0.20	0.90	<0.10	<0.10	<0.10	0.50	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Silver	mg/kg dw	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg dw	54	128	52	55	49	138	58	43	29	36	30	42	37	31	15	37	29	17

Notes: mg/kg dw = milligrams per kilogram dry weight. Sediment metal concentrations are based predominantly on bulk sediment samples. Concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. Iron concentrations in sediment in 1999 were measured using both ICP-AA (Inductively Coupled Plasma Atomic Absorption) as well as ICP-MS (Inductively Coupled Plasma Mass Spectrometry for each sample collected (Beak 2000). Iron results measured using ICP-MS are displayed herein because this method is consistent with analysis methods used for post-breach monitoring (see Section 4.1.2). "-" indicates no data available.

[a] Monitoring areas WQ8, WQ8B, WQ9, and WQ10 sampled in 1995 (HKP 1996) were considered equivalent to sampling areas W8, W8A, W9, and W10 sampled in 1996 (HKP 1997a), respectively.

[b] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997a) and are suspected errors.

Table D.2.1: Baseline Sediment Quality Data for the Upper and Lower Edney Creek Monitoring Areas, 1995 to 1999

Analyte	Units	1995 (HKP 1996) [a]						1996 (HKP 1997a) [b]											
		WQ10						W8						W8A					
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
Physical Tests																			
Moisture	%	29.4	26.1	14.6	11.2	8.1	12.6	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																			
Gravel (> 2mm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sand (2.0 mm - 0.050 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silt (0.050 mm - 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clay (< 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																			
Aluminum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/kg dw	0.12	0.80	0.45	0.38	0.38	0.25	0.48	0.47	0.30	0.25	0.45	0.23	0.58	0.58	0.53	1.1	0.59	0.41
Arsenic	mg/kg dw	8.54	4.08	18.1	9.83	14.4	10.1	5.67	4.88	6.56	2.12	7.08	6.19	15.9	21.9	9.96	13.5	14.1	10
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg dw	0.10	<0.10	0.40	0.10	0.20	0.30	0.40	0.50	0.40	0.10	0.60	<0.10	0.60	0.60	0.30	0.60	<0.10	0.40
Calcium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg dw	42	8	34	24	31	29	68	83	66	52	64	64	59	44	56	56	55	66
Cobalt	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg dw	34	12	28	21	38	32	691	1,770	1,320	605	596	1,590	2,070	1,830	2,770	4,340	2,120	1,860
Iron	mg/kg dw	30,000	12,700	51,900	29,100	28,000	56,600	35,700	34,000	32,700	22,500	37,400	31,200	38,900	39,900	29,100	3,160	30,900	34,700
Lead	mg/kg dw	4	<2.0	4	4	3	4	10	13	14	7	10	11	13	8	10	31	9	12
Magnesium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/kg dw	644	527	1,470	823	733	1,170	876	1,150	2,490	421	1,080	835	12,200	13,700	5,040	5,120	2,160	1,290
Mercury	mg/kg dw	0.058	<0.0050	0.035	0.048	0.015	0.101	0.015	0.065	0.094	0.047	<0.0050	0.052	0.046	0.053	0.036	0.039	0.040	0.228
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg dw	30	10	30	20	20	42	41	48	38	16	45	42	45	38	36	35	35	35
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg dw	0.20	0.10	0.30	0.10	0.40	0.70	0.50	0.60	0.60	0.20	0.70	0.60	0.40	0.10	0.20	0.40	0.10	0.30
Silver	mg/kg dw	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/kg dw	60	23	126	54	51	97	191	321	266	126	174	295	389	398	462	792	630	351

Notes: mg/kg dw = milligrams per kilogram dry weight. Sediment metal concentrations are based predominantly on bulk sediment samples. Concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. Iron concentrations in sediment in 1999 were measured using both ICP-AA (Inductively Coupled Plasma Atomic Absorption) as well as ICP-MS (Inductively Coupled Plasma Mass Spectrometry for each sample collected (Beak 2000). Iron results measured using ICP-MS are displayed herein because this method is consistent with analysis methods used for post-breach monitoring (see Section 4.1.2). "-" indicates no data available.

[a] Monitoring areas WQ8, WQ8B, WQ9, and WQ10 sampled in 1995 (HKP 1996) were considered equivalent to sampling areas W8, W8A, W9, and W10 sampled in 1996 (HKP 1997a), respectively.

[b] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997a) and are suspected errors.

Table D.2.1: Baseline Sediment Quality Data for the Upper and Lower Edney Creek Monitoring Areas, 1995 to 1999

Analyte	Units	1996 (HKP 1997a)[b]												1999 (Beak 2000)					
		W9						W10						W8			W9		
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 1	Rep 2	Rep 3
Physical Tests																			
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																			
Gravel (> 2mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		5.4		-	-	-
Sand (2.0 mm - 0.050 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		15.1		-	-	-
Silt (0.050 mm - 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		44		-	-	-
Clay (< 2 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		36		-	-	-
Organic / Inorganic Carbon																			
Total Organic Carbon	%	-	-	-	-	-	-	-	-	-	-	-	-		1.4		-	-	
Metals, Metalloids, and Non-Metals																			
Aluminum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	21,000	20,000	22,000	9,500	9,000	12,000
Antimony	mg/kg dw	0.32	0.69	0.42	0.49	0.60	0.42	0.41	0.64	0.55	0.65	1.54	0.73	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Arsenic	mg/kg dw	7.38	11.2	4.89	4.83	9.47	6.39	4.67	7.36	6.24	11.9	7.07	11.5	7.2	7.2	8	22	22	5.8
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	150	160	160	170	180	120
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.50	0.50	0.30	0.30	0.30
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.90	0.40	0.30	0.30	>0.2	0.20
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	3.1	4.2	2.7	2.1	3.5	2.6
Cadmium	mg/kg dw	<0.10	<0.10	0.10	0.30	0.90	0.30	0.20	0.30	0.40	<0.10	0.50	<0.10	0.40	0.60	0.40	0.30	0.30	0.30
Calcium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	11,000	9,800	17,000	7,000	8,300	7,500
Chromium	mg/kg dw	44	109	40	61	81	49	30	49	51	44	61	50	47	46	48	24	23	30
Cobalt	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	17	16	17	11	11	12
Copper	mg/kg dw	1,130	6,740	698	2,900	4,100	2,120	442	2,590	3,350	2,450	12,200	4,060	56	54	62	19	20	25
Iron	mg/kg dw	19,200	24,900	18,400	19,400	21,800	19,700	15,900	17,800	19,000	20,500	17,800	20,100	38,000	35,000	40,000	48,000	52,000	23,000
Lead	mg/kg dw	8	32	6	12	18	9	6	11	12	21	41	10	12	10	12	5.3	6.5	5.6
Magnesium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	11,000	10,000	13,000	5,800	5,800	6,000
Manganese	mg/kg dw	1,080	1,510	743	962	895	991	482	686	662	586	800	546	1,000	1,100	840	1,200	1,500	1,500
Mercury	mg/kg dw	0.0050	0.042	0.015	0.015	0.035	0.022	0.027	0.022	0.011	<0.0050	0.019	0.020	0.050	<0.040	<0.040	<0.040	<0.040	<0.040
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.70	0.60	0.70	1.1	1.3	0.60
Nickel	mg/kg dw	22	53	21	32	37	25	15	27	26	22	34	35	43	40	46	18	18	22
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	790	910	830	1,000	1,200	910
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	2,100	1,900	2,300	950	1,000	820
Selenium	mg/kg dw	0.20	0.40	0.20	0.20	0.30	0.20	0.20	0.40	0.30	0.30	0.50	0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	0.20	0.10	0.10	0.10	0.10
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	170	160	190	190	230	160
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	100	100	120	69	72	69
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	290	500	180	560	730	530
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.20	0.20	0.20	<0.20	<0.20	<0.20
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	1.2	1.2	1.1	1.0	0.60	1.0
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	460	390	440	240	290	270
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.80	1.0	0.80	0.80	0.90	1.0
Vanadium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	52	46	56	48	48	45
Zinc	mg/kg dw	284	1,810	151	442	873	362	107	573	642	476	2,680	1,120	84	84	89	43	47	58

Notes: mg/kg dw = milligrams per kilogram dry weight. Sediment metal concentrations are based predominantly on bulk sediment samples. Concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. Iron concentrations in sediment in 1999 were measured using both ICP-AA (Inductively Coupled Plasma Atomic Absorption) as well as ICP-MS (Inductively Coupled Plasma Mass Spectrometry for each sample collected (Beak 2000). Iron results measured using ICP-MS are displayed herein because this method is consistent with analysis methods used for post-breach monitoring (see Section 4.1.2). "-" indicates no data available.

[a] Monitoring areas WQ8, WQ8B, WQ9, and WQ10 sampled in 1995 (HKP 1996) were considered equivalent to sampling areas W8, W8A, W9, and W10 sampled in 1996 (HKP 1997a), respectively.

[b] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997a) and are suspected errors.

Table D.2.2: Baseline and Pre-Breach Sediment Quality Data for the Upper Hazeltine Creek Monitoring Area for Calculation of Pre-Breach 95th Percentile, 1995 to 2013

Analyte	Units	1995 (W7) HKP (1996)						1996 (W7)[a] HKP (1997)						1999 (W6)[b] Beak (2000)			2007 (W7) Minnow (2009)			2009 (W7) Minnow (2011)				
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	UHC-1	UHC-2	UHC-3	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Physical Tests																								
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																								
Gravel (> 2mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		8.90		2.00	8.00	1.00	4.00	2.00	5.00	11.0	2.00
Sand (2.0 mm - 0.063 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		49.3		38.0	35.0	46.0	45.0	50.0	***76.0***	58.0	62.0
Silt (0.063 mm - 4 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		31.0		46.0	43.0	41.0	38.0	39.0	16.0	27.0	30.0
Clay (< 4µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		10.0		***15.0***	***14.0***	12.0	13.0	9.00	4.00	4.00	5.00
Organic / Inorganic Carbon																								
Total Organic Carbon	%	-	-	-	-	-	-	-	-	-	-	-	-		3.20		12.5	10.9	7.77	7.50	8.37	7.40	7.47	8.73
Anions and Nutrients																								
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																								
Aluminum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	12,000	13,000	10,000	14,400	14,300	16,500	-	-	-	-	-
Antimony	mg/kg dw	***0.810***	0.330	***0.510***	0.370	0.120	0.340	***0.720***	***0.620***	***0.610***	***1.75***	***0.870***	***0.590***	<0.20	<0.20	<0.20	***<10.0***	***<10.0***	***<10.0***	***<10.0***	***<10.0***	***<10.0***	***<10.0***	***<10.0***
Arsenic	mg/kg dw	***18.1***	6.87	3.69	***24.5***	***10.7***	2.67	6.77	3.17	4.12	***17.1***	5.56	5.05	2.50	3.00	3.20	<5.0	5.30	7.40	5.80	<5.0	<5.0	<5.0	<5.0
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	110	110	84.0	115	104	***156***	117	127	83.2	97.5	96.6
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.300	0.400	0.300	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20	<20.0	<20.0	<20.0	-	-	-	-	-
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	***5.50***	4.50	3.60	-	-	-	-	-	-	-	-
Cadmium	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.400***	0.300	***0.500***	***2.60***	0.100	***0.500***	0.100	0.100	0.100	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***	***<0.50***
Calcium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,470	8,910	10,600	-	-	-	-	-
Chromium	mg/kg dw	26.0	30.0	5.00	9.00	***45.0***	27.0	***138***	***146***	***110***	***201***	***74.0***	***131***	29.0	30.0	22.0	25.3	27.6	32.0	36.5	30.7	18.8	25.6	24.4
Cobalt	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	9.00	9.90	8.50	8.70	8.90	9.70	***10.8***	9.10	6.60	7.90	7.60
Copper	mg/kg dw	17.0	47.0	25.0	20.0	79.0	39.0	***5,250***	***7,670***	***7,980***	***22,000***	***2,340***	***8,420***	47.0	39.0	23.0	55.9	63.6	67.0	53.7	50.1	34.4	45.5	45.4
Iron	mg/kg dw	***33,000***	25,400	12,600	17,900	***57,500***	***35,100***	***31,700***	29,100	28,600	***55,500***	***31,000***	29,900	15,000	17,000	15,000	19,600	22,500	22,900	-	-	-	-	-
Lead	mg/kg dw	3.00	4.00	2.00	2.00	5.00	***8.00***	***35.0***	***29.0***	***21.0***	***103***	***14.0***	***26.0***	***6.70***	5.80	4.20	***<30.0***	***<30.0***	***<30.0***	***<30.0***	***<30.0***	***<30.0***	***<30.0***	***<30.0***
Lithium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.4	12.6	***14.8***	-	-	-	-	-
Magnesium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,520	5,780	***6,430***	-	-	-	-	-
Manganese	mg/kg dw	858	613	362	480	1,300	743	1,260	***1,720***	***2,010***	***10,100***	***1,420***	***2,470***	320	340	320	***2,480***	1,290	868	-	-	-	-	-
Mercury	mg/kg dw	0.0250	0.0460	0.0460	0.0510	0.105	0.0470	0.0880	0.0470	0.0660	0.0920	0.0700	0.0920	<0.040	<0.040	<0.040	0.113	0.118	0.130	0.0960	0.0990	0.0640	0.101	0.0870
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.500	0.500	0.200	***<4.0***	***<4.0***	***<4.0***	***<4.0***	***<4.0***	***<4.0***	***<4.0***	***<4.0***
Nickel	mg/kg dw	16.0	24.0	5.00	8.00	***25.0***	18.0	***69.0***	***68.0***	***54.0***	***134***	***33.0***	***65.0***	20.0	22.0	16.0	15.7	16.4	19.2	***25.2***	19.2	12.2	16.0	15.3
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	860	970	1,160	-	-	-	-	-
Selenium	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.600	0.400	0.600	1.40	0.500	0.500	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	0.540	0.790	1.14	0.600	0.770
Silver	mg/kg dw	***<1.0***	***<1.0***	***<1.0***	***<1.0***	***<1.0***	***<1.0***	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***<2.0***	***<2.0***	***<2.0***	***<2.0***	***<2.0***	***<2.0***	***<2.0***	***<2.0***
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210	210	230	-	-	-	-	-
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	100	100	78.0	74.7	68.8	87.5	-	-	-	-	-
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	***<0.20***	***<0.20***	***<0.20***	***<1.0***	***<1.0***	***<1.0***	-	-	-	-	-
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.700	0.600	0.700	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	390	390	380	542	568	596	-	-	-	-	-
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.500	0.500	0.300	-	-	-	-	-	-	-	-
Vanadium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	39.0	42.0	36.0	49.6	55.3	53.2	63.4	58.3	49.8	56.1	51.9
Zinc	mg/kg dw	41.0	53.0	33.0	29.0	***82.0***	51.0	***1,010***	***1,610***	***1,580***	***7,880***	***455***	***2,130***	51.0	46.0	35.0	50.7	57.6	53.8	54.6	46.6	43.8	51.6	51.2

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. "-" no data. Sediment metal concentrations are based predominantly on bulk sediment samples, concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. S = spring. F = fall.

[a] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997) and are suspected errors.

[b] Particle fractions for these samples are as follow: gravel (>2 mm), sand (2.0 mm - 0.050 mm), silt (0.050 mm - 0.002 mm), clay (<0.002 mm).

[c] 95th percentile includes all data except those from 1996 (HKP 1997) due to suspected errors.

Table D.2.2: Baseline and Pre-Breach Sediment Quality Data for the Upper Hazeltine Creek Monitoring Area for Calculation of Pre-Breach 95th Percentile, 1995 to 2013

Analyte	Units	2010 (W7) Minnow (2011)					2012 (W7 Pond) Minnow (2013a)								2013S (W7) Minnow (2013b)							
		UH SED-1	UH SED-2	UH SED-3	UH SED-4	UH SED-5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Physical Tests																						
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																						
Gravel (> 2mm)	%	20.0	29.9	***33.5***	29.2	***49.1***	6.40	<0.10	<0.10	<0.10	1.79	-	-	-	0.440							
Sand (2.0 mm - 0.063 mm)	%	37.8	63.2	59.0	***64.9***	49.5	39.0	11.4	19.3	14.1	22.3	-	-	-	20.4							
Silt (0.063 mm - 4 µm)	%	34.0	5.01	6.74	5.41	0.760	47.3	***76.4***	70.7	***76.4***	66.4	-	-	-	71.1							
Clay (< 4µm)	%	8.25	1.84	0.800	0.460	0.680	7.25	12.2	9.96	9.49	9.54	-	-	-	8.08							
Organic / Inorganic Carbon																						
Total Organic Carbon	%	7.36	0.580	0.520	0.490	0.540	8.32	12.0	11.2	***13.1***	12.6	9.95	***13.1***	10.4	-	-	-	-	-	-	-	-
Anions and Nutrients																						
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																						
Aluminum	mg/kg dw	13,900	10,200	9,220	8,120	9,710	-	-	-	11,000	14,100	14,500	13,800	14,100	14,500	15,400	13,900	17,300	16,200	16,000	14,900	14,200
Antimony	mg/kg dw	0.370	0.260	0.260	0.180	0.210	-	-	-	0.250	0.260	0.220	0.220	0.230	0.260	0.290	0.290	0.300	0.310	0.320	0.310	0.290
Arsenic	mg/kg dw	6.28	5.20	5.42	3.43	4.19	-	-	-	3.31	3.81	3.60	3.51	3.66	4.12	4.63	3.81	5.80	4.95	4.91	4.55	4.28
Barium	mg/kg dw	107	67.9	54.9	46.6	67.0	-	-	-	79.9	103	107	97.0	94.9	109	121	104	133	130	123	111	114
Beryllium	mg/kg dw	0.380	0.260	0.250	0.200	0.220	-	-	-	0.290	0.370	0.350	0.360	0.330	0.330	0.370	0.350	0.450	0.410	0.380	0.370	0.360
Bismuth	mg/kg dw	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/kg dw	0.210	<0.10	<0.10	<0.10	<0.10	-	-	-	0.266	0.299	0.293	0.263	0.246	0.312	0.335	0.251	***0.354***	***0.432***	0.353	0.285	0.300
Calcium	mg/kg dw	9,000	6,070	5,290	5,140	6,180	-	-	-	11,400	11,500	11,000	12,000	9,550	10,700	***13,400***	10,600	13,300	***13,800***	12,600	11,000	11,400
Chromium	mg/kg dw	35.1	26.7	26.3	16.3	16.7	-	-	-	24.1	30.6	31.0	29.2	27.8	29.3	29.9	28.3	34.2	31.9	32.7	31.6	29.4
Cobalt	mg/kg dw	***10.5***	8.76	8.65	6.09	7.06	-	-	-	6.80	8.42	8.52	8.70	9.05	8.31	9.06	8.31	***10.5***	9.41	9.65	9.07	8.64
Copper	mg/kg dw	64.5	24.2	23.0	13.9	16.4	-	-	-	66.2	78.6	75.6	69.4	67.8	76.7	84.2	62.4	91.1	86.4	79.4	72.0	70.0
Iron	mg/kg dw	25,900	21,900	22,300	15,800	19,300	-	-	-	15,200	18,900	18,700	18,300	19,100	18,500	21,100	17,600	23,700	20,100	19,800	18,900	17,900
Lead	mg/kg dw	5.28	3.35	3.36	2.75	3.04	-	-	-	4.86	5.33	5.46	5.07	4.94	5.77	6.06	5.14	6.33	5.96	5.90	5.60	5.29
Lithium	mg/kg dw	12.0	9.80	8.90	7.20	8.40	-	-	-	9.50	11.6	11.9	11.6	12.2	10.8	12.2	12.2	14.4	14.1	12.8	12.5	12.1
Magnesium	mg/kg dw	6,080	***6,550***	6,270	4,490	5,380	-	-	-	3,850	4,920	5,140	5,040	5,740	4,790	5,170	4,930	5,750	5,300	5,340	5,010	5,000
Manganese	mg/kg dw	708	426	743	423	479	-	-	-	817	895	772	638	445	1,210	1,330	992	***1,360***	***1,580***	1,300	1,030	1,070
Mercury	mg/kg dw	0.0950	<0.050	0.0780	<0.050	<0.050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/kg dw	***1.56***	<0.50	<0.50	<0.50	<0.50	-	-	-	0.980	1.11	0.940	0.830	1.09	1.24	1.35	0.920	1.48	***1.57***	1.18	1.00	1.07
Nickel	mg/kg dw	21.0	15.9	14.9	9.47	10.9	-	-	-	15.7	19.6	19.7	18.9	19.2	19.5	20.4	17.7	23.1	21.8	21.0	19.8	18.8
Phosphorus	mg/kg dw	978	777	744	614	729	-	-	-	940	996	1,080	1,050	1,050	1,150	1,290	1,040	***1,470***	1,280	1,160	1,110	1,090
Potassium	mg/kg dw	930	470	350	290	380	-	-	-	760	930	980	880	940	870	950	820	1,300	1,070	1,070	990	850
Selenium	mg/kg dw	1.79	0.290	0.280	0.260	0.330	2.09	3.32	***3.51***	2.75	2.89	2.29	2.21	2.13	2.76	3.25	2.05	3.09	3.16	2.82	2.36	2.47
Silver	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	0.110	0.120	0.120	0.110	0.100	0.120	0.140	0.120	0.160	0.160	0.150	0.120	0.110
Sodium	mg/kg dw	***440***	***490***	310	190	170	-	-	-	350	190	210	220	180	190	200	190	220	200	230	200	190
Strontium	mg/kg dw	91.8	47.0	45.6	35.3	59.6	-	-	-	93.4	101	101	96.6	91.1	98.8	111	98.4	***119***	***118***	113	103	107
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	0.0640	<0.050	<0.050	<0.050	<0.050	-	-	-	0.0590	0.0730	0.0740	0.0730	0.0720	0.0670	0.0750	0.0620	0.0860	0.0890	0.0760	0.0760	0.0670
Tin	mg/kg dw	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	mg/kg dw	738	***785***	724	721	***819***	-	-	-	382	462	457	509	581	461	466	589	553	516	610	604	570
Uranium	mg/kg dw	0.755	0.376	0.346	0.335	0.372	-	-	-	0.796	0.868	0.819	0.815	0.845	1.13	1.23	0.979	1.20	***1.42***	1.20	1.04	1.10
Vanadium	mg/kg dw	***75.4***	***65.4***	***66.6***	47.6	57.0	-	-	-	37.6	45.7	45.1	46.5	51.9	45.7	49.3	47.4	53.4	50.0	52.8	52.1	48.6
Zinc	mg/kg dw	66.0	40.4	41.5	35.1	40.0	-	-	-	46.2	56.8	58.1	54.7	56.4	56.9	63.1	56.2	***70.7***	66.8	66.1	62.6	59.0

Notes: mg/kg dw = milligrams per kilogram dry weight. **Bold/Italics** indicates value is > reference 95th percentile value (<5th percentile value for pH). Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. "-" no data. Sediment metal concentrations are based predominantly on bulk sediment samples, concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. S = spring. F = fall.

[a] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997) and are suspected errors.

[b] Particle fractions for these samples are as follow: gravel (>2 mm), sand (2.0 mm - 0.050 mm), silt (0.050 mm - 0.002 mm), clay (<0.002 mm).

[c] 95th percentile includes all data except those from 1996 (HKP 1997) due to suspected errors.

Table D.2.2: Baseline and Pre-Breach Sediment Quality Data for the Upper Hazeltine Creek Monitoring Area for Calculation of Pre-Breach 95th Percentile, 1995 to 2013

Analyte	Units	2013S (W7 Pond) Minnow (2013b)								2013F (USW7 Pond) Minnow (2013b)					2013F (W7 Pond) Minnow (2013b)								Pre-Breach 95th Percentile[c]
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	
Physical Tests																							
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																							
Gravel (> 2mm)	%	0.180								0.910					<0.10								33.1
Sand (2.0 mm - 0.063 mm)	%	22.8								24.1					12.8								64.7
Silt (0.063 mm - 4 µm)	%	68.1								63.9					74.6								76.2
Clay (< 4µm)	%	8.88								11.1					12.6								13.9
Organic / Inorganic Carbon																							
Total Organic Carbon	%	-	-	-	-	-	-	-	-	7.55	6.98	8.73	7.86	6.92	11.9	11.3	12.3	11.8	11.2	8.57	11.6	11.2	12.8
Anions and Nutrients																							
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																							
Aluminum	mg/kg dw	15,100	15,500	16,600	13,700	16,300	15,400	16,500	14,700	14,400	17,400	16,100	17,200	17,500	***19,000***	17,800	17,300	16,000	***18,200***	***18,000***	17,200	17,100	17,960
Antimony	mg/kg dw	0.270	0.270	0.300	0.270	0.320	0.310	0.320	0.300	0.270	0.290	0.290	0.270	0.270	0.310	0.310	0.300	0.310	0.300	0.300	0.290	0.270	0.370
Arsenic	mg/kg dw	3.87	4.18	4.12	3.89	4.63	4.49	4.71	4.15	3.11	3.34	3.33	3.19	2.90	3.87	4.12	3.62	4.17	3.93	3.87	4.13	4.04	8.23
Barium	mg/kg dw	116	124	118	109	127	120	131	118	106	122	120	121	97.7	***145***	***138***	133	127	132	125	132	127	136
Beryllium	mg/kg dw	0.400	0.410	0.420	0.360	0.430	0.400	0.440	0.400	0.360	0.440	0.410	0.420	0.390	***0.460***	***0.460***	***0.460***	0.410	0.430	0.430	0.430	0.400	0.460
Bismuth	mg/kg dw	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.40
Cadmium	mg/kg dw	0.334	0.341	0.352	0.279	0.319	0.317	0.319	0.290	0.208	0.224	0.200	0.213	0.193	***0.361***	0.336	0.342	0.322	0.321	0.297	0.352	0.302	0.354
Calcium	mg/kg dw	11,300	13,300	11,300	10,800	12,200	11,600	13,300	11,800	9,600	9,700	10,600	9,700	***34,500***	13,000	12,300	12,300	11,700	11,600	13,100	12,400	12,200	13,395
Chromium	mg/kg dw	31.0	32.5	34.5	28.4	33.7	31.9	34.2	30.6	35.5	***41.4***	38.6	39.8	34.8	***40.8***	37.8	36.8	34.1	38.6	36.9	36.0	36.1	40.1
Cobalt	mg/kg dw	8.79	9.22	9.17	7.97	9.33	8.67	9.54	8.54	9.15	9.99	9.45	9.84	10.3	10.2	9.53	9.59	9.22	9.62	9.39	9.10	8.77	10.4
Copper	mg/kg dw	85.7	89.2	91.8	71.5	87.2	83.6	86.2	76.6	76.9	90.5	82.3	91.4	67.4	***103***	90.9	***95.3***	94.3	***95.7***	89.4	88.0	86.5	94.6
Iron	mg/kg dw	18,700	19,100	20,000	16,900	20,200	18,900	20,600	18,100	20,400	24,000	22,000	24,200	26,800	23,400	22,200	22,000	19,800	22,000	21,400	21,400	20,100	29,900
Lead	mg/kg dw	5.95	6.08	6.21	5.02	6.06	5.69	6.26	5.62	5.65	6.45	6.22	6.63	5.24	***6.90***	6.41	6.69	6.37	6.59	6.39	6.25	5.86	6.70
Lithium	mg/kg dw	12.9	13.2	14.2	12.1	13.6	13.6	14.7	12.7	11.6	14.4	13.2	13.5	13.4	***15.3***	14.5	***14.8***	13.1	14.3	13.8	13.7	12.5	14.8
Magnesium	mg/kg dw	5,060	5,500	5,500	4,520	5,390	5,350	5,570	4,990	5,730	6,420	5,990	6,330	***6,930***	6,390	5,990	5,920	5,560	6,190	6,060	5,690	5,640	6,430
Manganese	mg/kg dw	873	979	662	1,050	1,190	910	1,230	1,050	343	295	361	351	355	616	716	593	458	564	552	783	605	1,345
Mercury	mg/kg dw	-	-	-	-	-	-	-	-	0.0921	0.102	0.0934	0.0965	0.0792	***0.154***	0.141	***0.147***	0.144	0.144	0.137	0.144	0.136	0.145
Molybdenum	mg/kg dw	1.26	1.49	1.32	1.02	1.25	1.24	1.22	1.09	0.930	1.04	1.12	1.03	0.890	1.11	1.09	1.11	***1.50***	0.980	0.960	1.14	1.14	1.50
Nickel	mg/kg dw	20.2	20.8	21.6	17.6	21.3	20.2	21.6	19.4	21.4	24.2	22.6	24.2	21.0	***25.0***	23.3	23.8	22.1	23.8	22.6	22.6	21.7	24.4
Phosphorus	mg/kg dw	1,140	1,310	1,120	1,000	1,260	1,070	1,250	1,160	1,150	1,370	1,290	1,250	1,040	***1,420***	1,330	1,350	1,170	1,330	1,300	1,230	1,100	1,375
Potassium	mg/kg dw	900	970	1,050	930	1,060	970	1,080	940	1,090	***1,450***	1,340	***1,480***	1,110	***1,470***	1,320	1,250	1,070	1,310	1,330	1,220	1,250	1,445
Selenium	mg/kg dw	3.08	3.04	3.15	2.67	3.24	2.85	3.07	2.74	1.73	1.85	2.23	1.96	1.24	***3.38***	2.92	***3.35***	3.27	3.00	2.88	3.28	3.05	3.32
Silver	mg/kg dw	0.150	0.140	0.150	0.110	0.150	0.140	***0.220***	0.140	0.110	0.120	0.110	0.120	<0.10	0.160	0.150	0.160	0.160	***0.170***	0.150	0.140	0.130	0.160
Sodium	mg/kg dw	190	210	190	180	200	200	220	200	240	250	280	280	350	260	240	230	210	300	290	230	310	350
Strontium	mg/kg dw	105	109	107	104	117	113	***125***	112	94.5	96.0	103	98.6	111	114	111	112	106	109	105	112	99.5	118
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	0.0780	0.0710	0.0800	0.0680	0.0820	0.0780	0.0800	0.0690	0.0730	0.0850	0.0750	0.0830	0.0610	***0.0980***	0.0940	0.0890	0.0830	***0.0950***	0.0930	0.0900	0.0850	0.0941
Tin	mg/kg dw	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	mg/kg dw	454	440	547	522	575	570	592	531	553	704	680	638	***962***	583	577	502	455	603	651	595	595	776
Uranium	mg/kg dw	1.08	1.05	1.08	1.01	***1.26***	1.12	***1.26***	1.11	0.650	0.697	0.800	0.712	0.653	1.06	1.04	1.06	1.06	0.970	1.03	1.11	1.02	1.26
Vanadium	mg/kg dw	47.9	49.2	51.3	45.5	53.2	51.0	54.2	49.0	51.4	58.1	56.2	55.6	65.1	55.7	55.0	52.6	50.5	54.6	55.5	51.9	52.2	65.3
Zinc	mg/kg dw	62.2	65.2	66.0	54.4	64.8	59.5	66.0	58.6	53.4	58.4	55.3	59.1	55.4	***70.1***	64.4	64.3	62.5	64.7	62.7	62.0	60.8	67.6

Notes: mg/kg dw = milligrams per kilogram dry weight. **Bold/Italics** indicates value is > reference 95th percentile value (<5th percentile value for pH). Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. "-" no data. Sediment metal concentrations are based predominantly on bulk sediment samples, concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. S = spring. F = fall.

[a] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997) and are suspected errors.

[b] Particle fractions for these samples are as follow: gravel (>2 mm), sand (2.0 mm - 0.050 mm), silt (0.050 mm - 0.002 mm), clay (<0.002 mm).

[c] 95th percentile includes all data except those from 1996 (HKP 1997) due to suspected errors.

Table D.2.3: Sediment Quality Data for the Upper Edney Creek (EDC-U; Reference) Monitoring Area for Calculation of Reference 95th Percentile, 2018 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2018					2019					2020				
				EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5
		Lower	Upper	15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18	15-Aug-18	9-Aug-19	8-Aug-19	8-Aug-19	8-Aug-19	8-Aug-19	8-Aug-20	8-Aug-20	8-Aug-20	8-Aug-20	8-Aug-20
Physical Tests																		
Moisture	%	-	-	54.8	***91.7***	58.1	73.0	75.3	58.4	50.0	66.2	68.9	79.7	57.6	54.8	50.1	68.4	59.4
pH (1:2 soil:water)	pH units	-	-	7.00	6.68	6.90	7.00	6.20	6.59	6.37	6.14	6.15	6.25	***5.99***	6.70	6.33	6.01	6.78
Particle Size																		
Gravel (>2mm)	%	-	-	<1.0	9.80	<1.0	***26.6***	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.30	<1.0	<1.0
Sand (2.0mm - 0.063mm)	%	-	-	42.3	36.2	31.3	30.2	37.2	48.1	38.5	56.4	53.0	29.7	68.4	67.5	***77.1***	58.6	51.5
Silt (0.063mm - 4um)	%	-	-	50.5	45.2	51.5	37.7	56.4	43.1	43.6	34.9	38.6	56.9	26.7	26.8	17.5	35.4	37.6
Clay (<4um)	%	-	-	6.80	8.80	16.4	5.60	6.40	8.60	***17.9***	8.70	8.30	13.4	4.90	5.70	4.10	6.00	10.5
Organic / Inorganic Carbon (<63 µm)																		
Total Organic Carbon	%	-	-	6.43	***11.1***	2.41	8.34	6.85	4.55	3.23	6.88	6.14	8.48	5.27	4.44	5.77	7.11	4.86
Nutrients (Bulk sediment)																		
Total Nitrogen	%	-	-	0.290	0.485	0.167	0.393	0.438	0.322	0.237	0.419	0.338	***0.615***	0.276	0.252	0.268	0.427	0.292
Metals, Metalloids, and Non-Metals (<63 µm)																		
Aluminum	mg/kg dw	-	-	17,400	16,700	22,800	19,800	17,200	19,700	22,700	19,500	18,500	18,500	15,700	14,400	15,800	15,000	18,400
Antimony	mg/kg dw	-	-	0.300	0.320	0.320	0.310	0.270	0.340	0.370	0.350	0.340	0.340	0.340	0.280	0.330	0.310	0.330
Arsenic	mg/kg dw	5.9	17	9.85	***22.2***	12.0	11.4	8.32	10.4	11.0	10.4	11.6	10.4	8.72	7.72	9.90	9.47	8.69
Barium	mg/kg dw	-	-	138	200	165	157	133	140	146	147	151	148	123	113	145	138	131
Beryllium	mg/kg dw	-	-	0.430	0.460	***0.630***	0.490	0.410	0.500	0.600	0.490	0.490	0.510	0.440	0.360	0.470	0.450	0.470
Bismuth	mg/kg dw	-	-	0.110	0.110	0.140	0.120	<0.10	0.120	0.140	0.110	0.110	0.120	<0.10	<0.10	0.110	<0.10	0.100
Boron	mg/kg dw	-	-	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	mg/kg dw	0.6	3.5	0.422	0.581	0.247	0.579	0.421	0.413	0.270	0.509	0.467	0.499	0.331	0.337	0.454	0.436	0.348
Calcium	mg/kg dw	-	-	9,210	11,000	8,650	10,500	8,680	10,200	7,950	10,200	9,950	***11,200***	8,100	7,860	9,090	8,770	8,200
Chromium	mg/kg dw	37.3	90	53.1	51.0	63.6	56.0	51.1	60.0	75.8	63.4	61.3	64.9	52.3	48.2	54.5	51.7	54.5
Cobalt	mg/kg dw	-	-	13.7	15.2	14.8	16.9	12.6	15.4	15.8	15.9	16.3	15.3	11.9	11.8	14.6	14.0	13.0
Copper	mg/kg dw	35.7	197	37.5	46.8	47.0	40.4	36.1	39.4	45.2	40.8	39.7	40.2	32.5	28.2	33.4	32.0	35.5
Iron	mg/kg dw	21,200	43,766	29,300	***42,000***	34,000	31,700	27,700	30,100	32,500	30,700	32,500	31,500	27,100	25,300	30,600	29,400	27,200
Lead	mg/kg dw	35	91.3	6.58	6.48	***8.33***	6.45	5.78	7.18	7.74	6.72	6.69	6.78	6.00	5.38	6.20	5.61	6.04
Lithium	mg/kg dw	-	-	14.1	12.6	***18.5***	14.8	13.1	16.0	17.8	14.9	14.9	15.0	13.9	13.0	14.7	13.6	15.5
Magnesium	mg/kg dw	-	-	7,100	6,880	7,920	7,630	6,650	7,390	7,790	7,380	7,430	7,030	6,370	6,260	6,850	6,260	6,890
Manganese	mg/kg dw	460	1,100	1,320	1,420	1,100	1,980	739	1,230	1,040	1,440	1,710	1,100	717	734	845	1,160	1,070
Mercury	mg/kg dw	0.17	0.486	0.0972	***0.154***	0.119	0.123	0.0949	0.0983	0.106	0.0957	0.101	0.104	0.102	0.103	0.0996	0.100	0.101
Molybdenum	mg/kg dw	25	23,000	0.780	1.12	0.800	0.830	0.560	1.29	***2.61***	1.66	1.60	2.39	0.760	0.540	0.630	0.560	0.610
Nickel	mg/kg dw	16	75	32.5	32.9	36.6	35.3	29.6	36.4	***45.7***	39.5	37.8	41.0	29.4	27.5	32.4	30.6	31.9
Phosphorus	mg/kg dw	-	-	1,180	1,360	1,180	1,330	1,250	1,250	1,190	1,350	***1,380***	1,370	1,000	1,160	1,220	1,160	1,120
Potassium	mg/kg dw	-	-	1,060	1,060	1,470	1,400	1,150	1,080	1,410	1,270	1,250	1,210	1,010	880	1,110	1,070	1,260
Selenium	mg/kg dw	2	-	0.570	0.880	0.660	0.680	0.550	0.590	0.670	0.610	0.610	0.630	0.540	0.330	0.530	0.530	0.510
Silver	mg/kg dw	0.5	-	0.158	0.192	0.194	0.188	0.205	0.173	0.196	0.167	0.171	0.198	0.128	0.118	0.148	0.146	0.154
Sodium	mg/kg dw	-	-	226	239	246	275	267	238	217	266	263	239	267	247	286	261	267
Strontium	mg/kg dw	-	-	71.6	81.4	73.8	83.5	66.4	75.7	64.3	79.6	76.8	82.5	62.3	58.9	66.9	66.5	69.8
Sulphur[c]	mg/kg dw	-	-	2,000	2,300	700	1,600	1,600	***3,000***	1,900	1,900	1,500	1,600	1,800	1,070	1,080	1,570	1,190
Thallium	mg/kg dw	-	-	0.118	0.118	***0.175***	0.135	0.114	0.140	0.166	0.129	0.135	0.137	0.122	0.100	0.115	0.110	0.128
Tin	mg/kg dw	-	-	0.360	0.390	0.460	0.390	0.370	0.540	0.470	0.550	0.470	0.500	0.580	0.460	0.580	0.620	0.540
Titanium	mg/kg dw	-	-	489	507	736	636	633	527	658	658	650	593	655	516	659	637	702
Uranium	mg/kg dw	-	-	1.37	1.67	2.15	1.46	1.31	1.60	2.07	1.51	1.43	1.56	1.31	1.05	1.27	1.32	1.45
Vanadium	mg/kg dw	-	-	70.6	86.1	84.7	75.9	70.2	77.6	84.5	80.1	78.6	74.9	75.0	66.6	78.4	72.2	71.4
Zinc	mg/kg dw	123	315	73.3	73.2	72.8	84.2	74.8	76.0	71.4	87.5	82.6	81.4	63.1	62.8	74.8	71.7	65.2
Zirconium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	1.20	1.20	1.10	1.00	<1.0

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** : Value is > reference 95th percentile value (<5th percentile value for pH), "-" indicates no current BC Working Sediment Quality Guidelines/ no data. The 95th percentile was calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.3: Sediment Quality Data for the Upper Edney Creek (EDC-U; Reference) Monitoring Area for Calculation of Reference 95th Percentile, 2018 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2021					2022					2023					2024					95th Percentile (2018 to 2024)[b]
				EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	
		Lower	Upper	2-Aug-21	2-Aug-21	1-Aug-21	1-Aug-21	1-Aug-21	7-Aug-22	7-Aug-22	7-Aug-22	7-Aug-22	7-Aug-22	8-Aug-23	7-Aug-23	7-Aug-23	7-Aug-23	7-Aug-23	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	
Physical Tests																								
Moisture	%	-	-	51.0	60.4	52.1	59.9	52.4	63.9	70.8	64.9	64.5	45.5	62.9	60.1	68.3	54.9	52.6	72.6	76.4	59.1	47.0	47.2	79.7
pH (1:2 soil:water)	pH	-	-	6.58	7.32	6.47	6.63	7.03	6.67	6.64	6.44	7.03	6.97	6.67	6.65	6.40	6.59	6.53	6.77	6.03	7.32	7.29	6.46	6.01
Particle Size																								
% Gravel (>2 mm)	%	-	-	1.20	4.60	3.00	2.50	11.3	2.00	<1	<1	<1	1.00	3.40	3.70	<1	<1	<1	2.00	<1	<1	2.00	2.20	11.3
% Sand (2.0 mm - 0.063 mm)	%	-	-	65.3	50.5	64.8	37.7	66.3	44.9	37.7	60.7	55.8	76.2	55.2	53.0	30.3	55.2	55.1	44.4	20.3	62.9	42.2	65.4	76.2
% Silt (0.063 mm - 4 µm)	%	-	-	28.3	37.0	27.0	46.2	18.3	44.9	47.4	32.7	36.1	17.6	34.6	33.9	59.9	37.0	35.1	46.1	***68.4***	30.4	42.4	26.4	59.9
% Clay (<4 µm)	%	-	-	5.20	7.90	5.20	13.6	4.10	8.20	14.3	6.30	8.10	5.20	6.80	9.40	9.50	7.40	9.60	7.50	11.2	6.20	13.4	6.00	16.4
Organic / Inorganic Carbon (<63 µm)																								
Total Organic Carbon	%	-	-	4.89	7.51	6.96	4.94	5.55	7.11	3.78	7.08	5.43	6.65	9.96	5.60	7.08	6.75	5.18	6.32	7.97	6.35	2.22	6.42	9.96
Nutrients (Bulk sediment)																								
Total Nitrogen	%	-	-	0.221	0.404	0.221	0.318	0.167	0.424	0.303	0.248	0.271	0.167	0.312	0.212	0.366	0.255	0.185	0.471	0.519	0.281	0.182	0.196	0.519
Metals, Metalloids, and Non-Metals (<63 µm)																								
Aluminum	mg/kg dw	-	-	20,700	17,400	21,300	***26,200***	20,900	16,600	12,300	14,600	14,800	15,400	19,200	18,200	17,700	18,400	21,000	21,200	19,300	22,500	22,900	22,300	22,900
Antimony	mg/kg dw	-	-	***0.460***	0.270	0.310	0.420	0.300	0.340	0.240	0.310	0.300	0.310	0.340	0.340	0.290	0.310	0.310	0.320	0.290	0.370	0.320	0.350	0.420
Arsenic	mg/kg dw	5.9	17	10.5	9.99	9.90	10.4	11.0	8.78	5.80	9.52	8.03	8.23	10.5	10.9	12.0	9.27	10.4	10.3	11.5	14.1	12.8	12.6	14.1
Barium	mg/kg dw	-	-	168	194	195	***203***	185	129	79.3	116	105	111	162	141	150	142	161	168	161	159	154	156	200
Beryllium	mg/kg dw	-	-	0.480	0.410	0.500	0.620	0.480	0.390	0.290	0.380	0.380	0.420	0.470	0.470	0.440	0.500	0.530	0.510	0.480	0.560	0.530	0.530	0.620
Bismuth	mg/kg dw	-	-	0.110	<0.1	0.110	0.130	0.110	0.100	<0.1	<0.1	<0.1	<0.1	<0.1	0.100	<0.1	<0.1	0.110	0.120	0.120	0.130	0.140	0.120	0.140
Boron	mg/kg dw	-	-	5.40	<5	5.40	<5	<5	5.30	<5	<5	<5	<5	***5.90***	<5	<5	5.20	5.60	5.50	<5	<5	<5	5.40	5.60
Cadmium	mg/kg dw	0.6	3.5	0.508	0.540	0.534	0.523	0.556	0.426	0.165	0.387	0.316	0.351	0.471	0.378	0.431	0.371	0.434	0.586	***0.611***	0.512	0.345	0.446	0.586
Calcium	mg/kg dw	-	-	9,510	9,590	10,000	9,880	10,000	8,850	6,170	7,820	7,950	8,440	9,890	8,450	8,480	8,990	8,930	10,800	9,580	10,600	7,540	9,230	11,000
Chromium	mg/kg dw	37.3	90	67.1	55.1	66.2	***76.7***	69.4	49.5	37.2	47.4	47.3	53.2	58.8	55.2	54.6	58.8	62.6	59.2	52.9	62.4	65.7	62.7	75.8
Cobalt	mg/kg dw	-	-	15.5	15.6	15.8	14.5	18.1	13.0	8.18	12.5	11.9	12.2	14.4	13.5	14.5	14.0	15.6	16.2	15.8	***18.5***	16.4	17.6	18.1
Copper	mg/kg dw	35.7	197	40.1	35.3	42.3	***69.9***	40.5	32.2	20.2	28.2	25.5	27.6	39.6	41.4	35.7	33.7	37.3	48.8	45.3	41.1	39.2	41.3	48.8
Iron	mg/kg dw	21,200	43,766	31,500	28,800	30,900	29,700	32,400	26,400	18,400	26,800	24,700	27,200	30,900	29,200	32,100	30,400	33,100	31,700	32,100	35,200	34,900	35,200	35,200
Lead	mg/kg dw	35	91.3	7.14	5.77	6.84	7.99	6.59	8.14	5.70	6.88	5.90	6.35	6.16	6.41	5.76	6.06	6.94	7.26	6.59	7.74	7.66	7.69	8.14
Lithium	mg/kg dw	-	-	13.9	12.3	14.3	16.4	13.9	12.8	10.4	12.2	11.8	12.8	14.5	15.0	14.1	14.7	16.6	15.4	14.7	16.2	17.6	16.4	17.8
Magnesium	mg/kg dw	-	-	7,850	6,950	7,840	8,640	7,930	6,570	5,210	6,150	6,150	6,460	7,720	7,660	7,190	7,440	8,270	8,480	7,250	***8,930***	8,650	8,500	8,650
Manganese	mg/kg dw	460	1,100	1,530	***3,050***	1,350	1,160	2,710	560	541	852	1,080	1,010	1,390	933	1,080	859	765	1,000	1,120	2,180	1,460	1,070	2,710
Mercury	mg/kg dw	0.17	0.486	0.105	0.0767	0.112	0.125	0.0967	0.0820	0.0530	0.0794	0.0747	0.0866	0.106	0.0875	0.0897	0.0823	0.0913	0.0945	0.0929	0.105	0.0790	0.106	0.125
Molybdenum	mg/kg dw	25	23,000	1.11	1.07	1.52	1.52	1.91	0.670	0.470	0.570	0.560	0.620	0.840	0.620	0.630	0.620	0.660	0.760	0.630	1.02	0.770	0.700	2.39
Nickel	mg/kg dw	16	75	39.5	33.8	39.3	43.2	42.3	28.2	19.0	26.2	25.6	27.2	33.4	32.9	31.3	30.7	34.7	38.4	35.0	39.2	37.8	37.5	43.2
Phosphorus	mg/kg dw	-	-	1,170	1,220	1,300	1,130	1,200	1,060	954	1,010	1,020	1,080	1,070	1,160	1,260	1,160	1,130	1,370	1,220	1,370	1,180	1,370	1,370
Potassium	mg/kg dw	-	-	1,330	1,170	1,450	***1,690***	1,390	1,240	720	1,030	1,000	1,100	1,200	1,190	1,210	1,140	1,360	1,500	1,330	1,380	1,450	1,460	1,500
Selenium	mg/kg dw	2	-	0.630	0.530	0.660	***0.930***	0.570	0.490	0.240	0.370	0.430	0.440	0.580	0.460	0.440	0.420	0.480	0.760	0.610	0.680	0.430	0.680	0.880
Silver	mg/kg dw	0.5	-	0.157	0.153	0.175	***0.212***	0.157	0.159	0.100	0.139	0.124	0.132	0.142	0.137	0.137	0.134	0.152	0.206	0.192	0.196	0.176	0.186	0.206
Sodium	mg/kg dw	-	-	340	244	***358***	247	274	289	200	255	262	269	284	254	272	275	280	298	239	291	266	304	340
Strontium	mg/kg dw	-	-	83.6	83.3	85.5	85.3	87.9	77.1	55.7	68.9	70.5	75.8	77.6	66.8	67.6	71.6	75.4	89.7	79.4	***93.8***	72.0	81.4	89.7
Sulphur[c]	mg/kg dw	-	-	<500	890	<500	620	<500	760	710	690	610	<500	1,130	790	1,160	910	680	1,240	1,060	670	540	520	2,300
Thallium	mg/kg dw	-	-	0.136	0.115	0.138	0.164	0.136	0.128	0.0840	0.107	0.103	0.114	0.125	0.116	0.102	0.111	0.135	0.150	0.131	0.149	0.140	0.146	0.166
Tin	mg/kg dw	-	-	***1.00***	0.330	0.380	0.430	0.360	0.460	0.250	0.330	0.340	0.430	0.510	0.410	0.410	0.500	0.480	0.450	0.410	0.490	0.460	0.460	0.620
Titanium	mg/kg dw	-	-	***754***	460	688	658	623	626	492	588	608	652	684	638	687	686	698	618	553	616	719	690	736
Uranium	mg/kg dw	-	-	1.49	1.22	1.42	***2.41***	1.38	1.48	1.15	1.23	1.19	1.33	1.39	1.32	1.17	1.33	1.57	1.65	1.50	1.71	1.90	1.60	2.15
Vanadium	mg/kg dw	-	-	84.4	69.1	84.5	85.7	80.2	67.1	48.4	64.7	63.6	68.2	81.4	75.1	73.9	80.1	85.9	83.5	73.7	***92.2***	89.2	91.6	91.6
Zinc	mg/kg dw	123	315	88.7	80.0	89.7	94.0	85.6	73.4	45.4	68.3	62.0	67.6	74.7	72.9	75.2	73.5	79.5	***94.3***	82.0	87.4	81.2	88.5	94.0
Zirconium	mg/kg dw	-	-	1.00	1.10	1.20	***1.90***	1.30	1.10	<1	1.00	<1	<1	1.00	1.50	1.00	1.20	1.10	1.60	1.30	1.40	1.10	1.30	1.60

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** : Value is > reference 95th percentile value (<5th percentile value for pH), "-" indicates no current BC Working Sediment Quality Guidelines/ no data. The 95th percentile was calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.4: Baseline and Pre-Breach Sediment Quality Data for the Lower Hazeltine Creek Monitoring Area for Calculation of Pre-Breach 95th Percentile, 1995 to 2012

Analyte	Units	1995 (W11) HKP (1996)						1996 (W11)[a] HKP (1997)						1999 (W11)[b] Beak (2000)		
		Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 1	Rep 2	Rep 3
Physical Tests																
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics																
Gravel (>2 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		***57.0***	
Sand (2.0 mm - 0.063 mm)	%	-	-	-	-	-	-	-	-	-	-	-	-		34.0	
Silt (0.063 mm - 4 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		8.00	
Clay (<4 µm)	%	-	-	-	-	-	-	-	-	-	-	-	-		2.00	
Organic / Inorganic Carbon																
Total Organic Carbon	%	-	-	-	-	-	-	-	-	-	-	-	-		-	
Anions and Nutrients																
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals																
Aluminum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	11,000	9,700	10,000
Antimony	mg/kg dw	0.610	0.650	***1.85***	1.05	0.780	0.720	0.600	0.360	0.630	0.770	***25.4***	0.740	<0.20	<0.20	<0.20
Arsenic	mg/kg dw	9.87	10.9	8.79	8.01	10.0	12.0	4.01	5.29	***12.6***	6.94	***17.2***	9.27	6.50	8.70	6.60
Barium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	98.0	98.0	94.0
Beryllium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.300	0.300	0.300
Bismuth	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	***3.00***	2.70	2.00
Cadmium	mg/kg dw	0.200	<0.10	0.100	<0.10	0.200	<0.10	0.200	0.200	<0.10	<0.10	<0.10	***0.300***	***0.300***	0.200	0.200
Calcium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/kg dw	24.0	22.0	23.0	17.0	32.0	19.0	***112***	31.0	***47.0***	***65.0***	***117***	***49.0***	24.0	21.0	22.0
Cobalt	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	10.0	10.0	10.0
Copper	mg/kg dw	***46.0***	28.0	28.0	26.0	41.0	32.0	***4,080***	***480***	***4,180***	***9,060***	***16,200***	***3,010***	33.0	26.0	27.0
Iron	mg/kg dw	29,700	31,600	34,900	31,100	***37,400***	20,800	18,500	16,900	22,000	20,400	23,100	21,200	20,000	21,000	19,000
Lead	mg/kg dw	4.00	5.00	3.00	3.00	4.00	3.00	***19.0***	5.00	<2.0	***16.0***	***190***	***12.0***	***5.80***	4.90	5.50
Lithium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/kg dw	569	814	930	694	909	657	882	513	668	***1,390***	1,010	634	880	***1,500***	810
Mercury	mg/kg dw	***0.193***	0.0840	0.0330	0.0300	0.0590	0.127	0.0550	0.0290	<0.0050	0.0340	0.0330	0.0240	<0.040	<0.040	<0.040
Molybdenum	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	0.500	0.700	0.500
Nickel	mg/kg dw	13.0	17.0	17.0	15.0	***26.0***	13.0	***52.0***	16.0	23.0	***32.0***	***33.0***	***26.0***	22.0	20.0	21.0
Phosphorus	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/kg dw	0.600	0.200	0.100	0.200	0.300	<0.10	0.200	0.200	0.400	0.800	0.800	0.300	<1.0	<1.0	<1.0
Silver	mg/kg dw	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.100***	<0.10	<0.10
Sodium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	64.0	48.0	60.0
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	<0.20	<0.20	<0.20
Tin	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	1.10	1.10	1.00
Titanium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	310	330	290
Uranium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	***0.800***	0.600	0.600
Vanadium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	37.0	44.0	37.0
Zinc	mg/kg dw	***61.0***	57.0	54.0	44.0	60.0	39.0	***785***	***109***	***1,030***	***2,280***	***4,040***	***690***	49.0	46.0	46.0

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. "-" no data. Sediment metal concentrations are based predominantly on bulk sediment samples, concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. S = spring. F = fall.

[a] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997) and are suspected errors.

[b] Particle fractions for these samples are as follow: gravel (>2 mm), sand (2.0 mm - 0.050 mm), silt (0.050 mm - 0.002 mm), clay (<0.002 mm).

[c] 95th percentile includes all data except those from 1996 (HKP 1997a) due to suspected errors.

Table D.2.4: Baseline and Pre-Breach Sediment Quality Data for the Lower Hazeltine Creek Monitoring Area for Calculation of Pre-Breach 95th Percentile, 1995 to 2012

Analyte	Units	2007 (W11)			2010 (W11)					2012 (W11 mouth)					Pre-Breach 95th Percentile[c]
		Minnow (2009)			Minnow (2011)					Minnow (2013a)					
		LHC-1	LHC-2	LHC-3	LH SED-1	LH SED-2	LH SED-3	LH SED-4	LH SED-5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
Physical Tests															
Moisture	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH (1:2 soil:water)	pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physical Characteristics															
Gravel (>2 mm)	%	1.00	3.00	<1.0	4.68	2.99	17.7	46.5	47.9	-	-	-	-	-	53.4
Sand (2.0 mm - 0.063 mm)	%	72.0	50.0	68.0	***85.1***	72.0	71.0	45.3	46.5	-	-	-	-	-	79.9
Silt (0.063 mm - 4 µm)	%	20.0	***36.0***	24.0	9.31	22.7	9.34	7.58	5.13	-	-	-	-	-	31.2
Clay (<4 µm)	%	7.00	***11.0***	8.00	0.940	2.28	2.06	0.580	0.430	-	-	-	-	-	9.80
Organic / Inorganic Carbon															
Total Organic Carbon	%	3.71	3.19	1.82	0.450	1.31	0.270	0.440	0.330	8.52	***9.80***	4.92	8.39	6.62	9.03
Anions and Nutrients															
Total Nitrogen by LECO	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals, Metalloids, and Non-Metals															
Aluminum	mg/kg dw	***12,800***	12,000	12,300	9,060	9,550	8,320	8,390	8,430	-	-	-	-	-	12,550
Antimony	mg/kg dw	<10.0	<10.0	<10.0	0.280	0.340	0.300	0.290	0.340	-	-	-	-	-	1.33
Arsenic	mg/kg dw	9.20	10.0	12.0	10.9	***12.4***	8.74	8.45	11.5	-	-	-	-	-	12.1
Barium	mg/kg dw	100	***109***	96.7	74.4	74.5	55.5	72.6	56.1	-	-	-	-	-	104
Beryllium	mg/kg dw	<0.50	<0.50	<0.50	0.270	0.300	0.260	0.260	0.270	-	-	-	-	-	0.300
Bismuth	mg/kg dw	<20.0	<20.0	<20.0	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	-	-	<0.20
Boron	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	2.97
Cadmium	mg/kg dw	<0.50	<0.50	<0.50	0.120	0.180	0.110	0.110	0.120	-	-	-	-	-	0.235
Calcium	mg/kg dw	6,850	***7,120***	6,390	5,270	5,780	4,980	5,440	4,780	-	-	-	-	-	7,026
Chromium	mg/kg dw	31.7	31.4	***35.5***	29.0	28.7	29.0	32.5	29.5	-	-	-	-	-	33.1
Cobalt	mg/kg dw	9.70	9.90	***11.8***	8.98	10.2	8.55	8.38	8.80	-	-	-	-	-	11.0
Copper	mg/kg dw	36.8	33.7	30.7	17.9	22.4	17.0	17.6	19.2	-	-	-	-	-	42.0
Iron	mg/kg dw	24,100	25,100	27,500	22,600	25,300	23,200	24,500	23,600	-	-	-	-	-	35,400
Lead	mg/kg dw	<30.0	<30.0	<30.0	4.01	4.87	4.39	4.15	4.54	-	-	-	-	-	5.61
Lithium	mg/kg dw	***13.0***	12.4	12.8	8.40	9.30	8.40	8.20	8.50	-	-	-	-	-	12.9
Magnesium	mg/kg dw	***6,190***	6,050	6,100	5,480	5,790	4,930	5,190	5,780	-	-	-	-	-	6,159
Manganese	mg/kg dw	385	1,020	1,010	605	633	401	537	512	-	-	-	-	-	1,116
Mercury	mg/kg dw	0.0688	0.108	0.0646	<0.050	0.0520	<0.050	<0.050	<0.050	-	-	-	-	-	0.140
Molybdenum	mg/kg dw	<4.0	<4.0	<4.0	0.620	***0.780***	0.590	0.530	0.630	-	-	-	-	-	0.752
Nickel	mg/kg dw	22.2	20.3	22.2	18.3	20.2	18.2	18.9	23.5	-	-	-	-	-	24.0
Phosphorus	mg/kg dw	-	-	-	596	***733***	579	713	654	-	-	-	-	-	729
Potassium	mg/kg dw	***940***	850	800	510	530	450	530	440	-	-	-	-	-	909
Selenium	mg/kg dw	<2.0	<5.0	<2.0	0.240	0.340	<0.20	0.280	0.280	1.28	***1.49***	0.740	1.14	0.970	1.30
Silver	mg/kg dw	<2.0	<2.0	<2.0	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	0.0300
Sodium	mg/kg dw	240	220	240	***260***	200	170	220	210	-	-	-	-	-	253
Strontium	mg/kg dw	***68.1***	66.0	53.3	52.5	56.2	39.9	47.7	41.7	-	-	-	-	-	67.1
Sulphur	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/kg dw	<1.0	<1.0	<1.0	0.0500	***0.0510***	<0.050	<0.050	<0.050	-	-	-	-	-	0.0508
Tin	mg/kg dw	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	1.10
Titanium	mg/kg dw	574	564	621	654	652	664	***737***	574	-	-	-	-	-	701
Uranium	mg/kg dw	-	-	-	0.356	0.570	0.412	0.400	0.375	-	-	-	-	-	0.730
Vanadium	mg/kg dw	61.9	64.3	71.1	65.7	70.9	67.0	***77.9***	69.7	-	-	-	-	-	74.5
Zinc	mg/kg dw	49.3	46.1	47.3	40.0	45.1	39.9	40.1	41.7	-	-	-	-	-	60.2

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/Italics*** indicates value is > reference 95th percentile value (<5th percentile value for pH). Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. "-" no data. Sediment metal concentrations are based predominantly on bulk sediment samples, concentrations reported in 1995 and 1996 were for the silt and clay (< 63 µm) fraction only. S = spring. F = fall.

[a] Some unusually high sediment metal concentrations were reported for 1996 (HKP 1997) and are suspected errors.

[b] Particle fractions for these samples are as follow: gravel (>2 mm), sand (2.0 mm - 0.050 mm), silt (0.050 mm - 0.002 mm), clay (<0.002 mm).

[c] 95th percentile includes all data except those from 1996 (HKP 1997a) due to suspected errors.

Table D.2.5: Sediment Quality Data for the Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Area for Calculation of Reference 95th Percentile, 2018 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2018					2019					2020					2021				
				EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5
		Lower	Upper	16-Aug-18	16-Aug-18	16-Aug-18	15-Aug-18	15-Aug-18	11-Aug-19	11-Aug-19	11-Aug-19	10-Aug-19	9-Aug-19	7-Aug-20	7-Aug-20	7-Aug-20	7-Aug-20	7-Aug-20	30-Jul-21	30-Jul-21	30-Jul-21	30-Jul-21	30-Jul-21
Physical Tests																							
Moisture	%	-	-	27.2	28.7	43.0	48.1	54.6	72.7	67.7	50.5	36.4	70.6	39.2	34.0	34.8	30.0	32.9	65.3	44.9	50.5	42.5	38.7
pH (1:2 soil:water)	pH units	-	-	8.15	7.90	7.88	8.14	7.56	6.74	6.99	7.48	7.52	7.16	7.53	7.67	7.76	7.88	7.52	7.37	7.55	7.83	7.33	7.41
Particle Size																							
Gravel (>2mm)	%	-	-	2.40	1.90	5.60	***10.7***	6.80	<1.0	<1.0	<1.0	<1.0	<1.0	4.20	<1.0	<1.0	1.80	4.30	<1	<1	<1	2.70	<1
Sand (2.0mm - 0.063mm)	%	-	-	***87.7***	83.9	57.6	51.8	62.8	31.9	57.0	46.4	65.0	49.5	66.9	78.0	74.6	79.3	73.8	54.8	65.7	56.2	61.5	52.5
Silt (0.063mm - 4um)	%	-	-	7.30	11.0	31.0	33.1	25.8	***58.3***	35.4	43.8	28.7	41.2	25.3	18.5	21.1	15.7	18.1	38.5	28.8	38.0	29.6	41.9
Clay (<4um)	%	-	-	2.60	3.20	5.80	4.30	4.70	***9.80***	7.20	9.70	5.90	8.40	3.60	3.50	4.10	3.20	3.80	6.30	5.10	5.60	6.20	4.80
Organic / Inorganic Carbon (<63 µm)																							
Total Organic Carbon	%	-	-	3.09	1.56	3.06	2.77	3.76	3.56	2.41	3.42	2.51	3.82	2.90	2.38	2.28	1.92	1.95	3.63	2.49	2.26	2.56	1.15
Nutrients (Bulk sediment)																							
Total Nitrogen	%	-	-	0.0330	0.0370	0.121	0.146	0.0900	0.284	0.116	0.200	0.106	0.237	0.136	0.102	0.106	0.0810	0.0970	0.203	0.113	0.139	0.142	0.111
Metals, Metalloids, and Non-Metals (<63 µm)																							
Aluminum	mg/kg dw	-	-	13,800	14,600	13,900	13,000	15,500	15,700	14,900	15,500	14,900	15,200	12,000	12,700	12,900	11,700	11,300	19,000	16,500	***19,800***	16,700	12,500
Antimony	mg/kg dw	-	-	***0.540***	0.430	0.400	0.320	0.460	0.360	0.400	0.420	0.390	0.380	0.340	0.370	0.360	0.370	0.360	0.330	0.330	0.410	0.350	0.310
Arsenic	mg/kg dw	5.9	17	19.5	***19.8***	15.4	7.57	6.48	11.2	12.9	15.1	12.2	13.4	9.37	12.6	11.9	12.2	12.2	13.0	11.6	17.0	12.0	9.25
Barium	mg/kg dw	-	-	184	***192***	127	104	120	118	129	141	113	122	111	128	119	118	112	177	179	169	137	97.3
Beryllium	mg/kg dw	-	-	***0.510***	0.470	0.380	0.350	0.410	0.400	0.400	0.410	0.430	0.390	0.330	0.360	0.350	0.360	0.350	0.430	0.370	0.480	0.370	0.290
Bismuth	mg/kg dw	-	-	0.130	0.120	0.120	0.110	0.130	0.120	0.140	0.140	0.140	0.130	0.100	0.120	0.110	0.100	0.100	0.130	0.110	0.140	0.110	<0.1
Boron	mg/kg dw	-	-	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<5.0	<5.0	<5.0	<5.0	<5.0	6.40	5.50	6.50	<5.0	<5.0
Cadmium	mg/kg dw	0.6	3.5	0.307	0.318	0.313	0.256	0.175	0.285	0.314	0.328	0.292	0.296	0.236	0.252	0.240	0.231	0.233	0.361	0.292	0.329	0.310	0.190
Calcium	mg/kg dw	-	-	10,100	10,300	8,790	7,320	9,710	9,340	10,100	***11,800***	9,650	9,170	8,390	9,590	8,370	8,280	8,270	9,940	9,010	11,000	8,570	7,860
Chromium	mg/kg dw	37.3	90	44.0	45.5	41.5	40.0	39.6	47.1	49.0	50.6	52.3	43.2	43.2	45.6	43.0	45.9	44.7	60.4	50.9	***67.2***	51.6	47.0
Cobalt	mg/kg dw	-	-	12.2	13.0	11.9	10.5	10.4	13.6	14.1	15.2	13.5	13.4	11.4	12.3	12.2	11.7	12.0	15.5	12.8	***16.2***	13.4	10.1
Copper	mg/kg dw	35.7	197	31.8	32.7	32.3	30.2	43.5	36.4	35.1	36.2	33.8	33.3	24.9	27.3	27.0	25.7	25.6	35.8	31.6	38.1	30.7	25.4
Iron	mg/kg dw	21,200	43,766	29,700	32,100	29,800	25,200	21,400	29,800	31,400	32,800	32,600	30,100	27,200	30,100	29,000	29,300	29,700	33,600	29,800	***38,100***	31,300	27,100
Lead	mg/kg dw	35	91.3	8.27	7.72	7.23	6.53	7.82	7.36	8.21	8.37	7.97	7.35	6.00	6.48	6.55	6.33	6.15	7.76	7.01	***8.62***	6.87	5.72
Lithium	mg/kg dw	-	-	15.9	15.4	15.3	14.1	***17.9***	16.3	16.7	16.5	15.8	15.0	13.2	13.4	13.5	12.9	12.8	16.0	14.0	16.8	13.9	10.0
Magnesium	mg/kg dw	-	-	6,580	6,850	6,810	6,140	6,820	7,150	7,140	7,630	7,160	6,920	5,880	6,360	6,410	6,120	6,060	8,140	7,060	***8,760***	7,220	5,910
Manganese	mg/kg dw	460	1,100	798	870	732	343	255	583	943	1,410	781	1,080	821	771	902	760	777	***1,460***	721	1,210	627	374
Mercury	mg/kg dw	0.17	0.486	0.0891	0.0589	0.0724	0.0633	0.0876	0.0614	0.0610	0.0576	0.0530	0.0623	0.0692	0.0545	0.0626	0.0554	0.0541	0.0628	0.0635	0.0734	0.0636	0.0454
Molybdenum	mg/kg dw	25	23,000	1.51	1.01	0.780	0.420	0.730	1.05	1.09	1.13	0.910	0.690	0.530	0.590	0.690	0.680	0.620	1.27	1.11	***1.62***	0.890	0.800
Nickel	mg/kg dw	16	75	30.7	31.3	29.5	26.7	32.5	35.4	35.8	37.8	33.8	31.7	27.2	28.6	28.9	27.5	28.2	39.9	33.0	***41.7***	32.4	26.1
Phosphorus	mg/kg dw	-	-	1,000	1,140	1,070	1,060	915	1,120	1,070	***1,210***	1,190	1,070	959.0	1,050	964	1,040	1,150	1,180	989	1,170	1,050	1,150
Potassium	mg/kg dw	-	-	1,260	1,240	1,110	890	1,000	1,320	1,240	1,260	980	1,260	1,000	1,020	1,000	960.0	910.0	1,480	1,230	1,500	1,230	860
Selenium	mg/kg dw	2	-	0.760	1.05	0.680	0.510	1.06	0.620	0.550	0.800	0.480	0.600	0.390	0.510	0.470	0.410	0.330	0.620	***4.08***	0.640	0.520	0.340
Silver	mg/kg dw	0.5	-	***0.284***	0.110	0.118	0.102	0.174	0.129	0.139	0.138	0.121	0.123	0.0840	0.0910	0.103	0.0970	0.0900	0.121	0.112	0.142	0.117	0.0780
Sodium	mg/kg dw	-	-	276	295	248	240	204	247	242	260	225	235	275	300	271	256	243	320	359	331	275	231
Strontium	mg/kg dw	-	-	***106***	86.9	80.5	72.2	84.5	71.6	74.8	82.2	72.8	80.4	68.4	73.5	71.9	74.7	71.5	87.9	76.8	105	80.7	65.0
Sulphur[c]	mg/kg dw	-	-	500	<500	500	500	500	1,200	600	900	<500	900	1,560	<500	600	<500	<500	540	<500	<500	<500	<500
Thallium	mg/kg dw	-	-	***0.135***	0.109	0.107	0.095	0.118	0.111	0.116	0.110	0.109	0.107	0.0820	0.0870	0.0890	0.0880	0.0790	0.125	0.101	0.124	0.0930	0.0680
Tin	mg/kg dw	-	-	0.400	0.410	0.360	0.300	0.310	0.410	0.410	0.510	***0.830***	0.540	0.320	0.430	0.320	0.450	0.360	0.360	0.350	0.420	0.310	0.260
Titanium	mg/kg dw	-	-	591	660	594	599	472	673	674	693	702	655	741	711	647	661	657	742	714	900	796	677
Uranium	mg/kg dw	-	-	0.915	0.803	0.839	0.766	***1.56***	0.994	0.986	0.887	1.04	0.946	0.851	0.832	0.816	0.822	0.785	1.02	0.961	1.20	1.08	0.830
Vanadium	mg/kg dw	-	-	70.6	75.7	65.9	59.3	53.3	60.8	63.4	66.2	75.9	61.6	66.0	74.2	66.8	72.4	71.5	71.7	67.7	***85.2***	71.6	67.4
Zinc	mg/kg dw	123	315	61.9	65.0	62.2	56.1	52.5	69.1	70.9	72.7	67.1	68.1	55.1	58.1	58.8	56.0	56.8	82.2	68.8	80.9	70.4	56.6
Zirconium	mg/kg dw	-	-	-	-	-	-	-	-	-	-	-	-	1.40	1.50	1.50	1.50	1.50	1.40	1.40	1.60	1.40	1.60

Value is > BC Lower Working Sediment Quality Guideline.
Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. EDC-REF is the alternate name used the for EDC-D sampling area for HRWG reporting. ***Bold/Italics*** : Value is > reference 95th percentile value (<5th percentile value for pH), "-" indicates no current BC Working Sediment Quality Guidelines/ no data. The 95th percentile was calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.5: Sediment Quality Data for the Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Area for Calculation of Reference 95th Percentile, 2018 to 2024

Analyte	Units	BC Working Sediment Quality Guidelines[a]		2022					2023					2024					95th Percentile (2018 to 2024)[b]
				EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	
		Lower	Upper	3-Aug-22	3-Aug-22	3-Aug-22	3-Aug-22	3-Aug-22	8-Aug-23	7-Aug-23	7-Aug-23	7-Aug-23	7-Aug-23	9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	
Physical Tests																			
Moisture	%	-	-	50.0	52.8	60.6	43.8	59.8	50.7	54.4	51.5	50.1	48.6	65.3	56.3	***76.8***	53.1	53.7	72.7
pH (1:2 soil:water)	pH units	-	-	7.30	7.71	7.87	7.69	6.49	7.45	7.37	7.98	7.14	7.65	6.92	7.15	6.49	7.40	7.73	6.49
Particle Size																			
Gravel (>2mm)	%	-	-	<1	1.20	<1	<1	1.10	5.40	<1	4.80	<1	<1	<1	3.80	1.00	2.30	<1	6.80
Sand (2.0mm - 0.063mm)	%	-	-	59.5	52.7	51.2	70.0	58.1	50.0	33.9	34.5	50.4	53.8	53.8	50.7	34.2	55.1	50.9	83.9
Silt (0.063mm - 4um)	%	-	-	33.5	38.7	40.9	24.1	34.0	36.8	56.8	52.7	42.1	38.7	39.2	39.4	57.2	36.9	42.3	57.2
Clay (<4um)	%	-	-	6.60	7.40	7.00	5.80	6.80	7.80	9.10	8.00	7.20	7.40	6.90	6.10	7.60	5.70	6.80	9.70
Organic / Inorganic Carbon (<63 µm)																			
Total Organic Carbon	%	-	-	3.43	2.84	3.56	3.05	5.29	3.66	3.75	2.30	2.49	2.53	4.63	4.68	***6.58***	4.33	3.59	5.29
Nutrients (Bulk sediment)																			
Total Nitrogen	%	-	-	0.189	0.158	0.210	0.0870	0.206	0.191	0.204	0.170	0.146	0.117	0.242	0.231	***0.388***	0.285	0.220	0.285
Metals, Metalloids, and Non-Metals (<63 µm)																			
Aluminum	mg/kg dw	-	-	13,800	14,600	14,200	13,100	13,600	17,300	16,100	15,700	15,000	14,400	17,200	16,500	18,600	16,500	16,200	19,000
Antimony	mg/kg dw	-	-	0.340	0.330	0.360	0.350	0.320	0.360	0.350	0.300	0.340	0.340	0.350	0.360	0.370	0.350	0.350	0.460
Arsenic	mg/kg dw	5.9	17	9.30	8.39	10.5	11.3	9.49	12.7	12.0	7.33	11.6	15.2	14.5	13.9	11.5	12.1	14.0	19.5
Barium	mg/kg dw	-	-	110	111	118	126	122	142	138	109	128	123	156	172	166	140	137	184
Beryllium	mg/kg dw	-	-	0.350	0.400	0.360	0.370	0.350	0.430	0.390	0.380	0.370	0.350	0.400	0.380	0.410	0.390	0.380	0.480
Bismuth	mg/kg dw	-	-	0.110	0.110	0.110	0.120	0.120	0.120	0.100	<0.1	0.100	0.100	0.130	0.120	0.140	0.120	0.120	0.140
Boron	mg/kg dw	-	-	<5.0	<5.0	5.00	<5.0	<5.0	6.20	6.30	5.10	<5	<5	6.50	***7.00***	6.40	5.70	5.10	6.50
Cadmium	mg/kg dw	0.6	3.5	0.264	0.213	0.265	0.278	0.288	0.295	0.274	0.193	0.275	0.276	0.355	0.352	***0.426***	0.333	0.300	0.361
Calcium	mg/kg dw	-	-	8,300	8,550	8,940	8,700	8,480	9,560	9,260	8,510	8,660	8,530	9,650	9,660	10,000	9,230	9,300	11,000
Chromium	mg/kg dw	37.3	90	42.3	44.8	45.0	43.9	41.1	49.6	46.3	44.9	45.0	46.2	46.7	46.3	48.2	49.0	47.9	60.4
Cobalt	mg/kg dw	-	-	11.4	11.2	12.3	12.1	11.7	13.8	13.0	10.8	12.9	13.1	14.0	13.8	13.7	13.8	13.8	15.5
Copper	mg/kg dw	35.7	197	25.8	29.2	27.3	27.6	31.5	33.3	30.3	26.6	32.0	28.7	40.3	38.0	***48.3***	36.4	34.8	43.5
Iron	mg/kg dw	21,200	43,766	27,100	26,100	29,300	28,900	27,200	33,000	30,900	25,300	30,100	32,600	30,800	30,800	31,600	30,600	31,600	33,600
Lead	mg/kg dw	35	91.3	6.44	7.26	6.73	6.87	6.77	7.20	6.82	6.55	6.76	6.73	7.42	7.12	7.99	7.28	7.35	8.37
Lithium	mg/kg dw	-	-	13.3	15.0	14.0	13.4	13.9	16.8	16.3	15.5	16.1	15.2	15.2	15.0	16.4	15.2	15.7	16.8
Magnesium	mg/kg dw	-	-	6,450	6,880	7,100	6,620	6,760	8,210	7,740	7,260	7,300	7,400	7,900	7,400	8,550	7,620	7,650	8,550
Manganese	mg/kg dw	460	1,100	514	564	1,000	904	541	836	862	443	852	846	974	730	486	786	1,020	1,410
Mercury	mg/kg dw	0.17	0.486	0.0530	0.0689	0.0578	0.0533	0.0661	0.0609	0.0536	0.0507	0.0588	0.0549	0.0594	***0.111***	0.0717	0.0642	0.0598	0.0891
Molybdenum	mg/kg dw	25	23,000	0.600	0.580	0.650	0.540	0.550	0.660	0.620	0.380	0.780	0.530	0.660	0.640	0.890	0.630	0.670	1.51
Nickel	mg/kg dw	16	75	26.9	28.0	28.7	27.9	28.2	33.2	31.5	27.7	30.9	30.4	33.9	32.2	37.1	33.3	32.5	39.9
Phosphorus	mg/kg dw	-	-	930	953	1,050	960	968	1,050	1,090	1,020	1,000	1,080	1,170	1,180	1,150	1,150	1,100	1,190
Potassium	mg/kg dw	-	-	1,120	1,140	1,240	1,110	1,080	1,440	1,360	1,170	1,130	1,040	1,540	1,460	***1,660***	1,350	1,360	1,540
Selenium	mg/kg dw	2	-	0.380	0.490	0.430	0.390	0.540	0.500	0.570	0.370	0.740	0.440	0.750	1.07	0.930	0.650	0.700	1.07
Silver	mg/kg dw	0.5	-	0.0940	0.116	0.107	0.103	0.107	0.109	0.0960	0.0890	0.100	0.0960	0.125	0.120	0.154	0.124	0.124	0.174
Sodium	mg/kg dw	-	-	280	267	290	257	226	311	315	316	264	248	330	***362***	328	312	307	359
Strontium	mg/kg dw	-	-	77.8	87.4	84.9	80.5	75.8	84.2	80.5	79.6	68.5	70.1	89.7	85.0	92.0	85.1	86.7	105
Sulphur[c]	mg/kg dw	-	-	620	530	570	<500	520	760	780	700	***1,850***	1,280	820	690	1,050	780	630	1,560
Thallium	mg/kg dw	-	-	0.0930	0.106	0.0970	0.0920	0.0900	0.103	0.0940	0.0910	0.0870	0.0830	0.118	0.109	0.129	0.111	0.106	0.129
Tin	mg/kg dw	-	-	0.340	0.350	0.410	0.370	0.350	0.590	0.420	0.440	0.400	0.350	0.430	0.430	0.440	0.400	0.410	0.590
Titanium	mg/kg dw	-	-	706	704	766	666	543	824	863	***920***	737	757	732	800	713	737	747	900
Uranium	mg/kg dw	-	-	1.06	1.06	1.03	0.965	0.894	0.969	0.970	0.871	1.08	0.801	1.03	1.00	1.34	0.981	0.919	1.34
Vanadium	mg/kg dw	-	-	63.1	62.3	67.2	68.5	59.2	73.4	68.8	61.7	66.7	68.9	71.3	72.0	69.9	73.5	72.0	75.9
Zinc	mg/kg dw	123	315	59.4	65.0	64.9	62.7	65.5	71.6	68.2	65.5	66.8	64.9	75.8	72.0	***84.1***	74.1	72.6	82.2
Zirconium	mg/kg dw	-	-	1.50	1.90	1.50	1.70	1.60	1.60	1.50	***2.10***	1.60	1.60	1.60	1.60	1.90	1.80	1.60	1.90

Value is > BC Lower Working Sediment Quality Guideline.
Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. EDC-REF is the alternate name used the for EDC-D sampling area for HRWG reporting. ***Bold/Italics*** : Value is > reference 95th percentile value (<5th percentile value for pH), "-" indicates no current BC Working Sediment Quality Guidelines/ no data. The 95th percentile was calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] 5th percentile value for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.6: **Sediment Quality Data for the Upper Edney Creek (EDC-U; Reference) Monitoring Area, 2024**

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile (EDC-U 2018 to 2024)[b]	2024									
					EDC-U-1	EDC-U-2	EDC-U-3	EDC-U-4	EDC-U-5	Mean	Median	Standard Deviation	Minimum	Maximum
		Lower	Upper		11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24					
Physical Tests														
Moisture	%	-	-	79.7	72.6	76.4	59.1	47.0	47.2	60.5	59.1	13.8	47.0	76.4
pH (1:2 soil:water)	pH units	-	-	6.01	6.77	6.03	7.32	7.29	6.46	6.77	6.77	0.551	6.03	7.32
Particle Size														
Gravel (>2mm)	%	-	-	11.3	2.00	<1	<1	2.00	2.20	1.64	2.00	0.0980	<1	2.20
Sand (2.0mm - 0.063mm)	%	-	-	76.2	44.4	20.3	62.9	42.2	65.4	47.0	44.4	18.3	20.3	65.4
Silt (0.063mm - 4um)	%	-	-	59.9	46.1	**68.4**	30.4	42.4	26.4	42.7	42.4	16.5	26.4	**68.4**
Clay (<4um)	%	-	-	16.4	7.50	11.2	6.20	13.4	6.00	8.86	7.50	3.29	6.00	13.4
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	9.96	6.32	7.97	6.35	2.22	6.42	5.86	6.35	2.15	2.22	7.97
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.519	0.471	0.519	0.281	0.182	0.196	0.330	0.281	0.156	0.182	0.519
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	22,900	21,200	19,300	22,500	22,900	22,300	21,640	22,300	1,452	19,300	22,900
Antimony	mg/kg dw	-	-	0.420	0.320	0.290	0.370	0.320	0.350	0.330	0.320	0.0308	0.290	0.370
Arsenic	mg/kg dw	5.9	17	14.1	10.3	11.5	14.1	12.8	12.6	12.3	12.6	1.43	10.3	14.1
Barium	mg/kg dw	-	-	200	168	161	159	154	156	160	159	5.41	154	168
Beryllium	mg/kg dw	-	-	0.620	0.510	0.480	0.560	0.530	0.530	0.522	0.530	0.0295	0.480	0.560
Bismuth	mg/kg dw	-	-	0.140	0.120	0.120	0.130	0.140	0.120	0.126	0.120	0.00894	0.120	0.140
Boron	mg/kg dw	-	-	5.60	5.50	<5	<5	<5	5.40	5.18	<5.2	0.0566	<5	5.50
Cadmium	mg/kg dw	0.6	3.5	0.586	0.586	**0.611**	0.512	0.345	0.446	0.500	0.512	0.108	0.345	**0.611**
Calcium	mg/kg dw	-	-	11,000	10,800	9,580	10,600	7,540	9,230	9,550	9,580	1,305	7,540	10,800
Chromium	mg/kg dw	37.3	90	75.8	59.2	52.9	62.4	65.7	62.7	60.6	62.4	4.87	52.9	65.7
Cobalt	mg/kg dw	-	-	18.1	16.2	15.8	**18.5**	16.4	17.6	16.9	16.4	1.12	15.8	**18.5**
Copper	mg/kg dw	35.7	197	48.8	48.8	45.3	41.1	39.2	41.3	43.1	41.3	3.87	39.2	48.8
Iron	mg/kg dw	21,200	43,766	35,200	31,700	32,100	35,200	34,900	35,200	33,820	34,900	1,763	31,700	35,200
Lead	mg/kg dw	35	91.3	8.14	7.26	6.59	7.74	7.66	7.69	7.39	7.66	0.485	6.59	7.74
Lithium	mg/kg dw	-	-	17.8	15.4	14.7	16.2	17.6	16.4	16.1	16.2	1.09	14.7	17.6
Magnesium	mg/kg dw	-	-	8,650	8,480	7,250	**8,930**	8,650	8,500	8,362	8,500	647	7,250	**8,930**
Manganese	mg/kg dw	460	1,100	2,710	1,000	1,120	2,180	1,460	1,070	1,366	1,120	488	1,000	2,180
Mercury	mg/kg dw	0.17	0.486	0.125	0.0945	0.0929	0.105	0.0790	0.106	0.0955	0.0945	0.0110	0.0790	0.106
Molybdenum	mg/kg dw	25	23,000	2.39	0.760	0.630	1.02	0.770	0.700	0.776	0.760	0.147	0.630	1.02
Nickel	mg/kg dw	16	75	43.2	38.4	35.0	39.2	37.8	37.5	37.6	37.8	1.58	35.0	39.2
Phosphorus	mg/kg dw	-	-	1,370	1,370	1,220	1,370	1,180	1,370	1,302	1,370	94.2	1,180	1,370
Potassium	mg/kg dw	-	-	1,500	1,500	1,330	1,380	1,450	1,460	1,424	1,450	68.0	1,330	1,500
Selenium	mg/kg dw	2	-	0.880	0.760	0.610	0.680	0.430	0.680	0.632	0.680	0.125	0.430	0.760
Silver	mg/kg dw	0.5	-	0.206	0.206	0.192	0.196	0.176	0.186	0.191	0.192	0.0112	0.176	0.206
Sodium	mg/kg dw	-	-	340	298	239	291	266	304	280	291	26.9	239	304
Strontium	mg/kg dw	-	-	89.7	89.7	79.4	**93.8**	72.0	81.4	83.3	81.4	8.63	72.0	**93.8**
Sulphur[c]	mg/kg dw	-	-	2,300	1,240	1,060	670	540	520	806	670	326	520	1,240
Thallium	mg/kg dw	-	-	0.166	0.150	0.131	0.149	0.140	0.146	0.143	0.146	0.00785	0.131	0.150
Tin	mg/kg dw	-	-	0.620	0.450	0.410	0.490	0.460	0.460	0.454	0.460	0.0288	0.410	0.490
Titanium	mg/kg dw	-	-	736	618	553	616	719	690	639	618	65.9	553	719
Uranium	mg/kg dw	-	-	2.15	1.65	1.50	1.71	1.90	1.60	1.67	1.65	0.149	1.50	1.90
Vanadium	mg/kg dw	-	-	91.6	83.5	73.7	**92.2**	89.2	91.6	86.0	89.2	7.71	73.7	**92.2**
Zinc	mg/kg dw	123	315	94.0	**94.3**	82.0	87.4	81.2	88.5	86.7	87.4	5.33	81.2	**94.3**
Zirconium	mg/kg dw	-	-	1.60	1.60	1.30	1.40	1.10	1.30	1.34	1.30	0.182	1.10	1.60

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. ***Bold/ Italics*** **=** value is > reference 95th percentile values (< 5th percentile value for pH). "-" indicates no current BC Working Sediment Guidelines/no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] For calculation of reference 95th percentile values see Appendix Table D.2.3. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.7: Sediment Quality Data for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/ Pre-Breach 95th Percentile[b]		2024									
						HAC-U-1	HAC-U-2	HAC-U-3	HAC-U-4	HAC-U-5	Mean	Median	Standard Deviation	Minimum	Maximum
		Lower	Upper	Reference (Upper Edney Creek; EDC-U 2018 to 2023)	Pre-Breach (HAC-U)	13-Aug-24	13-Aug-24	13-Aug-24	12-Aug-24	13-Aug-24					
Physical Tests															
Moisture	%	-	-	79.7	-	**87.1**	**85.1**	**84.1**	**88.0**	**89.6**	**86.8**	**87.1**	2.21	**84.1**	**89.6**
pH (1:2 soil:water)	pH units	-	-	6.01	-	7.44	7.45	7.34	7.45	7.53	7.44	7.45	0.0676	7.34	7.53
Particle Size															
Gravel (>2mm)	%	-	-	11.3	33.1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
Sand (2.0mm - 0.063mm)	%	-	-	76.2	64.7	5.20	7.40	4.50	5.90	9.40	6.48	5.90	1.95	4.50	9.40
Silt (0.063mm - 4um)	%	-	-	59.9	76.2	75.2	75.8	74.9	72.6	72.4	74.2	74.9	1.57	72.4	75.8
Clay (<4um)	%	-	-	16.4	13.9	**19.6**	**16.8**	**20.6**	**21.2**	**18.2**	**19.3**	**19.6**	1.79	**16.8**	**21.2**
Organic / Inorganic Carbon (<63 µm)[c]															
Total Organic Carbon	%	-	-	9.96	12.8	6.75	5.76	6.07	6.91	6.80	6.46	6.75	0.511	5.76	6.91
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	0.519	-	**0.776**	**0.642**	**0.791**	**0.883**	**0.818**	**0.782**	**0.791**	0.0883	**0.642**	**0.883**
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg dw	-	-	22,900	17,960	19,100	20,800	19,900	16,900	16,600	18,660	19,100	1,847	16,600	20,800
Antimony	mg/kg dw	-	-	0.420	0.370	0.380	**0.430**	0.280	0.380	0.350	0.364	0.380	0.0550	0.280	**0.430**
Arsenic	mg/kg dw	5.9	17	14.1	8.23	8.22	9.78	8.96	9.11	8.60	8.93	8.96	0.585	8.22	9.78
Barium	mg/kg dw	-	-	200	136	**277**	**330**	**293**	**367**	**301**	**314**	**301**	35.5	**277**	**367**
Beryllium	mg/kg dw	-	-	0.620	0.460	0.570	0.580	0.580	0.520	0.500	0.550	0.570	0.0374	0.500	0.580
Bismuth	mg/kg dw	-	-	0.140	<0.20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1
Boron	mg/kg dw	-	-	5.60	5.40	**17.8**	**15.7**	**15.2**	**21.7**	**24.6**	**19.0**	**17.8**	4.04	**15.2**	**24.6**
Cadmium	mg/kg dw	0.6	3.5	0.586	0.354	0.572	0.547	0.526	0.574	0.508	0.545	0.547	0.0287	0.508	0.574
Calcium	mg/kg dw	-	-	11,000	13,395	**26,800**	**26,300**	**22,400**	**34,300**	**34,600**	**28,880**	**26,800**	5,363	**22,400**	**34,600**
Chromium	mg/kg dw	37.3	90	75.8	40.05	27.7	35.9	24.0	24.0	24.7	27.3	24.7	5.07	24.0	35.9
Cobalt	mg/kg dw	-	-	18.1	10.4	17.0	**18.2**	17.3	16.6	15.1	16.8	17.0	1.14	15.1	**18.2**
Copper	mg/kg dw	35.7	197	48.8	94.6	**549**	**528**	**542**	**506**	**482**	**521**	**528**	27.5	**482**	**549**
Iron	mg/kg dw	21,200	43,766	35,200	29,900	**36,400**	**40,000**	**36,400**	32,300	33,200	**35,660**	**36,400**	3,053	32,300	**40,000**
Lead	mg/kg dw	35	91.3	8.14	6.70	6.34	6.77	6.41	6.07	5.81	6.28	6.34	0.362	5.81	6.77
Lithium	mg/kg dw	-	-	17.8	14.8	14.1	15.0	14.8	12.7	12.1	13.7	14.1	1.29	12.1	15.0
Magnesium	mg/kg dw	-	-	8,650	6,430	**10,200**	**10,800**	**10,600**	**9,410**	**8,930**	**9,988**	**10,200**	796	**8,930**	**10,800**
Manganese	mg/kg dw	460	1,100	2,710	1,345	2,040	2,550	2,450	**7,290**	**4,560**	**3,778**	2,550	2,193	2,040	**7,290**
Mercury	mg/kg dw	0.17	0.486	0.125	0.145	0.130	0.0828	0.0836	0.128	0.0998	0.105	0.0998	0.0231	0.0828	0.130
Molybdenum	mg/kg dw	25	23,000	2.39	1.50	**4.96**	**6.72**	**5.48**	**5.25**	**5.62**	**5.61**	**5.48**	0.671	**4.96**	**6.72**
Nickel	mg/kg dw	16	75	43.2	24.4	28.4	32.5	28.4	25.6	24.6	27.9	28.4	3.08	24.6	32.5
Phosphorus	mg/kg dw	-	-	1,370	1,375	**1,620**	**1,660**	**1,700**	**1,710**	**1,680**	**1,674**	**1,680**	35.8	**1,620**	**1,710**
Potassium	mg/kg dw	-	-	1,500	1,445	1,450	**1,580**	1,500	1,430	1,410	1,474	1,450	68.0	1,410	**1,580**
Selenium	mg/kg dw	2	-	0.880	3.32	**7.91**	**7.20**	**7.66**	**8.08**	**8.51**	**7.87**	**7.91**	0.487	**7.20**	**8.51**
Silver	mg/kg dw	0.5	-	0.206	0.16	**0.232**	**0.228**	**0.234**	**0.215**	0.203	**0.222**	**0.228**	0.0131	0.203	**0.234**
Sodium	mg/kg dw	-	-	340	350	**553**	**576**	**536**	**537**	**546**	**550**	**546**	16.3	**536**	**576**
Strontium	mg/kg dw	-	-	89.7	118	**154**	**156**	**144**	**163**	**163**	**156**	**156**	7.84	**144**	**163**
Sulphur[d]	mg/kg dw	-	-	2,300	-	**5,830**	**4,440**	**5,110**	**4,190**	**4,020**	**4,718**	**4,440**	747	**4,020**	**5,830**
Thallium	mg/kg dw	-	-	0.166	0.0941	0.0580	0.0580	0.0560	<0.05	0.0500	0.0544	0.0560	0.00423	<0.05	0.0580
Tin	mg/kg dw	-	-	0.620	<2.0	**0.810**	**0.840**	**0.730**	0.620	**0.700**	**0.740**	**0.730**	0.0880	0.620	**0.840**
Titanium	mg/kg dw	-	-	736	776	**828**	**998**	762	674	707	**794**	762	128	674	**998**
Uranium	mg/kg dw	-	-	2.15	1.26	0.867	0.955	0.972	0.799	0.966	0.912	0.955	0.0761	0.799	0.972
Vanadium	mg/kg dw	-	-	91.6	65.3	**109**	**129**	**108**	**96.2**	**100**	**108**	**108**	12.7	**96.2**	**129**
Zinc	mg/kg dw	123	315	94.0	67.6	**113**	93.6	87.3	77.7	**98.8**	**94.1**	93.6	13.2	77.7	**113**
Zirconium	mg/kg dw	-	-	1.60	-	**2.50**	**3.20**	**2.90**	1.60	**1.90**	**2.42**	**2.50**	0.669	1.60	**3.20**

Value is > BC Lower Working Sediment Quality Guideline.

Value is > BC Upper Working Sediment Quality Guideline.

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2 is the alternate area identifier for HAC-U in the HRWG report. ***Bold/ Italics*** **=** value is > reference 95th percentile values (< 5th percentile value for pH). "-" indicates no current BC Working Sediment Guidelines/no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] Pre-breach values that were reported as < the laboratory reporting limit were not used for screening. For calculation of pre-breach 95th percentile values see Appendix Table D.2.2. For calculation of reference 95th percentile values see Appendix Table D.2.3. Pre-breach sediment metal concentrations are based predominantly on bulk sediment rather than the fines fraction (<63 µm). The 5th percentile is reported for pH.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Tables D.2.2).

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.8: **Sediment Quality Data for the Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Area, 2024**

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference 95th Percentile (EDC-D 2018 to 2024)[b]	2024									
					EDC-D-1	EDC-D-2	EDC-D-3	EDC-D-4	EDC-D-5	Mean	Median	Standard Deviation	Minimum	Maximum
		Lower	Upper		9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24					
Physical Tests														
Moisture	%	-	-	72.7	65.3	56.3	**76.8**	53.1	53.7	61.0	56.3	10.1	53.1	**76.8**
pH (1:2 soil:water)	pH units	-	-	6.49	6.92	7.15	6.49	7.40	7.73	7.14	7.15	0.471	6.49	7.73
Particle Size														
Gravel (>2mm)	%	-	-	6.80	<1	3.80	1.00	2.30	<1	1.82	1.00	1.36	<1	3.80
Sand (2.0mm - 0.063mm)	%	-	-	83.9	53.8	50.7	34.2	55.1	50.9	48.9	50.9	8.45	34.2	55.1
Silt (0.063mm - 4um)	%	-	-	57.2	39.2	39.4	57.2	36.9	42.3	43.0	39.4	8.17	36.9	57.2
Clay (<4um)	%	-	-	9.70	6.90	6.10	7.60	5.70	6.80	6.62	6.80	0.740	5.70	7.60
Organic / Inorganic Carbon (<63 µm)														
Total Organic Carbon	%	-	-	5.29	4.63	4.68	**6.58**	4.33	3.59	4.76	4.63	1.11	3.59	**6.58**
Nutrients (Bulk sediment)														
Total Nitrogen	%	-	-	0.285	0.242	0.231	**0.388**	0.285	0.220	0.273	0.242	0.0687	0.220	**0.388**
Metals, Metalloids, and Non-Metals (<63 µm)														
Aluminum	mg/kg dw	-	-	19,000	17,200	16,500	18,600	16,500	16,200	17,000	16,500	967	16,200	18,600
Antimony	mg/kg dw	-	-	0.460	0.350	0.360	0.370	0.350	0.350	0.356	0.350	0.00894	0.350	0.370
Arsenic	mg/kg dw	5.9	17	19.5	14.5	13.9	11.5	12.1	14.0	13.2	13.9	1.32	11.5	14.5
Barium	mg/kg dw	-	-	184	156	172	166	140	137	154	156	15.5	137	172
Beryllium	mg/kg dw	-	-	0.480	0.400	0.380	0.410	0.390	0.380	0.392	0.390	0.0130	0.380	0.410
Bismuth	mg/kg dw	-	-	0.140	0.130	0.120	0.140	0.120	0.120	0.126	0.120	0.00894	0.120	0.140
Boron	mg/kg dw	-	-	6.50	6.50	**7.00**	6.40	5.70	5.10	6.14	6.40	0.744	5.10	**7.00**
Cadmium	mg/kg dw	0.6	3.5	0.361	0.355	0.352	**0.426**	0.333	0.300	0.353	0.352	0.0462	0.300	**0.426**
Calcium	mg/kg dw	-	-	11,000	9,650	9,660	10,000	9,230	9,300	9,568	9,650	311	9,230	10,000
Chromium	mg/kg dw	37.3	90	60.4	46.7	46.3	48.2	49.0	47.9	47.6	47.9	1.11	46.3	49.0
Cobalt	mg/kg dw	-	-	15.5	14.0	13.8	13.7	13.8	13.8	13.8	13.8	0.110	13.7	14.0
Copper	mg/kg dw	35.7	197	43.5	40.3	38.0	**48.3**	36.4	34.8	39.6	38.0	5.29	34.8	**48.3**
Iron	mg/kg dw	21,200	43,766	33,600	30,800	30,800	31,600	30,600	31,600	31,080	30,800	482	30,600	31,600
Lead	mg/kg dw	35	91.3	8.37	7.42	7.12	7.99	7.28	7.35	7.43	7.35	0.331	7.12	7.99
Lithium	mg/kg dw	-	-	16.8	15.2	15.0	16.4	15.2	15.7	15.5	15.2	0.566	15.0	16.4
Magnesium	mg/kg dw	-	-	8,550	7,900	7,400	8,550	7,620	7,650	7,824	7,650	443	7,400	8,550
Manganese	mg/kg dw	460	1,100	1,410	974	730	486	786	1,020	799	786	214	486	1,020
Mercury	mg/kg dw	0.17	0.486	0.0891	0.0594	**0.111**	0.0717	0.0642	0.0598	0.0732	0.0642	0.0217	0.0594	**0.111**
Molybdenum	mg/kg dw	25	23,000	1.51	0.660	0.640	0.890	0.630	0.670	0.698	0.660	0.108	0.630	0.890
Nickel	mg/kg dw	16	75	39.9	33.9	32.2	37.1	33.3	32.5	33.8	33.3	1.96	32.2	37.1
Phosphorus	mg/kg dw	-	-	1,190	1,170	1,180	1,150	1,150	1,100	1,150	1,150	30.8	1,100	1,180
Potassium	mg/kg dw	-	-	1,540	1,540	1,460	**1,660**	1,350	1,360	1,474	1,460	130	1,350	**1,660**
Selenium	mg/kg dw	2	-	1.07	0.750	1.07	0.930	0.650	0.700	0.820	0.750	0.175	0.650	1.07
Silver	mg/kg dw	0.5	-	0.174	0.125	0.120	0.154	0.124	0.124	0.129	0.124	0.0139	0.120	0.154
Sodium	mg/kg dw	-	-	359	330	**362**	328	312	307	328	328	21.5	307	**362**
Strontium	mg/kg dw	-	-	105	89.7	85.0	92.0	85.1	86.7	87.7	86.7	3.06	85.0	92.0
Sulphur[c]	mg/kg dw	-	-	1,560	820	690	1,050	780	630	794	780	161	630	1,050
Thallium	mg/kg dw	-	-	0.129	0.118	0.109	0.129	0.111	0.106	0.115	0.111	0.00918	0.106	0.129
Tin	mg/kg dw	-	-	0.590	0.430	0.430	0.440	0.400	0.410	0.422	0.430	0.0164	0.400	0.440
Titanium	mg/kg dw	-	-	900	732	800	713	737	747	746	737	32.7	713	800
Uranium	mg/kg dw	-	-	1.34	1.03	1.00	1.34	0.981	0.919	1.05	1.00	0.165	0.919	1.34
Vanadium	mg/kg dw	-	-	75.9	71.3	72.0	69.9	73.5	72.0	71.7	72.0	1.30	69.9	73.5
Zinc	mg/kg dw	123	315	82.2	75.8	72.0	**84.1**	74.1	72.6	75.7	74.1	4.91	72.0	**84.1**
Zirconium	mg/kg dw	-	-	1.90	1.60	1.60	1.90	1.80	1.60	1.70	1.60	0.141	1.60	1.90

Value is > BC Working Sediment Quality Guideline Effect Lower Level.

Value is > BC Working Sediment Quality Guideline Effect Upper Level.

Notes: mg/kg dw = milligrams per kilogram dry weight. EDC-REF is the alternate name used the for EDC-D sampling area for HRWG reporting. ***Bold/ Italics*** **=** value is > reference 95th percentile values (< 5th percentile value for pH). **"-"** indicates no current BC Working Sediment Guidelines/no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] For calculation of reference 95th percentile values see Appendix Table D.2.5. The 5th percentile is reported for pH.

[c] Total sulphur measured in bulk sediment, not the <63 µm fraction.

Table D.2.9: Sediment Quality Data for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) Monitoring Area, 2024

Parameter	Units	BC Working Sediment Quality Guidelines[a]		Reference/ Pre-Breach 95th Percentile[b]		2024									
						HAC-D-1	HAC-D-2	HAC-D-3	HAC-D-4	HAC-D-5	Mean	Median	Standard Deviation	Minimum	Maximum
		Lower	Upper	Reference (Lower Edney Creek; EDC-D 2018 to 2024)	Pre-Breach (HAC-D)	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24					
Physical Tests															
Moisture	%	-	-	72.7	-	58.8	64.0	64.4	64.8	71.9	64.8	64.4	4.67	58.8	71.9
pH (1:2 soil:water)	pH units	-	-	6.49	-	7.63	7.69	7.58	7.56	7.36	7.56	7.58	0.125	7.36	7.69
Particle Size															
Gravel (>2mm)	%	-	-	6.80	53.4	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
Sand (2.0mm - 0.063mm)	%	-	-	83.9	79.9	35.9	9.30	10.8	9.10	3.70	13.8	9.30	12.7	3.70	35.9
Silt (0.063mm - 4um)	%	-	-	57.2	31.2	49.0	**75.1**	**74.5**	**76.8**	**78.9**	**70.9**	**75.1**	12.3	49.0	**78.9**
Clay (<4um)	%	-	-	9.70	9.80	**15.1**	**15.6**	**14.6**	**14.1**	**17.3**	**15.3**	**15.1**	1.23	**14.1**	**17.3**
Organic / Inorganic Carbon (<63 µm)															
Total Organic Carbon	%	-	-	5.29	9.03	1.69	1.95	1.98	2.12	2.30	2.01	1.98	0.225	1.69	2.30
Nutrients (Bulk sediment)															
Total Nitrogen	%	-	-	0.285	-	0.168	0.236	0.259	0.270	**0.344**	0.255	0.259	0.0634	0.168	**0.344**
Metals, Metalloids, and Non-Metals (<63 µm)[c]															
Aluminum	mg/kg dw	-	-	19,000	12,550	18,000	18,500	18,300	**22,200**	**24,000**	**20,200**	18,500	2,729	18,000	**24,000**
Antimony	mg/kg dw	-	-	0.460	1.33	0.560	0.540	0.500	0.570	0.660	0.566	0.560	0.0590	0.500	0.660
Arsenic	mg/kg dw	5.9	17	19.5	12.1	**43.7**	**25.2**	**21.8**	**23.0**	**24.7**	**27.7**	**24.7**	9.06	**21.8**	**43.7**
Barium	mg/kg dw	-	-	184	104	**201**	**224**	**206**	**249**	**297**	**235**	**224**	39.2	**201**	**297**
Beryllium	mg/kg dw	-	-	0.480	0.300	**0.600**	**0.620**	**0.600**	**0.660**	**0.720**	**0.640**	**0.620**	0.0510	**0.600**	**0.720**
Bismuth	mg/kg dw	-	-	0.140	<0.20	0.190	0.200	0.180	0.190	0.200	0.192	0.190	0.00837	0.180	0.200
Boron	mg/kg dw	-	-	6.50	2.97	**9.00**	**10.6**	**10.1**	**13.0**	**12.6**	**11.1**	**10.6**	1.70	**9.00**	**13.0**
Cadmium	mg/kg dw	0.6	3.5	0.361	0.235	**0.437**	**0.412**	0.354	**0.406**	**0.471**	**0.416**	**0.412**	0.0431	0.354	**0.471**
Calcium	mg/kg dw	-	-	11,000	7,026	**18,600**	**20,700**	**21,300**	**20,800**	**20,100**	**20,300**	**20,700**	1,042	**18,600**	**21,300**
Chromium	mg/kg dw	37.3	90	60.4	33.1	37.5	37.4	36.0	41.2	45.1	39.4	37.5	3.70	36.0	45.1
Cobalt	mg/kg dw	-	-	15.5	11.0	**17.4**	**16.5**	15.4	**17.7**	**19.2**	**17.2**	**17.4**	1.42	15.4	**19.2**
Copper	mg/kg dw	35.7	197	43.5	42.0	**227**	**286**	**278**	**378**	**342**	**302**	**286**	58.8	**227**	**378**
Iron	mg/kg dw	21,200	43,766	33,600	35,400	**38,400**	**39,200**	**38,000**	**43,800**	**43,800**	**40,640**	**39,200**	2,917	**38,000**	**43,800**
Lead	mg/kg dw	35	91.3	8.37	5.61	**11.5**	**12.2**	**10.6**	**11.4**	**11.9**	**11.5**	**11.5**	0.606	**10.6**	**12.2**
Lithium	mg/kg dw	-	-	16.8	12.9	14.9	15.7	15.5	**17.6**	**20.4**	16.8	15.7	2.24	14.9	**20.4**
Magnesium	mg/kg dw	-	-	8,550	6,159	**8,970**	**9,230**	**8,820**	**9,970**	**11,100**	**9,618**	**9,230**	939	**8,820**	**11,100**
Manganese	mg/kg dw	460	1,100	1,410	1,116	903	852	821	1,120	**2,700**	1,279	903	803	821	**2,700**
Mercury	mg/kg dw	0.17	0.486	0.0891	0.140	0.0883	0.102	0.106	0.110	**0.146**	0.110	0.106	0.0215	0.0883	**0.146**
Molybdenum	mg/kg dw	25	23,000	1.51	0.752	1.40	1.34	**1.62**	**1.65**	**2.51**	**1.70**	**1.62**	0.470	1.34	**2.51**
Nickel	mg/kg dw	16	75	39.9	24.0	37.3	34.3	32.2	34.9	**40.9**	35.9	34.9	3.32	32.2	**40.9**
Phosphorus	mg/kg dw	-	-	1,190	729	1,190	**1,210**	**1,210**	**1,460**	**1,420**	**1,298**	**1,210**	131	1,190	**1,460**
Potassium	mg/kg dw	-	-	1,540	909	**1,910**	**1,990**	**1,890**	**2,160**	**2,410**	**2,072**	**1,990**	217	**1,890**	**2,410**
Selenium	mg/kg dw	2	-	1.07	1.30	**1.67**	**1.96**	**1.99**	**2.83**	**3.46**	**2.38**	**1.99**	0.742	**1.67**	**3.46**
Silver	mg/kg dw	0.5	-	0.174	0.0300	**0.185**	**0.208**	**0.179**	**0.225**	**0.220**	**0.203**	**0.208**	0.0206	**0.179**	**0.225**
Sodium	mg/kg dw	-	-	359	253	325	355	341	**387**	**440**	**370**	355	45.5	325	**440**
Strontium	mg/kg dw	-	-	105	67.1	**167**	**190**	**172**	**189**	**184**	**180**	**184**	10.4	**167**	**190**
Sulphur[d]	mg/kg dw	-	-	1,560	-	1,150	1,510	1,430	1,370	**1,640**	1,420	1,430	182	1,150	**1,640**
Thallium	mg/kg dw	-	-	0.129	0.0508	**0.242**	**0.220**	**0.188**	**0.195**	**0.218**	**0.213**	**0.218**	0.0216	**0.188**	**0.242**
Tin	mg/kg dw	-	-	0.590	1.10	0.610	0.670	0.640	0.770	0.750	0.688	0.670	0.0694	0.610	0.770
Titanium	mg/kg dw	-	-	900	701	632	751	752	**1,020**	**982**	827	752	166	632	**1,020**
Uranium	mg/kg dw	-	-	1.34	0.730	1.10	1.20	1.12	1.19	1.30	1.18	1.19	0.0789	1.10	1.30
Vanadium	mg/kg dw	-	-	75.9	74.5	**99.8**	**102**	**97.7**	**122**	**108**	**106**	**102**	9.79	**97.7**	**122**
Zinc	mg/kg dw	123	315	82.2	60.2	**94.4**	**95.3**	**86.6**	**102**	**108**	**97.3**	**95.3**	8.12	**86.6**	**108**
Zirconium	mg/kg dw	-	-	1.90	-	**2.50**	**2.70**	**2.50**	**3.00**	**2.50**	**2.64**	**2.50**	0.219	**2.50**	**3.00**

Value is > BC Working Sediment Quality Guideline Effect Lower Level.
Value is > BC Working Sediment Quality Guideline Effect Upper Level.

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R5 is the alternate name used the for HAC-D sampling area for HRWG reporting.. ***Bold/ Italics*** **=** value is > reference 95th percentile values (< 5th percentile value for pH). "-" indicates no current BC Working Sediment Guidelines/no data. All summary statistics were calculated to 3 significant figures.

[a] British Columbia Working Sediment Guidelines (BCMOWLRS 2024) and approved BC Sediment Quality Guideline for Selenium (BCMOWLRS 2025).

[b] For calculation of pre-breach 95th percentile values see Appendix Table D.2.4. For calculation of reference 95th percentile values see Appendix Table D.2.5. Pre-breach sediment metal concentrations are based predominantly on bulk sediment rather than the fines fraction (<63 µm). The 5th percentile is reported for pH.

[c] Total Organic Carbon (TOC) and metals data are presented for the <63 µm sediment fraction for post-breach (2014 to 2024) data only. TOC and metals data presented for pre-breach results represent bulk sediment samples (see Appendix Table D.2.4)

[d] Total sulphur measured in bulk sediment, not the <63 µm fraction.

APPENDIX D.3
PERIPHYTON COMMUNITY AND PRODUCTIVITY

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Density (cells/cm²)	Total Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	Diatoms Richness (# of Diatom Taxa)	Diatoms (cells/cm²)	Chlorophytes (cells/cm²)	Chrysophytes (cells/cm²)	Cyanobacteria (cells/cm²)	Dinoflagellates (cells/cm²)
1995	EDC-U (W9)[a]	Reference (Baseline)	W9-1	-	37	-	-	23	-	-	-	-	-
			W9-2	-	35	-	-	21	-	-	-	-	-
			W9-3	-	34	-	-	20	-	-	-	-	-
	HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	W7-A	-	12	-	-	15	-	-	-	-	-
			W7-B	-	23	-	-	18	-	-	-	-	-
			W7-C	-	17	-	-	11	-	-	-	-	-
1996	EDC-U (W9)[a]	Reference (Baseline)	W9-A	-	40	-	-	27	-	-	-	-	-
			W9-B	-	36	-	-	27	-	-	-	-	-
			W9-C	-	45	-	-	29	-	-	-	-	-
	HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	W7-1	-	28	-	-	23	-	-	-	-	-
			W7-2	-	32	-	-	21	-	-	-	-	-
			W7-3	-	27	-	-	20	-	-	-	-	-
2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	W7	21,200,428	34	-	-	22	52,079	10,691	-	21,108,545	0
2017	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
	HAC-R1	Exposed	HAC-R1-1	-	-	-	-	-	-	-	-	-	-
			HAC-R1-2	-	-	-	-	-	-	-	-	-	-
			HAC-R1-3	-	-	-	-	-	-	-	-	-	-
			HAC-R1-4	-	-	-	-	-	-	-	-	-	-
			HAC-R1-5	-	-	-	-	-	-	-	-	-	-
2018	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	1,055,389	27	0.247	0.850	13	112,365	28,552	-	909,867	0
			EDC-U-2	1,021,188	33	0.255	0.881	18	139,996	54,341	-	822,246	0
			EDC-U-3	889,906	28	0.194	0.816	14	93,777	20,765	-	770,005	0
			EDC-U-4	1,616,699	28	0.194	0.816	14	197,468	50,104	-	1,357,338	0
			EDC-U-5	1,108,844	28	0.148	0.759	17	109,786	13,263	-	982,110	0
	HAC-R1	Exposed	HAC-R1-1	1,107,074	23	0.214	0.797	14	383,147	112,365	-	604,193	0
			HAC-R1-2	992,498	22	0.234	0.806	14	565,879	110,523	-	309,465	0
			HAC-R1-3	915,040	29	0.263	0.869	16	419,988	40,525	-	412,159	29,473
			HAC-R1-4	990,411	29	0.265	0.870	18	486,302	27,631	-	474,636	0
			HAC-R1-5	637,877	27	0.440	0.916	16	416,830	44,209	-	176,837	0
	HAC-U (HAC-R2)[b]		HAC-U-1	1,031,550	21	0.246	0.806	16	930,237	70,612	-	24,561	0
			HAC-U-2	908,746	19	0.287	0.816	13	692,612	58,946	-	154,732	0
			HAC-U-3	1,547,325	16	0.204	0.694	10	1,394,697	78,945	-	73,682	0
			HAC-U-4	923,483	20	0.207	0.758	14	857,169	31,929	-	34,385	0
			HAC-U-5	565,964	22	0.306	0.852	13	371,614	148,966	-	43,782	0

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Density (cells/cm²)	Total Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	Diatoms Richness (# of Diatom Taxa)	Diatoms (cells/cm²)	Chlorophytes (cells/cm²)	Chrysophytes (cells/cm²)	Cyanobacteria (cells/cm²)	Dinoflagellates (cells/cm²)
2019	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	1,207,383	28	0.269	0.867	14	50,640	13,598	0	1,121,577	0
			EDC-U-2	589,659	32	0.225	0.861	20	98,052	4,551	0	487,056	0
			EDC-U-3	88,329	22	0.241	0.811	13	7,207	3,821	0	68,010	0
			EDC-U-4	1,084,694	26	0.0667	0.424	16	27,216	8,256	0	1,046,164	0
			EDC-U-5	280,674	33	0.284	0.893	17	32,001	8,088	0	200,846	0
	HAC-R1	Exposed	HAC-R1-1	251,352	26	0.116	0.669	16	16,591	1,443	721	215,284	0
			HAC-R1-2	237,397	30	0.192	0.826	20	26,185	1,082	649	186,974	0
			HAC-R1-3	185,009	28	0.133	0.731	18	51,243	2,813	603	118,293	0
			HAC-R1-4	159,086	27	0.192	0.807	17	32,056	0	406	118,509	0
			HAC-R1-5	742,283	27	0.0767	0.517	14	20,439	1,803	601	683,973	0
	HAC-U (HAC-R2)[b]		HAC-U-1	347,921	30	0.403	0.917	15	122,935	40,190	1,182	147,561	0
			HAC-U-2	1,157,479	25	0.0828	0.517	15	121,576	126,599	0	854,043	0
			HAC-U-3	1,771,522	27	0.0566	0.346	15	192,449	42,509	0	1,496,373	0
			HAC-U-4	426,184	31	0.136	0.762	16	84,902	23,612	0	317,670	0
			HAC-U-5	483,442	25	0.194	0.794	16	188,585	28,597	0	266,260	0
2020	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	540,622	26	0.120	0.679	14	9,785	11,009	0	512,285	0
			EDC-U-2	1,608,224	11	0.191	0.524	3	2,679	0	0	1,590,138	0
			EDC-U-3	2,082,852	9	0.202	0.450	2	4,689	11,387	0	2,060,077	0
			EDC-U-4	644,856	21	0.205	0.767	6	3,517	8,206	0	612,269	0
			EDC-U-5	250,654	11	0.199	0.544	5	4,995	204	0	244,945	0
	HAC-R1	Exposed	HAC-R1-1	1,085,911	29	0.112	0.692	19	110,774	36,925	0	859,088	0
			HAC-R1-2	1,125,327	29	0.113	0.695	19	203,966	23,913	0	728,649	0
			HAC-R1-3	1,343,828	22	0.201	0.774	13	88,620	18,287	0	1,006,230	0
			HAC-R1-4	646,960	20	0.410	0.878	11	73,850	3,517	0	421,016	0
			HAC-R1-5	1,928,410	19	0.231	0.772	9	66,113	8,440	0	1,663,958	0
	HAC-U (HAC-R2)[b]		HAC-U-1	939,866	24	0.331	0.874	14	221,046	7,536	0	509,076	0
			HAC-U-2	353,842	17	0.270	0.782	12	146,694	0	0	142,843	0
			HAC-U-3	1,264,235	24	0.280	0.851	17	334,081	0	0	705,088	0
			HAC-U-4	662,888	26	0.343	0.888	17	276,057	70,333	0	137,149	0
			HAC-U-5	784,377	26	0.290	0.868	16	185,723	9,891	0	482,165	0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	-
			HAC-R3-2	-	-	-	-	-	-	-	-	-	-
			HAC-R3-3	-	-	-	-	-	-	-	-	-	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	-

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Density (cells/cm²)	Total Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	Diatoms Richness (# of Diatom Taxa)	Diatoms (cells/cm²)	Chlorophytes (cells/cm²)	Chrysophytes (cells/cm²)	Cyanobacteria (cells/cm²)	Dinoflagellates (cells/cm²)
2021	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	1,486,106	24	0.160	0.740	16	77,132	2,624	0	1,406,351	0
			EDC-U-2	794,143	21	0.105	0.546	9	24,136	7,346	0	682,380	0
			EDC-U-3	103,781	41	0.167	0.854	22	13,038	10,266	0	79,862	0
			EDC-U-4	342,829	26	0.182	0.789	14	28,890	3,611	0	280,883	0
			EDC-U-5	507,750	27	0.127	0.709	16	38,057	9,167	0	455,527	0
	HAC-R1	Exposed	HAC-R1-1	1,091,336	16	0.0948	0.340	10	5,431	11,334	0	1,061,113	0
			HAC-R1-2	721,023	19	0.0973	0.459	11	8,889	23,334	0	679,355	0
			HAC-R1-3	246,090	16	0.239	0.739	7	5,833	23,334	0	177,755	0
			HAC-R1-4	305,564	22	0.144	0.684	16	23,612	19,723	0	236,673	0
			HAC-R1-5	747,243	19	0.0751	0.299	13	25,556	27,779	0	689,742	0
	HAC-U (HAC-R2)[b]		HAC-U-1	328,354	20	0.332	0.849	13	86,576	87,364	0	89,088	0
			HAC-U-2	383,656	26	0.360	0.893	15	145,606	14,167	0	149,900	0
			HAC-U-3	474,484	13	0.404	0.810	8	194,516	61,840	0	143,919	0
			HAC-U-4	317,353	27	0.311	0.881	17	73,084	23,050	0	145,325	0
			HAC-U-5	432,704	18	0.244	0.772	8	20,070	36,992	0	335,108	0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	-
			HAC-R3-2	-	-	-	-	-	-	-	-	-	-
			HAC-R3-3	-	-	-	-	-	-	-	-	-	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	-
2022	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	1,217,368	13	0.230	0.666	5	15,853	75,492	0	1,089,786	0
			EDC-U-2	3,685,304	25	0.112	0.643	13	322,152	16,759	0	3,335,220	0
			EDC-U-3	3,196,274	22	0.265	0.828	12	444,767	23,635	0	2,727,872	0
			EDC-U-4	2,063,768	24	0.139	0.700	14	95,647	5,925	0	1,954,579	0
			EDC-U-5	2,986,351	25	0.183	0.782	13	134,732	23,003	0	2,764,536	0
	HAC-R1	Exposed	HAC-R1-1	1,178,821	30	0.0965	0.654	20	176,094	25,503	0	839,991	0
			HAC-R1-2	932,045	27	0.217	0.829	18	125,296	0	0	746,096	0
			HAC-R1-3	4,021,097	26	0.0477	0.194	14	61,937	23,074	0	3,755,134	0
			HAC-R1-4	2,239,208	22	0.0596	0.238	17	127,517	6,072	0	1,962,315	0
			HAC-R1-5	1,109,121	26	0.166	0.769	21	371,334	6,572	0	593,196	0
	HAC-U (HAC-R2)[b]		HAC-U-1	723,839	30	0.116	0.712	20	124,481	13,966	0	569,605	0
			HAC-U-2	500,918	25	0.347	0.885	17	158,283	9,311	0	219,733	0
			HAC-U-3	583,291	32	0.449	0.930	24	414,054	26,289	0	85,440	0
			HAC-U-4	1,542,775	26	0.127	0.698	17	250,060	42,563	0	1,203,598	0
			HAC-U-5	1,495,113	27	0.0814	0.545	18	128,488	61,451	0	1,225,847	0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	-
			HAC-R3-2	-	-	-	-	-	-	-	-	-	-
			HAC-R3-3	-	-	-	-	-	-	-	-	-	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	-

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Density (cells/cm²)	Total Richness (# of Taxa)	Simpson's Evenness	Simpson's Diversity	Diatoms Richness (# of Diatom Taxa)	Diatoms (cells/cm²)	Chlorophytes (cells/cm²)	Chrysophytes (cells/cm²)	Cyanobacteria (cells/cm²)	Dinoflagellates (cells/cm²)
2023	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	4,988,371	8	0.194	0.356	1	23,652	105,359	0	4,844,309	0
			EDC-U-2	14,610,096	11	0.106	0.140	5	175,086	55,290	0	14,379,720	0
			EDC-U-3	6,270,544	11	0.136	0.333	4	8,601	19,352	0	6,221,090	0
			EDC-U-4	6,125,013	9	0.147	0.244	2	4,300	111,809	0	5,944,398	0
			EDC-U-5	6,068,887	20	0.0796	0.372	8	217,168	79,557	0	5,739,910	0
	HAC-R1	Exposed	HAC-R1-1	1,547,562	29	0.110	0.685	16	127,291	3,440	0	1,395,330	0
			HAC-R1-2	765,755	23	0.153	0.716	13	52,004	7,001	0	667,747	0
			HAC-R1-3	1,536,302	19	0.0870	0.395	13	166,639	4,300	0	1,275,056	0
			HAC-R1-4	3,567,347	25	0.0755	0.470	14	141,912	104,642	0	3,293,558	0
			HAC-R1-5	3,003,256	25	0.0702	0.430	15	93,486	47,678	0	2,852,744	0
	HAC-U (HAC-R2)[b]		HAC-U-1	2,098,078	18	0.123	0.549	10	175,322	193,516	0	1,719,316	0
			HAC-U-2	3,314,778	16	0.112	0.441	6	195,170	72,775	0	3,010,445	0
			HAC-U-3	1,658,542	19	0.147	0.642	7	39,746	31,927	0	1,573,838	0
			HAC-U-4	2,811,976	18	0.157	0.647	7	132,805	80,948	0	2,591,899	0
			HAC-U-5	1,636,231	20	0.165	0.697	9	63,709	58,931	0	1,511,203	0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	-
			HAC-R3-2	-	-	-	-	-	-	-	-	-	-
			HAC-R3-3	-	-	-	-	-	-	-	-	-	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	-
2024	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	-
			FPC-R3-2	-	-	-	-	-	-	-	-	-	-
			FPC-R3-3	-	-	-	-	-	-	-	-	-	-
			FPC-R3-4	-	-	-	-	-	-	-	-	-	-
			FPC-R3-5	-	-	-	-	-	-	-	-	-	-
	EDC-U		EDC-U-1	5,429,184	13	0.119	0.354	6	845,144	46,219	0	4,471,795	0
			EDC-U-2	1,782,268	13	0.155	0.503	8	369,750	1,541	0	1,400,192	0
			EDC-U-3	2,392,881	24	0.208	0.800	10	311,088	158,210	0	1,918,250	0
			EDC-U-4	1,157,515	26	0.171	0.775	13	135,642	99,471	0	914,364	0
			EDC-U-5	6,795,666	21	0.0797	0.403	14	455,255	9,244	0	6,310,368	0
	HAC-R1	Exposed	HAC-R1-1	862,248	19	0.0812	0.352	13	63,802	7,536	0	720,075	0
			HAC-R1-2	833,636	21	0.124	0.615	13	28,673	20,542	0	734,351	0
			HAC-R1-3	321,439	23	0.0923	0.529	15	54,307	13,095	0	218,987	0
			HAC-R1-4	1,330,491	14	0.114	0.376	11	67,017	20,798	0	1,027,758	0
			HAC-R1-5	531,244	20	0.112	0.554	13	69,328	15,599	0	349,835	0
	HAC-U (HAC-R2)[b]		HAC-U-1	526,709	15	0.196	0.660	9	59,314	2,311	0	312,562	0
			HAC-U-2	804,808	12	0.107	0.222	6	15,834	14,978	0	710,230	0
			HAC-U-3	1,394,505	17	0.126	0.533	13	62,531	4,078	0	1,023,396	0
			HAC-U-4	1,150,247	22	0.0707	0.357	15	80,455	14,550	0	937,983	0
			HAC-U-5	849,848	13	0.188	0.591	6	39,286	65,284	0	712,925	0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	-
			HAC-R3-2	-	-	-	-	-	-	-	-	-	-
			HAC-R3-3	-	-	-	-	-	-	-	-	-	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	-

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Phaeophytes (cells/cm²)	Rhodophytes (cells/cm²)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cyanobacteria (%)	Dinoflagellates (%)	Phaeophytes (%)	Rhodophytes (%)	Chlorophyll-a (mg/m²)	Ash Free Dry Mass (g/m²)
1995	EDC-U (W9)[a]	Reference (Baseline)	W9-1	-	-	80.0	20.0	-	0	0	-	-	10.8	-
			W9-2	-	-	90.0	10.0	-	1.00	0	-	-	10.5	-
			W9-3	-	-	89.0	10.0	-	1.00	0	-	-	7.52	-
	HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	W7-A	-	-	100	0	-	0	0	-	-	10.3	-
			W7-B	-	-	99.0	0	-	1.00	0	-	-	10.8	-
			W7-C	-	-	100	0	-	0	0	-	-	10.8	-
1996	EDC-U (W9)[a]	Reference (Baseline)	W9-A	-	-	97.0	3.00	-	0	0	-	-	15.6	-
			W9-B	-	-	97.0	2.00	-	1.00	0	-	-	20.1	-
			W9-C	-	-	97.0	1.00	-	2.00	0	-	-	12.8	-
	HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	W7-1	-	-	25.0	0	-	75.0	0	-	-	17.7	-
			W7-2	-	-	49.0	0	-	51.0	0	-	-	11.9	-
			W7-3	-	-	65.0	0	-	35.0	0	-	-	34.6	-
2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	W7	-	-	0	0	-	100	0	-	-	14.6	-
2017	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	6.10	3.30
			FPC-R3-2	-	-	-	-	-	-	-	-	-	5.45	5.55
			FPC-R3-3	-	-	-	-	-	-	-	-	-	13.9	7.45
	HAC-R1	Exposed	HAC-R1-1	-	-	-	-	-	-	-	-	-	23.4	9.50
			HAC-R1-2	-	-	-	-	-	-	-	-	-	5.90	7.25
			HAC-R1-3	-	-	-	-	-	-	-	-	-	4.08	1.95
			HAC-R1-4	-	-	-	-	-	-	-	-	-	16.7	6.25
			HAC-R1-5	-	-	-	-	-	-	-	-	-	8.70	2.45
2018	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	17.1	4.20
			FPC-R3-2	-	-	-	-	-	-	-	-	-	18.0	6.70
			FPC-R3-3	-	-	-	-	-	-	-	-	-	13.7	10.1
			FPC-R3-4	-	-	-	-	-	-	-	-	-	15.6	3.95
			FPC-R3-5	-	-	-	-	-	-	-	-	-	18.7	4.50
	EDC-U		EDC-U-1	-	-	10.6	2.71	-	86.2	0	-	-	12.6	6.05
			EDC-U-2	-	-	13.7	5.32	-	80.5	0	-	-	12.1	7.30
			EDC-U-3	-	-	10.5	2.33	-	86.5	0	-	-	6.40	3.55
			EDC-U-4	-	-	12.2	3.10	-	84.0	0	-	-	15.0	12.6
			EDC-U-5	-	-	9.90	1.20	-	88.6	0	-	-	11.4	3.80
	HAC-R1	Exposed	HAC-R1-1	-	-	34.6	10.2	-	54.6	0	-	-	21.3	38.6
			HAC-R1-2	-	-	57.0	11.1	-	31.2	0	-	-	31.0	19.2
			HAC-R1-3	-	-	45.9	4.43	-	45.0	3.22	-	-	12.7	10.4
			HAC-R1-4	-	-	49.1	2.79	-	47.9	0	-	-	10.8	5.10
			HAC-R1-5	-	-	65.3	6.93	-	27.7	0	-	-	12.7	4.00
	HAC-U (HAC-R2)[b]		HAC-U-1	-	-	90.2	6.85	-	2.38	0	-	-	9.55	7.20
			HAC-U-2	-	-	76.2	6.49	-	17.0	0	-	-	10.9	13.8
			HAC-U-3	-	-	90.1	5.10	-	4.76	0	-	-	9.83	9.15
			HAC-U-4	-	-	92.8	3.46	-	3.72	0	-	-	18.0	13.2
			HAC-U-5	-	-	65.7	26.3	-	7.74	0	-	-	14.8	7.80

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Phaeophytes (cells/cm²)	Rhodophytes (cells/cm²)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cyanobacteria (%)	Dinoflagellates (%)	Phaeophytes (%)	Rhodophytes (%)	Chlorophyll-a (mg/m²)	Ash Free Dry Mass (g/m²)
2019	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	50.0	11.9
			FPC-R3-2	-	-	-	-	-	-	-	-	-	37.1	11.9
			FPC-R3-3	-	-	-	-	-	-	-	-	-	27.4	7.75
			FPC-R3-4	-	-	-	-	-	-	-	-	-	26.1	11.2
			FPC-R3-5	-	-	-	-	-	-	-	-	-	11.6	3.00
	EDC-U		EDC-U-1	0	21,569	4.19	1.13	0	92.9	0	0	1.79	19.1	5.95
			EDC-U-2	0	0	16.6	0.772	0	82.6	0	0	0	23.8	6.55
			EDC-U-3	0	9,291	8.16	4.33	0	77.0	0	0	10.5	12.4	7.25
			EDC-U-4	0	3,058	2.51	0.761	0	96.5	0	0	0.282	60.0	23.8
			EDC-U-5	0	39,738	11.4	2.88	0	71.6	0	0	14.2	9.80	4.50
	HAC-R1	Exposed	HAC-R1-1	17,313	0	6.60	0.574	0.287	85.7	0	6.89	0	53.5	68.0
			HAC-R1-2	22,507	0	11.0	0.456	0.273	78.8	0	9.48	0	56.0	88.5
			HAC-R1-3	12,057	0	27.7	1.52	0.326	63.9	0	6.52	0	42.1	57.0
			HAC-R1-4	8,115	0	20.1	0	0.255	74.5	0	5.10	0	30.1	42.4
			HAC-R1-5	35,467	0	2.75	0.243	0.0810	92.1	0	4.78	0	54.5	34.7
	HAC-U (HAC-R2)[b]		HAC-U-1	36,053	0	35.3	11.6	0.340	42.4	0	10.4	0	27.0	39.0
			HAC-U-2	55,262	0	10.5	10.9	0	73.8	0	4.77	0	31.9	27.8
			HAC-U-3	40,190	0	10.9	2.40	0	84.5	0	2.27	0	52.0	30.4
			HAC-U-4	0	0	19.9	5.54	0	74.5	0	0	0	36.8	29.2
			HAC-U-5	0	0	39.0	5.92	0	55.1	0	0	0	30.6	23.8
2020	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	31.4	16.2
			FPC-R3-2	-	-	-	-	-	-	-	-	-	34.0	26.6
			FPC-R3-3	-	-	-	-	-	-	-	-	-	6.75	19.0
			FPC-R3-4	-	-	-	-	-	-	-	-	-	8.30	6.95
			FPC-R3-5	-	-	-	-	-	-	-	-	-	20.1	9.95
	EDC-U		EDC-U-1	0	7,543	1.81	2.04	0	94.8	0	0	1.40	6.05	7.15
			EDC-U-2	0	15,406	0.167	0	0	98.9	0	0	0.958	17.4	8.60
			EDC-U-3	0	6,698	0.225	0.547	0	98.9	0	0	0.322	6.80	8.75
			EDC-U-4	0	20,865	0.545	1.27	0	95.0	0	0	3.24	9.60	11.8
			EDC-U-5	0	510	1.99	0.0813	0	97.7	0	0	0.203	2.46	4.00
	HAC-R1	Exposed	HAC-R1-1	79,125	0	10.2	3.40	0	79.1	0	7.29	0	32.1	140
			HAC-R1-2	168,799	0	18.1	2.12	0	64.8	0	15.0	0	69.5	172
			HAC-R1-3	230,692	0	6.59	1.36	0	74.9	0	17.2	0	99.0	71.0
			HAC-R1-4	148,578	0	11.4	0.544	0	65.1	0	23.0	0	50.0	128
			HAC-R1-5	189,899	0	3.43	0.438	0	86.3	0	9.85	0	33.0	118
	HAC-U (HAC-R2)[b]		HAC-U-1	202,207	0	23.5	0.802	0	54.2	0	21.5	0	11.2	57.0
			HAC-U-2	64,304	0	41.5	0	0	40.4	0	18.2	0	3.49	31.2
			HAC-U-3	225,065	0	26.4	0	0	55.8	0	17.8	0	20.8	75.5
			HAC-U-4	179,349	0	41.6	10.6	0	20.7	0	27.1	0	12.4	71.5
			HAC-U-5	106,598	0	23.7	1.26	0	61.5	0	13.6	0	26.6	62.0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	1.50	5.95
			HAC-R3-2	-	-	-	-	-	-	-	-	-	3.00	3.75
			HAC-R3-3	-	-	-	-	-	-	-	-	-	1.74	1.95
			HAC-R3-4	-	-	-	-	-	-	-	-	-	1.74	3.10
			HAC-R3-5	-	-	-	-	-	-	-	-	-	0.324	2.60

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Phaeophytes (cells/cm²)	Rhodophytes (cells/cm²)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cyanobacteria (%)	Dinoflagellates (%)	Phaeophytes (%)	Rhodophytes (%)	Chlorophyll-a (mg/m²)	Ash Free Dry Mass (g/m²)
2021	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	47.1	6.75
			FPC-R3-2	-	-	-	-	-	-	-	-	-	39.8	7.35
			FPC-R3-3	-	-	-	-	-	-	-	-	-	35.8	9.15
			FPC-R3-4	-	-	-	-	-	-	-	-	-	21.1	3.80
			FPC-R3-5	-	-	-	-	-	-	-	-	-	44.4	8.50
	EDC-U		EDC-U-1	0	0	5.19	0.177	0	94.6	0	0	0	6.75	6.65
			EDC-U-2	5,247	75,033	3.04	0.925	0	85.9	0	0.661	9.45	5.80	7.80
			EDC-U-3	0	616	12.6	9.89	0	77.0	0	0	0.594	2.05	2.00
			EDC-U-4	6,945	22,501	8.43	1.05	0	81.9	0	2.03	6.56	6.20	4.00
			EDC-U-5	0	5,000	7.50	1.81	0	89.7	0	0	0.985	6.40	4.00
	HAC-R1	Exposed	HAC-R1-1	13,459	0	0.498	1.04	0	97.2	0	1.23	0	19.9	28.4
			HAC-R1-2	9,445	0	1.23	3.24	0	94.2	0	1.31	0	29.1	7.55
			HAC-R1-3	39,168	0	2.37	9.48	0	72.2	0	15.9	0	15.2	14.4
			HAC-R1-4	25,556	0	7.73	6.45	0	77.5	0	8.36	0	29.6	15.6
			HAC-R1-5	4,167	0	3.42	3.72	0	92.3	0	0.558	0	76.0	13.3
	HAC-U (HAC-R2)[b]		HAC-U-1	65,326	0	26.4	26.6	0	27.1	0	19.9	0	24.9	68.0
			HAC-U-2	73,984	0	38.0	3.69	0	39.1	0	19.3	0	24.1	49.8
			HAC-U-3	74,208	0	41.0	13.0	0	30.3	0	15.6	0	29.1	15.1
			HAC-U-4	75,895	0	23.0	7.26	0	45.8	0	23.9	0	24.8	40.5
			HAC-U-5	40,534	0	4.64	8.55	0	77.5	0	9.37	0	11.6	13.0
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	4.54	2.40
			HAC-R3-2	-	-	-	-	-	-	-	-	-	8.55	4.55
			HAC-R3-3	-	-	-	-	-	-	-	-	-	1.96	1.50
			HAC-R3-4	-	-	-	-	-	-	-	-	-	6.50	1.75
			HAC-R3-5	-	-	-	-	-	-	-	-	-	0.895	0.550
2022	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	21.4	4.00
			FPC-R3-2	-	-	-	-	-	-	-	-	-	112	11.2
			FPC-R3-3	-	-	-	-	-	-	-	-	-	46.8	4.40
			FPC-R3-4	-	-	-	-	-	-	-	-	-	51.0	8.15
			FPC-R3-5	-	-	-	-	-	-	-	-	-	15.2	6.60
	EDC-U		EDC-U-1	0	36,236	1.30	6.20	0	89.5	0	0	2.98	18.4	14.1
			EDC-U-2	0	11,173	8.74	0.455	0	90.5	0	0	0.303	26.4	6.50
			EDC-U-3	0	0	13.9	0.739	0	85.3	0	0	0	63.5	12.2
			EDC-U-4	0	7,618	4.63	0.287	0	94.7	0	0	0.369	55.0	16.9
			EDC-U-5	0	64,080	4.51	0.770	0	92.6	0	0	2.15	34.3	3.55
	HAC-R1	Exposed	HAC-R1-1	137,232	0	14.9	2.16	0	71.3	0	11.6	0	53.5	85.5
			HAC-R1-2	60,653	0	13.4	0	0	80.0	0	6.51	0	71.5	49.9
			HAC-R1-3	180,952	0	1.54	0.574	0	93.4	0	4.50	0	106	139
			HAC-R1-4	143,304	0	5.69	0.271	0	87.6	0	6.40	0	144	129
			HAC-R1-5	138,018	0	33.5	0.593	0	53.5	0	12.4	0	62.5	80.0
	HAC-U (HAC-R2)[b]		HAC-U-1	15,788	0	17.2	1.93	0	78.7	0	2.18	0	32.4	32.8
			HAC-U-2	113,591	0	31.6	1.86	0	43.9	0	22.7	0	14.4	38.8
			HAC-U-3	57,508	0	71.0	4.51	0	14.6	0	9.86	0	31.2	74.5
			HAC-U-4	46,554	0	16.2	2.76	0	78.0	0	3.02	0	28.1	12.6
			HAC-U-5	79,328	0	8.59	4.11	0	82.0	0	5.31	0	27.6	30.2
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	3.54	1.90
			HAC-R3-2	-	-	-	-	-	-	-	-	-	12.2	3.45
			HAC-R3-3	-	-	-	-	-	-	-	-	-	2.43	-
			HAC-R3-4	-	-	-	-	-	-	-	-	-	0.740	-
			HAC-R3-5	-	-	-	-	-	-	-	-	-	0.930	-

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.1: Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Year	Area	Type	Station	Phaeophytes (cells/cm²)	Rhodophytes (cells/cm²)	Diatoms (%)	Chlorophytes (%)	Chrysophytes (%)	Cyanobacteria (%)	Dinoflagellates (%)	Phaeophytes (%)	Rhodophytes (%)	Chlorophyll-a (mg/m²)	Ash Free Dry Mass (g/m²)
2023	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	17.2	7.15
			FPC-R3-2	-	-	-	-	-	-	-	-	-	55.0	6.85
			FPC-R3-3	-	-	-	-	-	-	-	-	-	26.4	6.25
			FPC-R3-4	-	-	-	-	-	-	-	-	-	21.8	13.6
			FPC-R3-5	-	-	-	-	-	-	-	-	-	27.2	5.25
	EDC-U		EDC-U-1	2,150	12,901	0.474	2.11	0	97.1	0	0.0431	0.259	23.7	6.30
			EDC-U-2	0	0	1.20	0.378	0	98.4	0	0	0	18.9	7.65
			EDC-U-3	0	21,502	0.137	0.309	0	99.2	0	0	0.343	9.90	6.95
			EDC-U-4	0	64,505	0.0702	1.83	0	97.0	0	0	1.05	9.70	10.6
			EDC-U-5	0	32,253	3.58	1.31	0	94.6	0	0	0.531	18.1	8.75
	HAC-R1	Exposed	HAC-R1-1	21,502	0	8.23	0.222	0	90.2	0	1.39	0	38.5	16.4
			HAC-R1-2	39,003	0	6.79	0.914	0	87.2	0	5.09	0	15.0	5.75
			HAC-R1-3	90,307	0	10.8	0.280	0	83.0	0	5.88	0	66.0	21.4
			HAC-R1-4	27,236	0	3.98	2.93	0	92.3	0	0.763	0	26.3	10.2
			HAC-R1-5	9,349	0	3.11	1.59	0	95.0	0	0.311	0	57.5	21.5
	HAC-U (HAC-R2)[b]		HAC-U-1	9,924	0	8.36	9.22	0	82.0	0	0.473	0	34.2	26.8
			HAC-U-2	36,388	0	5.89	2.20	0	90.8	0	1.10	0	23.7	16.6
			HAC-U-3	13,031	0	2.40	1.92	0	94.9	0	0.786	0	13.6	14.2
			HAC-U-4	6,324	0	4.72	2.88	0	92.2	0	0.225	0	26.3	13.9
			HAC-U-5	2,389	0	3.89	3.60	0	92.4	0	0.146	0	18.7	26.7
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	27.1	44.4
			HAC-R3-2	-	-	-	-	-	-	-	-	-	4.51	29.6
			HAC-R3-3	-	-	-	-	-	-	-	-	-	1.68	2.60
			HAC-R3-4	-	-	-	-	-	-	-	-	-	7.00	7.30
			HAC-R3-5	-	-	-	-	-	-	-	-	-	2.14	0.500
2024	FPC-R3	Reference	FPC-R3-1	-	-	-	-	-	-	-	-	-	26.6	11.0
			FPC-R3-2	-	-	-	-	-	-	-	-	-	34.3	13.5
			FPC-R3-3	-	-	-	-	-	-	-	-	-	35.1	6.40
			FPC-R3-4	-	-	-	-	-	-	-	-	-	28.4	12.0
			FPC-R3-5	-	-	-	-	-	-	-	-	-	29.6	5.80
	EDC-U		EDC-U-1	0	66,027	15.6	0.851	0	82.4	0	0	1.22	16.6	12.4
			EDC-U-2	0	10,784	20.8	0.0864	0	78.6	0	0	0.605	5.55	16.1
			EDC-U-3	0	5,333	13.0	6.61	0	80.2	0	0	0.223	19.0	18.2
			EDC-U-4	0	8,038	11.7	8.59	0	79.0	0	0	0.694	10.3	18.4
			EDC-U-5	0	20,798	6.70	0.136	0	92.9	0	0	0.306	12.2	10.1
	HAC-R1	Exposed	HAC-R1-1	70,835	0	7.40	0.874	0	83.5	0	8.22	0	43.3	80.5
			HAC-R1-2	50,070	0	3.44	2.46	0	88.1	0	6.01	0	75.0	46.6
			HAC-R1-3	35,049	0	16.9	4.07	0	68.1	0	10.9	0	30.6	71.0
			HAC-R1-4	214,917	0	5.04	1.56	0	77.2	0	16.1	0	56.5	52.0
			HAC-R1-5	96,482	0	13.1	2.94	0	65.8	0	18.2	0	29.6	94.5
	HAC-U (HAC-R2)[b]		HAC-U-1	152,522	0	11.3	0.439	0	59.3	0	29.0	0	4.59	61.5
			HAC-U-2	63,765	0	1.97	1.86	0	88.2	0	7.92	0	6.30	32.2
			HAC-U-3	304,500	0	4.48	0.292	0	73.4	0	21.8	0	39.5	156
			HAC-U-4	117,259	0	6.99	1.26	0	81.5	0	10.2	0	37.3	99.5
			HAC-U-5	32,353	0	4.62	7.68	0	83.9	0	3.81	0	14.3	22.6
	HAC-R3		HAC-R3-1	-	-	-	-	-	-	-	-	-	6.65	194
			HAC-R3-2	-	-	-	-	-	-	-	-	-	22.4	21.1
			HAC-R3-3	-	-	-	-	-	-	-	-	-	16.1	61.0
			HAC-R3-4	-	-	-	-	-	-	-	-	-	13.3	24.4
			HAC-R3-5	-	-	-	-	-	-	-	-	-	21.6	99.5

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category was therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W9 is the historical sampling area associated with EDC-U and W7 is the historical sampling area associated with HAC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (cells/cm²)	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	21,200,428	-	21,200,428	21,200,428	21,200,428
	2018	EDC-U	Reference	5	1,138,405	279,295	889,906	1,055,389	1,616,699
		HAC-R1	Exposed	5	928,580	176,395	637,877	990,411	1,107,074
		HAC-U (HAC-R2)[b]		5	995,413	354,621	565,964	923,483	1,547,325
	2019	EDC-U	Reference	5	650,148	488,659	88,329	589,659	1,207,383
		HAC-R1	Exposed	5	315,025	241,791	159,086	237,397	742,283
		HAC-U (HAC-R2)[b]		5	837,310	614,208	347,921	483,442	1,771,522
	2020	EDC-U	Reference	5	1,025,442	780,696	250,654	644,856	2,082,852
		HAC-R1	Exposed	5	1,226,087	466,988	646,960	1,125,327	1,928,410
		HAC-U (HAC-R2)[b]		5	801,041	336,590	353,842	784,377	1,264,235
	2021	EDC-U	Reference	5	646,922	532,153	103,781	507,750	1,486,106
		HAC-R1	Exposed	5	622,251	349,001	246,090	721,023	1,091,336
		HAC-U (HAC-R2)[b]		5	387,310	67,162	317,353	383,656	474,484
	2022	EDC-U	Reference	5	2,629,813	984,564	1,217,368	2,986,351	3,685,304
		HAC-R1	Exposed	5	1,896,058	1,293,886	932,045	1,178,821	4,021,097
		HAC-U (HAC-R2)[b]		5	969,187	508,426	500,918	723,839	1,542,775
	2022	EDC-U	Reference	5	2,629,813	984,564	1,217,368	2,986,351	3,685,304
		HAC-R1	Exposed	5	1,896,058	1,293,886	932,045	1,178,821	4,021,097
		HAC-U (HAC-R2)[b]		5	969,187	508,426	500,918	723,839	1,542,775
	2023	EDC-U	Reference	5	7,612,582	3,944,889	4,988,371	6,125,013	14,610,096
		HAC-R1	Exposed	5	2,084,045	1,158,756	765,755	1,547,562	3,567,347
		HAC-U (HAC-R2)[b]		5	2,303,921	739,027	1,636,231	2,098,078	3,314,778
	2024	EDC-U	Reference	5	3,511,503	2,462,014	1,157,515	2,392,881	6,795,666
		HAC-R1	Exposed	5	775,812	382,345	321,439	833,636	1,330,491
		HAC-U (HAC-R2)[b]		5	945,223	334,610	526,709	849,848	1,394,505
Total Richness (# of Taxa)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	35	1.53	34	35	37
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	17	5.51	12	17	23
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	40	4.51	36	40	45
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	29	2.65	27	28	32
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	34	-	34	34	34
	2018	EDC-U	Reference	5	29	2.39	27	28	33
		HAC-R1	Exposed	5	26	3.32	22	27	29
		HAC-U (HAC-R2)[b]		5	20	2.30	16	20	22
	2019	EDC-U	Reference	5	28	4.49	22	28	33
		HAC-R1	Exposed	5	28	1.52	26	27	30
		HAC-U (HAC-R2)[b]		5	28	2.79	25	27	31
	2020	EDC-U	Reference	5	16	7.47	9	11	26
		HAC-R1	Exposed	5	24	4.87	19	22	29
		HAC-U (HAC-R2)[b]		5	23	3.71	17	24	26
	2021	EDC-U	Reference	5	28	7.73	21	26	41
		HAC-R1	Exposed	5	18	2.51	16	19	22
		HAC-U (HAC-R2)[b]		5	21	5.81	13	20	27
	2022	EDC-U	Reference	5	22	5.07	13	24	25
		HAC-R1	Exposed	5	26	2.86	22	26	30
		HAC-U (HAC-R2)[b]		5	28	2.92	25	27	32
	2023	EDC-U	Reference	5	12	4.76	8	11	20
		HAC-R1	Exposed	5	24	3.63	19	25	29
		HAC-U (HAC-R2)[b]		5	18	1.48	16	18	20
	2024	EDC-U	Reference	5	19	6.11	13	21	26
		HAC-R1	Exposed	5	19	3.36	14	20	23
		HAC-U (HAC-R2)[b]		5	16	3.96	12	15	22
Simpson's Evenness	2018	EDC-U	Reference	5	0.208	0.0440	0.148	0.194	0.255
		HAC-R1	Exposed	5	0.283	0.0902	0.214	0.263	0.440
		HAC-U (HAC-R2)[b]		5	0.250	0.0462	0.204	0.246	0.306
	2019	EDC-U	Reference	5	0.217	0.0872	0.0667	0.241	0.284
		HAC-R1	Exposed	5	0.142	0.0500	0.0767	0.133	0.192
		HAC-U (HAC-R2)[b]		5	0.174	0.138	0.0566	0.136	0.403
	2020	EDC-U	Reference	5	0.183	0.0360	0.120	0.199	0.205
		HAC-R1	Exposed	5	0.213	0.122	0.112	0.201	0.410
		HAC-U (HAC-R2)[b]		5	0.303	0.0324	0.270	0.290	0.343
	2021	EDC-U	Reference	5	0.148	0.0315	0.105	0.160	0.182
		HAC-R1	Exposed	5	0.130	0.0661	0.0751	0.0973	0.239
		HAC-U (HAC-R2)[b]		5	0.330	0.0595	0.244	0.332	0.404
	2022	EDC-U	Reference	5	0.186	0.0628	0.112	0.183	0.265
		HAC-R1	Exposed	5	0.117	0.0723	0.0477	0.0965	0.217
		HAC-U (HAC-R2)[b]		5	0.224	0.164	0.0814	0.127	0.449
	2023	EDC-U	Reference	5	0.133	0.0434	0.0796	0.136	0.194
		HAC-R1	Exposed	5	0.0990	0.0337	0.0702	0.0870	0.153
		HAC-U (HAC-R2)[b]		5	0.141	0.0226	0.112	0.147	0.165
	2024	EDC-U	Reference	5	0.146	0.0491	0.0797	0.155	0.208
		HAC-R1	Exposed	5	0.105	0.0174	0.0812	0.112	0.124
		HAC-U (HAC-R2)[b]		5	0.138	0.0536	0.0707	0.126	0.196
Simpson's Diversity	2018	EDC-U	Reference	5	0.824	0.0457	0.759	0.816	0.881
		HAC-R1	Exposed	5	0.852	0.0496	0.797	0.869	0.916
		HAC-U (HAC-R2)[b]		5	0.785	0.0611	0.694	0.806	0.852
	2019	EDC-U	Reference	5	0.771	0.197	0.424	0.861	0.893
		HAC-R1	Exposed	5	0.710	0.125	0.517	0.731	0.826
		HAC-U (HAC-R2)[b]		5	0.667	0.231	0.346	0.762	0.917
	2020	EDC-U	Reference	5	0.593	0.128	0.450	0.544	0.767
		HAC-R1	Exposed	5	0.762	0.0759	0.692	0.772	0.878
		HAC-U (HAC-R2)[b]		5	0.853	0.0416	0.782	0.868	0.888
	2021	EDC-U	Reference	5	0.727	0.115	0.546	0.740	0.854
		HAC-R1	Exposed	5	0.504	0.199	0.299	0.459	0.739
		HAC-U (HAC-R2)[b]		5	0.841	0.0503	0.772	0.849	0.893
	2022	EDC-U	Reference	5	0.724	0.0786	0.643	0.700	0.828
		HAC-R1	Exposed	5	0.537	0.300	0.194	0.654	0.829
		HAC-U (HAC-R2)[b]		5	0.754	0.155	0.545	0.712	0.930
	2023	EDC-U	Reference	5	0.289	0.0966	0.140	0.333	0.372
		HAC-R1	Exposed	5	0.539	0.150	0.395	0.470	0.716
		HAC-U (HAC-R2)[b]		5	0.595	0.101	0.441	0.642	0.697
	2024	EDC-U	Reference	5	0.567	0.209	0.354	0.503	0.800
		HAC-R1	Exposed	5	0.485	0.115	0.352	0.529	0.615
		HAC-U (HAC-R2)[b]		5	0.473	0.180	0.222	0.533	0.660

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Diatoms Richness (# of Taxa)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	21	1.53	20	21	23
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	15	3.51	11	15	18
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	28	1.15	27	27	29
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	21	1.53	20	21	23
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	22	-	22	22	22
	2018	EDC-U	Reference	5	15	2.17	13	14	18
		HAC-R1	Exposed	5	16	1.67	14	16	18
		HAC-U (HAC-R2)[b]		5	13	2.17	10	13	16
	2019	EDC-U	Reference	5	16	2.74	13	16	20
		HAC-R1	Exposed	5	17	2.24	14	17	20
		HAC-U (HAC-R2)[b]		5	15	0.548	15	15	16
	2020	EDC-U	Reference	5	6	4.74	2	5	14
		HAC-R1	Exposed	5	14	4.60	9	13	19
		HAC-U (HAC-R2)[b]		5	15	2.17	12	16	17
	2021	EDC-U	Reference	5	15	4.67	9	16	22
		HAC-R1	Exposed	5	11	3.36	7	11	16
		HAC-U (HAC-R2)[b]		5	12	4.09	8	13	17
	2022	EDC-U	Reference	5	11	3.65	5	13	14
		HAC-R1	Exposed	5	18	2.74	14	18	21
		HAC-U (HAC-R2)[b]		5	19	2.95	17	18	24
	2023	EDC-U	Reference	5	4	2.74	1	4	8
		HAC-R1	Exposed	5	14	1.30	13	14	16
		HAC-U (HAC-R2)[b]		5	8	1.64	6	7	10
	2024	EDC-U	Reference	5	10	3.35	6	10	14
		HAC-R1	Exposed	5	13	1.41	11	13	15
		HAC-U (HAC-R2)[b]		5	10	4.09	6	9	15
Diatoms (cells/cm²)	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	52,079	-	52,079	52,079	52,079
	2018	EDC-U	Reference	5	130,679	40,869	93,777	112,365	197,468
		HAC-R1	Exposed	5	454,429	72,660	383,147	419,988	565,879
		HAC-U (HAC-R2)[b]		5	849,266	373,097	371,614	857,169	1,394,697
	2019	EDC-U	Reference	5	43,023	34,425	7,207	32,001	98,052
		HAC-R1	Exposed	5	29,303	13,590	16,591	26,185	51,243
		HAC-U (HAC-R2)[b]		5	142,089	46,787	84,902	122,935	192,449
	2020	EDC-U	Reference	5	5,133	2,761	2,679	4,689	9,785
		HAC-R1	Exposed	5	108,664	55,927	66,113	88,620	203,966
		HAC-U (HAC-R2)[b]		5	232,720	73,989	146,694	221,046	334,081
	2021	EDC-U	Reference	5	36,250	24,568	13,038	28,890	77,132
		HAC-R1	Exposed	5	13,864	9,901	5,431	8,889	25,556
		HAC-U (HAC-R2)[b]		5	103,971	67,505	20,070	86,576	194,516
	2022	EDC-U	Reference	5	202,630	175,966	15,853	134,732	444,767
		HAC-R1	Exposed	5	172,436	118,347	61,937	127,517	371,334
		HAC-U (HAC-R2)[b]		5	215,073	122,216	124,481	158,283	414,054
	2023	EDC-U	Reference	5	85,761	102,095	4,300	23,652	217,168
		HAC-R1	Exposed	5	116,266	44,624	52,004	127,291	166,639
		HAC-U (HAC-R2)[b]		5	121,350	67,962	39,746	132,805	195,170
	2024	EDC-U	Reference	5	423,376	263,239	135,642	369,750	845,144
		HAC-R1	Exposed	5	56,625	16,640	28,673	63,802	69,328
		HAC-U (HAC-R2)[b]		5	51,484	24,710	15,834	59,314	80,455
Chlorophytes (cells/cm²)	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	10,691	-	10,691	10,691	10,691
	2018	EDC-U	Reference	5	33,405	18,071	13,263	28,552	54,341
		HAC-R1	Exposed	5	67,051	40,996	27,631	44,209	112,365
		HAC-U (HAC-R2)[b]		5	77,880	43,524	31,929	70,612	148,966
	2019	EDC-U	Reference	5	7,663	3,880	3,821	8,088	13,598
		HAC-R1	Exposed	5	1,428	1,027	0	1,443	2,813
		HAC-U (HAC-R2)[b]		5	52,301	42,272	23,612	40,190	126,599
	2020	EDC-U	Reference	5	6,161	5,667	0	8,206	11,387
		HAC-R1	Exposed	5	18,216	13,173	3,517	18,287	36,925
		HAC-U (HAC-R2)[b]		5	17,552	29,837	0	7,536	70,333
	2021	EDC-U	Reference	5	6,603	3,366	2,624	7,346	10,266
		HAC-R1	Exposed	5	21,101	6,162	11,334	23,334	27,779
		HAC-U (HAC-R2)[b]		5	44,682	29,893	14,167	36,992	87,364
	2022	EDC-U	Reference	5	28,963	26,966	5,925	23,003	75,492
		HAC-R1	Exposed	5	12,244	11,328	0	6,572	25,503
		HAC-U (HAC-R2)[b]		5	30,716	21,467	9,311	26,289	61,451
	2023	EDC-U	Reference	5	74,273	38,013	19,352	79,557	111,809
		HAC-R1	Exposed	5	33,412	43,933	3,440	7,001	104,642
		HAC-U (HAC-R2)[b]		5	87,619	62,056	31,927	72,775	193,516
	2024	EDC-U	Reference	5	62,937	65,848	1,541	46,219	158,210
		HAC-R1	Exposed	5	15,514	5,539	7,536	15,599	20,798
		HAC-U (HAC-R2)[b]		5	20,240	25,844	2,311	14,550	65,284
Chrysophytes (cells/cm²)	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	596	117	406	603	721
		HAC-U (HAC-R2)[b]		5	236	529	0	0	1,182
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Cyanobacteria (cells/cm²)	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	21,108,545	-	21,108,545	21,108,545	21,108,545
	2018	EDC-U	Reference	5	968,313	232,168	770,005	909,867	1,357,338
		HAC-R1	Exposed	5	395,458	162,256	176,837	412,159	604,193
		HAC-U (HAC-R2)[b]		5	66,228	52,779	24,561	43,782	154,732
	2019	EDC-U	Reference	5	584,730	480,893	68,010	487,056	1,121,577
		HAC-R1	Exposed	5	264,607	238,264	118,293	186,974	683,973
		HAC-U (HAC-R2)[b]		5	616,382	561,799	147,561	317,670	1,496,373
	2020	EDC-U	Reference	5	1,003,943	779,464	244,945	612,269	2,060,077
		HAC-R1	Exposed	5	935,788	460,699	421,016	859,088	1,663,958
		HAC-U (HAC-R2)[b]		5	395,264	248,413	137,149	482,165	705,088
	2021	EDC-U	Reference	5	581,000	511,966	79,862	455,527	1,406,351
		HAC-R1	Exposed	5	568,928	364,844	177,755	679,355	1,061,113
		HAC-U (HAC-R2)[b]		5	172,668	94,161	89,088	145,325	335,108
	2022	EDC-U	Reference	5	2,374,398	869,886	1,089,786	2,727,872	3,335,220
		HAC-R1	Exposed	5	1,579,346	1,331,743	593,196	839,991	3,755,134
		HAC-U (HAC-R2)[b]		5	660,845	535,678	85,440	569,605	1,225,847
	2023	EDC-U	Reference	5	7,425,885	3,921,390	4,844,309	5,944,398	14,379,720
		HAC-R1	Exposed	5	1,896,887	1,119,528	667,747	1,395,330	3,293,558
		HAC-U (HAC-R2)[b]		5	2,081,340	677,787	1,511,203	1,719,316	3,010,445
	2024	EDC-U	Reference	5	3,002,994	2,302,397	914,364	1,918,250	6,310,368
		HAC-R1	Exposed	5	610,201	325,068	218,987	720,075	1,027,758
		HAC-U (HAC-R2)[b]		5	739,419	275,604	312,562	712,925	1,023,396
Dinoflagellates (cells/cm²)	2018	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	5,895	13,181	0	0	29,473
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
Phaeophytes (cells/cm²)	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	19,092	10,641	8,115	17,313	35,467
		HAC-U (HAC-R2)[b]		5	26,301	25,051	0	36,053	55,262
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	163,419	56,084	79,125	168,799	230,692
		HAC-U (HAC-R2)[b]		5	155,505	67,634	64,304	179,349	225,065
	2021	EDC-U	Reference	5	2,438	3,392	0	0	6,945
		HAC-R1	Exposed	5	18,359	14,051	4,167	13,459	39,168
		HAC-U (HAC-R2)[b]		5	65,989	14,816	40,534	73,984	75,895
	2022	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	132,032	43,812	60,653	138,018	180,952
		HAC-U (HAC-R2)[b]		5	62,554	36,588	15,788	57,508	113,591
	2023	EDC-U	Reference	5	430	962	0	0	2,150
		HAC-R1	Exposed	5	37,479	31,403	9,349	27,236	90,307
		HAC-U (HAC-R2)[b]		5	13,611	13,339	2,389	9,924	36,388
	2024	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	93,471	71,707	35,049	70,835	214,917
		HAC-U (HAC-R2)[b]		5	134,080	106,017	32,353	117,259	304,500
Rhodophytes (cells/cm²)	2019	EDC-U	Reference	5	14,731	16,240	0	9,291	39,738
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2020	EDC-U	Reference	5	10,205	7,970	510	7,543	20,865
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	20,630	31,755	0	5,000	75,033
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	23,821	26,291	0	11,173	64,080
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	26,232	24,440	0	21,502	64,505
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	22,196	25,190	5,333	10,784	66,027
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Diatoms (%)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	86.3	5.51	80.0	89.0	90.0
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	99.7	0.577	99.0	100	100
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	97.0	0	97.0	97.0	97.0
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	46.3	20.1	25.0	49.0	65.0
	2018	EDC-U	Reference	5	11.4	1.55	9.90	10.6	13.7
		HAC-R1	Exposed	5	50.4	11.6	34.6	49.1	65.3
		HAC-U (HAC-R2)[b]		5	83.0	11.7	65.7	90.1	92.8
	2019	EDC-U	Reference	5	8.58	5.68	2.51	8.16	16.6
		HAC-R1	Exposed	5	13.6	10.2	2.75	11.0	27.7
		HAC-U (HAC-R2)[b]		5	23.1	13.4	10.5	19.9	39.0
	2020	EDC-U	Reference	5	0.948	0.885	0.167	0.545	1.99
		HAC-R1	Exposed	5	9.95	5.54	3.43	10.2	18.1
		HAC-U (HAC-R2)[b]		5	31.3	9.39	23.5	26.4	41.6
	2021	EDC-U	Reference	5	7.34	3.59	3.04	7.50	12.6
		HAC-R1	Exposed	5	3.05	2.84	0.498	2.37	7.73
		HAC-U (HAC-R2)[b]		5	26.6	14.4	4.64	26.4	41.0
	2022	EDC-U	Reference	5	6.62	4.86	1.30	4.63	13.9
		HAC-R1	Exposed	5	13.8	12.3	1.54	13.4	33.5
		HAC-U (HAC-R2)[b]		5	28.9	24.9	8.59	17.2	71.0
	2023	EDC-U	Reference	5	1.09	1.46	0.0702	0.474	3.58
		HAC-R1	Exposed	5	6.59	3.15	3.11	6.79	10.8
		HAC-U (HAC-R2)[b]		5	5.05	2.24	2.40	4.72	8.36
	2024	EDC-U	Reference	5	13.6	5.16	6.70	13.0	20.8
		HAC-R1	Exposed	5	9.16	5.65	3.44	7.40	16.9
		HAC-U (HAC-R2)[b]		5	5.87	3.50	1.97	4.62	11.3
Chlorophytes (%)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	13.3	5.77	10.0	10.0	20.0
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	0	0	0	0	0
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	2.00	1.00	1.00	2.00	3.00
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	0	0	0	0	0
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	0	-	0	0	0
	2018	EDC-U	Reference	5	2.93	1.51	1.20	2.71	5.32
		HAC-R1	Exposed	5	7.09	3.58	2.79	6.93	11.1
		HAC-U (HAC-R2)[b]		5	9.64	9.42	3.46	6.49	26.3
	2019	EDC-U	Reference	5	1.97	1.58	0.761	1.13	4.33
		HAC-R1	Exposed	5	0.559	0.581	0	0.456	1.52
		HAC-U (HAC-R2)[b]		5	7.27	3.88	2.40	5.92	11.6
	2020	EDC-U	Reference	5	0.787	0.862	0	0.547	2.04
		HAC-R1	Exposed	5	1.57	1.23	0.438	1.36	3.40
		HAC-U (HAC-R2)[b]		5	2.53	4.55	0	0.802	10.6
	2021	EDC-U	Reference	5	2.77	4.02	0.177	1.05	9.89
		HAC-R1	Exposed	5	4.79	3.26	1.04	3.72	9.48
		HAC-U (HAC-R2)[b]		5	11.8	8.91	3.69	8.55	26.6
	2022	EDC-U	Reference	5	1.69	2.53	0.287	0.739	6.20
		HAC-R1	Exposed	5	0.720	0.843	0	0.574	2.16
		HAC-U (HAC-R2)[b]		5	3.03	1.23	1.86	2.76	4.51
	2023	EDC-U	Reference	5	1.19	0.822	0.309	1.31	2.11
		HAC-R1	Exposed	5	1.19	1.12	0.222	0.914	2.93
		HAC-U (HAC-R2)[b]		5	3.96	3.01	1.92	2.88	9.22
	2024	EDC-U	Reference	5	3.26	4.04	0.0864	0.851	8.59
		HAC-R1	Exposed	5	2.38	1.24	0.874	2.46	4.07
		HAC-U (HAC-R2)[b]		5	2.31	3.07	0.292	1.26	7.68
Chrysophytes (%)	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0.244	0.0950	0.0810	0.273	0.326
		HAC-U (HAC-R2)[b]		5	0.0680	0.152	0	0	0.340
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
Cyanobacteria (%)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	0.667	0.577	0	1.00	1.00
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	0.333	0.577	0	0	1.00
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	1.00	1.00	0	1.00	2.00
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	53.7	20.1	35.0	51.0	75.0
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	100	-	100	100	100
	2018	EDC-U	Reference	5	85.2	3.07	80.5	86.2	88.6
		HAC-R1	Exposed	5	41.3	11.4	27.7	45.0	54.6
		HAC-U (HAC-R2)[b]		5	7.13	5.88	2.38	4.76	17.0
	2019	EDC-U	Reference	5	84.1	10.5	71.6	82.6	96.5
		HAC-R1	Exposed	5	79.0	10.8	63.9	78.8	92.1
		HAC-U (HAC-R2)[b]		5	66.1	17.0	42.4	73.8	84.5
	2020	EDC-U	Reference	5	97.0	2.06	94.8	97.7	98.9
		HAC-R1	Exposed	5	74.0	9.26	64.8	74.9	86.3
		HAC-U (HAC-R2)[b]		5	46.5	16.4	20.7	54.2	61.5
	2021	EDC-U	Reference	5	85.8	6.83	77.0	85.9	94.6
		HAC-R1	Exposed	5	86.7	11.1	72.2	92.3	97.2
		HAC-U (HAC-R2)[b]		5	44.0	20.1	27.1	39.1	77.5
	2022	EDC-U	Reference	5	90.5	3.52	85.3	90.5	94.7
		HAC-R1	Exposed	5	77.2	15.6	53.5	80.0	93.4
		HAC-U (HAC-R2)[b]		5	59.4	29.5	14.6	78.0	82.0
	2023	EDC-U	Reference	5	97.3	1.76	94.6	97.1	99.2
		HAC-R1	Exposed	5	89.5	4.64	83.0	90.2	95.0
		HAC-U (HAC-R2)[b]		5	90.4	4.97	82.0	92.2	94.9
	2024	EDC-U	Reference	5	82.6	5.93	78.6	80.2	92.9
		HAC-R1	Exposed	5	76.6	9.59	65.8	77.2	88.1
		HAC-U (HAC-R2)[b]		5	77.3	11.4	59.3	81.5	88.2

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Dinoflagellates (%)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	0	0	0	0	0
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	0	0	0	0	0
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	0	0	0	0	0
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	0	0	0	0	0
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	0	-	0	0	0
	2018	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0.644	1.44	0	0	3.22
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
Phaeophytes (%)	2019	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	6.55	1.87	4.78	6.52	9.48
		HAC-U (HAC-R2)[b]		5	3.48	4.32	0	2.27	10.4
	2020	EDC-U	Reference	5	0	0	0	0	0
		HAC-R1	Exposed	5	14.4	6.18	7.29	15.0	23.0
		HAC-U (HAC-R2)[b]		5	19.6	5.02	13.6	18.2	27.1
	2021	EDC-U	Reference	5	0.537	0.880	0	0	2.03
		HAC-R1	Exposed	5	5.48	6.65	0.558	1.31	15.9
		HAC-U (HAC-R2)[b]		5	17.6	5.47	9.37	19.3	23.9
	2022	EDC-U	Reference	-	0	0	0	0	0
		HAC-R1	Exposed	-	8.30	3.52	4.50	6.51	12.4
		HAC-U (HAC-R2)[b]		-	8.61	8.41	2.18	5.31	22.7
	2023	EDC-U	Reference	-	0.00862	0.0193	0	0	0.0431
		HAC-R1	Exposed	-	2.69	2.60	0.311	1.39	5.88
		HAC-U (HAC-R2)[b]		-	0.545	0.397	0.146	0.473	1.10
	2024	EDC-U	Reference	-	0	0	0	0	0
		HAC-R1	Exposed	-	11.9	5.16	6.01	10.9	18.2
		HAC-U (HAC-R2)[b]		-	14.5	10.5	3.81	10.2	29.0
Rhodophytes (%)	2019	EDC-U	Reference	5	5.35	6.54	0	1.79	14.2
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2020	EDC-U	Reference	5	1.22	1.23	0.203	0.958	3.24
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2021	EDC-U	Reference	5	3.52	4.24	0	0.985	9.45
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2022	EDC-U	Reference	5	1.16	1.32	0	0.369	2.98
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2023	EDC-U	Reference	5	0.437	0.394	0	0.343	1.05
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0
	2024	EDC-U	Reference	5	0.609	0.393	0.223	0.605	1.22
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]		5	0	0	0	0	0

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.3.2: Summary Statistics of Periphyton Community and Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Chlorophyll-a (mg/m²)	1995	EDC-U (W9)[a]	Reference (Baseline)	3	9.60	1.81	7.52	10.5	10.8
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	10.6	0.312	10.3	10.8	10.8
	1996	EDC-U (W9)[a]	Reference (Baseline)	3	16.2	3.65	12.8	15.6	20.1
		HAC-U (W7; HAC-R2)[a,b]	Exposed (Baseline)	3	21.4	11.8	11.9	17.7	34.6
	2011	HAC-U (W7; HAC-R2)[a,b]	Exposed (Pre-Breach)	1	14.6	-	14.6	14.6	14.6
	2017	FPC-R3	Reference	3	8.50	4.73	5.45	6.10	13.9
		HAC-R1	Exposed	5	11.8	8.12	4.08	8.70	23.4
	2018	FPC-R3	Reference	5	16.6	2.00	13.7	17.1	18.7
		EDC-U	Reference	5	11.5	3.16	6.40	12.1	15.0
		HAC-R1	Exposed	5	17.7	8.48	10.8	12.7	31.0
		HAC-U (HAC-R2)[b]		5	12.6	3.67	9.55	10.9	18.0
	2019	FPC-R3	Reference	5	30.4	14.2	11.6	27.4	50.0
		EDC-U	Reference	5	25.0	20.3	9.80	19.1	60.0
		HAC-R1	Exposed	5	47.2	11.1	30.1	53.5	56.0
		HAC-U (HAC-R2)[b]		5	35.7	9.77	27.0	31.9	52.0
	2020	FPC-R3	Reference	5	20.1	12.6	6.75	20.1	34.0
		EDC-U	Reference	5	8.46	5.61	2.46	6.80	17.4
		HAC-R1	Exposed	5	56.7	28.1	32.1	50.0	99.0
		HAC-U (HAC-R2)[b]		5	14.9	8.96	3.49	12.4	26.6
		HAC-R3		5	1.66	0.951	0.324	1.74	3.00
	2021	FPC-R3	Reference	5	37.6	10.2	21.1	39.8	47.1
		EDC-U	Reference	5	5.44	1.93	2.05	6.20	6.75
		HAC-R1	Exposed	5	34.0	24.3	15.2	29.1	76.0
		HAC-U (HAC-R2)[b]		5	22.9	6.61	11.6	24.8	29.1
		HAC-R3		5	4.49	3.16	0.895	4.54	8.55
	2022	FPC-R3	Reference	5	49.2	38.1	15.2	46.8	112
		EDC-U	Reference	5	39.5	19.1	18.4	34.3	63.5
		HAC-R1	Exposed	5	87.4	37.1	53.5	71.5	144
		HAC-U (HAC-R2)[b]		5	26.8	7.18	14.4	28.1	32.4
		HAC-R3		8	3.97	4.74	0.740	2.43	12.2
	2023	FPC-R3	Reference	5	29.5	14.8	17.2	26.4	55.0
		EDC-U	Reference	5	16.1	6.10	9.70	18.1	23.7
		HAC-R1	Exposed	5	40.6	21.2	15.0	38.5	66.0
		HAC-U (HAC-R2)[b]		5	23.3	7.81	13.6	23.7	34.2
		HAC-R3		5	8.49	10.6	1.68	4.51	27.1
	2024	FPC-R3	Reference	5	30.8	3.75	26.6	29.6	35.1
		EDC-U	Reference	5	12.8	5.29	5.55	12.2	19.0
		HAC-R1	Exposed	5	47.0	19.1	29.6	43.3	75.0
		HAC-U (HAC-R2)[b]		5	20.4	16.9	4.59	14.3	39.5
		HAC-R3		5	16.0	6.46	6.65	16.1	22.4
Ash Free Dry Mass (g/m²)	2017	FPC-R3	Exposed	3	5.43	2.08	3.30	5.55	7.45
		HAC-U (HAC-R2)[b]	Exposed	5	5.48	3.22	1.95	6.25	9.50
	2018	FPC-R3	Reference	5	5.88	2.57	3.95	4.50	10.1
		EDC-U	Reference	5	6.66	3.67	3.55	6.05	12.6
		HAC-R1	Exposed	5	15.5	14.3	4.00	10.4	38.6
		HAC-U (HAC-R2)[b]		5	10.2	3.09	7.20	9.15	13.8
	2019	FPC-R3	Reference	5	9.15	3.85	3.00	11.2	11.9
		EDC-U	Reference	5	9.60	7.97	4.50	6.55	23.8
		HAC-R1	Exposed	5	58.1	21.3	34.7	57.0	88.5
		HAC-U (HAC-R2)[b]		5	30.0	5.57	23.8	29.2	39.0
	2020	FPC-R3	Reference	5	15.8	7.76	6.95	16.2	26.6
		EDC-U	Reference	5	8.05	2.81	4.00	8.60	11.8
		HAC-R1	Exposed	5	126	36.7	71.0	128	172
		HAC-U (HAC-R2)[b]		5	59.4	17.4	31.2	62.0	75.5
		HAC-R3		5	3.47	1.54	1.95	3.10	5.95
	2021	FPC-R3	Reference	5	7.11	2.08	3.80	7.35	9.15
		EDC-U	Reference	5	4.89	2.32	2.00	4.00	7.80
		HAC-R1	Exposed	5	15.9	7.68	7.55	14.4	28.4
		HAC-U (HAC-R2)[b]		5	37.3	23.4	13.0	40.5	68.0
		HAC-R3		5	2.15	1.50	0.550	1.75	4.55
	2022	FPC-R3	Reference	5	6.87	2.95	4.00	6.60	11.2
		EDC-U	Reference	5	10.6	5.47	3.55	12.2	16.9
		HAC-R1	Exposed	5	96.7	36.9	49.9	85.5	139
		HAC-U (HAC-R2)[b]		5	37.8	22.7	12.6	32.8	74.5
		HAC-R3		8	2.02	1.53	0.500	1.90	3.70
	2023	FPC-R3	Reference	5	7.82	3.31	5.25	6.85	13.6
		EDC-U	Reference	5	8.04	1.67	6.30	7.65	10.6
		HAC-R1	Exposed	5	15.1	6.97	5.75	16.4	21.5
		HAC-U (HAC-R2)[b]		5	19.6	6.55	13.9	16.6	26.8
		HAC-R3		5	16.9	19.2	0.500	7.30	44.4
	2024	FPC-R3	Reference	5	9.74	3.45	5.80	11.0	13.5
		EDC-U	Reference	5	15.0	3.68	10.1	16.1	18.4
		HAC-R1	Exposed	5	68.9	19.9	46.6	71.0	94.5
		HAC-U (HAC-R2)[b]		5	74.5	54.8	22.6	61.5	156
		HAC-R3		5	80.1	71.5	21.1	61.0	194

Notes: "-" indicates no value. mg/m² = milligrams per metre squared. g/m² = grams per metre squared. Periphyton community metrics that could be calculated for historical (baseline and pre-breach) data were limited due to the qualitative nature of these data. Data do not exist for each endpoint in each year; only years with reported data for a given endpoint are presented. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] W7 is the pre-breach sampling area associated with HAC-R1 and HAC-U. W9 is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

APPENDIX D.4
BENTHIC INVERTEBRATE COMMUNITY AND PRODUCTIVITY

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Density (#/m^2)	Richness (# of taxa)	Simpson's Evenness	Simpson's Diversity	Ephemeroptera (#/m^2)	Plecoptera (#/m^2)	Trichoptera (#/m^2)	EPT (#/m^2)	Arachnida (#/m^2)	Chironomidae (#/m^2)	Elmidae (#/m^2)	Non-Chironomidae Diptera (#/m^2)
2007	EDC-U (UER)[a]	Reference (Pre- Breach)	EDC-U-1	22,075	42	0.274	0.913	11,240	1,398	1,796	14,434	1,147	4,585	1,262	247
			EDC-U-2	57,534	42	0.423	0.944	18,473	4,731	7,950	31,154	5,849	17,319	2,867	344
			EDC-U-3	40,477	41	0.245	0.900	15,140	1,649	1,957	18,746	5,219	14,265	1,907	211
			EDC-U-4	63,208	35	0.398	0.928	25,118	5,086	11,882	42,086	2,186	15,484	2,875	233
			EDC-U-5	65,222	37	0.229	0.882	37,172	7,735	3,104	48,011	3,900	9,176	3,211	237
	HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre- Breach)	HAC-U-1	70,143	46	0.263	0.917	28,986	4,602	2,943	36,530	1,778	20,416	4,473	459
			HAC-U-2	33,857	42	0.224	0.894	13,878	1,964	1,491	17,333	7,914	5,219	1,950	401
			HAC-U-3	28,201	45	0.277	0.920	11,989	2,136	1,108	15,233	1,204	8,774	2,125	229
			HAC-U-4	42,297	40	0.314	0.920	17,892	5,430	2,520	25,842	6,308	6,079	2,581	516
			HAC-U-5	21,642	48	0.266	0.922	7,986	2,573	1,319	11,878	3,563	3,928	1,125	201
2018	FPC-R3	Reference	FPC-R3-1	13,964	27	0.341	0.891	4,875	2,896	172	7,943	631	4,588	86.0	0
			FPC-R3-2	12,724	26	0.282	0.863	609	681	71.7	1,362	179	8,925	0	287
			FPC-R3-3	7,419	35	0.418	0.932	1,075	2,384	89.6	3,548	71.7	2,186	502	53.8
			FPC-R3-4	17,491	35	0.305	0.906	968	1,183	179	2,330	645	11,864	681	143
			FPC-R3-5	6,949	30	0.318	0.895	159	518	59.7	737	39.8	4,062	119	179
	EDC-U		EDC-U-1	18,894	25	0.185	0.784	563	973	768	2,304	7,066	8,449	51.2	205
			EDC-U-2	179	14	0.410	0.826	0	0	0	0	57.4	100	0	3.58
			EDC-U-3	6,989	28	0.403	0.911	591	789	71.7	1,452	573	3,011	215	89.6
			EDC-U-4	4,211	28	0.350	0.898	230	474	51.2	755	410	2,317	102	89.6
			EDC-U-5	2,018	36	0.197	0.859	100	609	21.5	731	373	674	28.7	10.8
	HAC-R1	Exposed	HAC-R1-1	14,839	21	0.249	0.809	502	35.8	2,222	2,760	1,720	8,925	0	0
			HAC-R1-2	18,740	18	0.203	0.727	307	0	2,919	3,226	1,280	12,545	0	0
			HAC-R1-3	14,775	23	0.254	0.829	358	39.8	1,673	2,071	3,465	8,005	0	79.7
			HAC-R1-4	25,448	21	0.273	0.825	143	0	4,588	4,731	1,935	15,484	0	0
			HAC-R1-5	24,946	22	0.200	0.773	358	0	3,584	3,943	717	17,204	0	0
	HAC-U (HAC-R2)[b]		HAC-U-1	55,627	19	0.365	0.856	215	0	6,953	7,168	0	35,125	0	573
			HAC-U-2	39,570	24	0.271	0.846	717	0	5,878	6,595	0	24,301	0	2,366
			HAC-U-3	29,821	23	0.285	0.847	573	0	3,656	4,229	0	19,498	0	860
			HAC-U-4	45,018	22	0.204	0.777	215	0	2,509	2,724	0	28,029	0	287
			HAC-U-5	26,595	21	0.273	0.826	573	0	3,154	3,728	0	16,272	0	3,297
2019	FPC-R3	Reference	FPC-R3-1	5,867	34	0.364	0.919	585	623	56.6	1,264	358	3,207	56.6	132
			FPC-R3-2	9,677	34	0.430	0.932	3,011	860	263	4,134	836	3,202	167	71.7
			FPC-R3-3	6,756	27	0.485	0.924	1,810	806	17.9	2,634	53.8	3,280	269	0
			FPC-R3-4	5,806	28	0.194	0.816	2,509	1,452	35.8	3,996	71.7	1,416	53.8	53.8
			FPC-R3-5	7,551	27	0.346	0.893	2,103	932	47.8	3,082	550	2,366	191	71.7
	EDC-U		EDC-U-1	18,500	27	0.232	0.841	6,667	1,444	222	8,333	4,889	4,444	556	222
			EDC-U-2	7,500	32	0.252	0.876	3,714	429	23.8	4,167	429	2,071	190	214
			EDC-U-3	27,400	30	0.170	0.804	7,533	1,333	0	8,867	10,467	6,600	533	400
			EDC-U-4	13,292	29	0.365	0.905	4,250	875	0	5,125	1,000	5,333	542	83.3
			EDC-U-5	10,467	29	0.311	0.889	4,400	233	167	4,800	233	3,533	300	66.7
	HAC-R1	Exposed	HAC-R1-1	35,667	23	0.284	0.847	11,600	0	9,000	20,600	5,133	8,267	0	267
			HAC-R1-2	36,533	24	0.434	0.904	8,333	0	9,467	17,800	5,400	10,333	0	2,000
			HAC-R1-3	44,667	29	0.365	0.906	10,533	0	9,867	20,400	3,400	18,933	267	800
			HAC-R1-4	35,400	28	0.393	0.909	6,933	0	6,067	13,000	4,200	15,267	0	400
			HAC-R1-5	25,200	27	0.347	0.893	6,133	66.7	8,067	14,267	267	8,000	0	2,267
	HAC-U (HAC-R2)[b]		HAC-U-1	38,000	29	0.381	0.909	9,200	0	10,667	19,867	200	13,600	200	3,533
			HAC-U-2	56,400	24	0.468	0.911	9,533	0	12,667	22,200	0	27,667	0	1,867
			HAC-U-3	57,933	25	0.432	0.907	9,467	0	14,200	23,667	0	27,933	0	2,533
			HAC-U-4	40,933	24	0.460	0.909	5,867	66.7	11,067	17,000	200	18,467	0	1,867
			HAC-U-5	43,133	29	0.376	0.908	5,933	0	7,600	13,533	66.7	21,067	66.7	667

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1 and HAC-U. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Density (#/m^2)	Richness (# of taxa)	Simpson's Evenness	Simpson's Diversity	Ephemeroptera (#/m^2)	Plecoptera (#/m^2)	Trichoptera (#/m^2)	EPT (#/m^2)	Arachnida (#/m^2)	Chironomidae (#/m^2)	Elmidae (#/m^2)	Non-Chironomidae Diptera (#/m^2)
2020	FPC-R3	Reference	FPC-R3-1	9,370	30	0.290	0.885	2,714	1,536	102	4,352	538	2,279	0	102
			FPC-R3-2	23,441	31	0.278	0.884	11,613	2,581	358	14,552	1,147	3,584	0	573
			FPC-R3-3	19,764	36	0.160	0.826	13,415	1,997	410	15,822	358	2,407	563	154
			FPC-R3-4	5,634	37	0.253	0.893	2,222	1,133	86.0	3,441	330	1,233	129	71.7
			FPC-R3-5	6,680	30	0.348	0.904	1,776	1,597	65.2	3,438	114	2,476	228	48.9
	HAC-R1	Exposed	HAC-R1-1	38,600	24	0.189	0.779	2,200	0	5,933	8,133	16,800	9,933	0	600
			HAC-R1-2	49,600	28	0.119	0.699	2,133	0	1,067	3,200	26,133	11,733	0	267
			HAC-R1-3	27,000	25	0.253	0.842	1,533	0	3,067	4,600	9,400	10,667	0	333
			HAC-R1-4	26,800	30	0.234	0.857	2,733	0	2,600	5,333	8,600	10,133	0	600
			HAC-R1-5	42,933	28	0.164	0.782	2,067	0	3,133	5,200	18,933	14,667	0	400
	HAC-U (HAC-R2)[b]		HAC-U-1	17,778	24	0.211	0.802	7,167	0	5,056	12,222	333	3,722	0	1,000
			HAC-U-2	21,600	22	0.242	0.812	8,267	0	2,933	11,200	333	3,800	0	5,800
			HAC-U-3	95,133	27	0.301	0.877	9,600	0	32,000	41,600	1,267	42,800	0	8,000
			HAC-U-4	42,267	31	0.216	0.851	3,600	0	17,933	21,533	867	16,467	66.7	1,733
			HAC-U-5	53,200	31	0.328	0.902	8,800	0	16,000	24,800	1,067	20,333	200	5,067
	HAC-R3		HAC-R3-1	16,238	25	0.248	0.839	5,000	286	8,857	14,143	47.6	1,619	0	333
			HAC-R3-2	22,600	26	0.411	0.906	6,533	267	9,933	16,733	66.7	4,533	667	533
			HAC-R3-3	11,933	30	0.210	0.841	3,800	200	5,767	9,767	0	1,300	200	133
			HAC-R3-4	10,600	26	0.241	0.840	3,167	100	5,767	9,033	66.7	1,000	0	167
			HAC-R3-5	11,233	20	0.351	0.858	3,033	133	3,600	6,767	33.3	767	467	100.0
2021	FPC-R3	Reference	FPC-R3-1	12,079	21	0.367	0.870	1,111	251	108	1,470	108	7,778	0	35.8
			FPC-R3-2	18,024	36	0.319	0.913	6,042	2,919	768	9,729	1,126	3,533	51.2	512
			FPC-R3-3	12,151	33	0.396	0.923	4,910	1,254	215	6,380	215	3,369	0	179
			FPC-R3-4	4,989	34	0.337	0.913	1,032	573	100	1,706	71.7	2,136	129	28.7
			FPC-R3-5	19,068	37	0.240	0.887	9,720	2,552	315	12,588	832	4,158	860	172
	EDC-U		EDC-U-1	7,814	27	0.194	0.809	430	167	382	980	2,557	3,631	134	48.4
			EDC-U-2	2,452	37	0.366	0.926	480	136	108	724	251	1,104	21.5	21.5
			EDC-U-3	4,287	27	0.314	0.882	530	100	71.7	703	516	1,821	0	115
			EDC-U-4	4,344	26	0.413	0.907	946	115	43.0	1,104	244	2,437	14.3	71.7
			EDC-U-5	3,751	25	0.252	0.841	746	138	57.4	941	963	1,365	161	0
	HAC-R1	Exposed	HAC-R1-1	7,667	33	0.183	0.834	1,267	0	767	2,033	2,683	1,333	0	16.7
			HAC-R1-2	9,250	31	0.283	0.886	2,139	0	2,528	4,667	1,667	1,750	83.3	0
			HAC-R1-3	11,800	26	0.172	0.776	2,467	33.3	700	3,200	4,800	2,667	66.7	33.3
			HAC-R1-4	10,667	31	0.195	0.834	2,667	0	567	3,233	3,433	2,367	33.3	33.3
			HAC-R1-5	11,133	32	0.214	0.854	3,167	133	500	3,800	2,733	3,800	0	33.3
	HAC-U (HAC-R2)[b]		HAC-U-1	13,292	24	0.340	0.878	6,458	0	3,583	10,042	250	2,458	41.7	125
			HAC-U-2	16,952	20	0.381	0.869	9,714	0	4,000	13,714	143	2,571	143	47.6
			HAC-U-3	12,593	27	0.230	0.839	6,704	0	2,407	9,111	148	2,296	0	222
			HAC-U-4	22,200	26	0.222	0.826	7,600	0	10,667	18,267	200	2,533	0	533
			HAC-U-5	15,952	31	0.177	0.818	4,524	47.6	7,476	12,048	0	2,190	429	286
	HAC-R3		HAC-R3-1	26,667	29	0.182	0.811	9,533	800	14,200	24,533	0	867	66.7	333
			HAC-R3-2	20,111	21	0.217	0.780	10,056	389	7,722	18,167	0	1,500	222	111
			HAC-R3-3	21,733	25	0.107	0.628	3,533	400	15,067	19,000	0	2,400	133	200
			HAC-R3-4	16,143	21	0.478	0.900	2,810	381	5,476	8,667	0	7,429	47.6	0
			HAC-R3-5	27,400	24	0.117	0.643	3,667	333	20,200	24,200	0	2,533	400	200

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1 and HAC-U. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Density (#/m^2)	Richness (# of taxa)	Simpson's Evenness	Simpson's Diversity	Ephemeroptera (#/m^2)	Plecoptera (#/m^2)	Trichoptera (#/m^2)	EPT (#/m^2)	Arachnida (#/m^2)	Chironomidae (#/m^2)	Elmidae (#/m^2)	Non-Chironomidae Diptera (#/m^2)
2022	FPC-R3	Reference	FPC-R3-1	19,304	31	0.137	0.765	7,629	1,741	102	9,473	410	2,714	0	205
			FPC-R3-2	26,595	26	0.157	0.755	16,559	5,520	1,219	23,297	789	1,362	287	71.7
			FPC-R3-3	14,444	30	0.196	0.830	8,781	3,405	502	12,688	430	466	323	108
			FPC-R3-4	18,399	25	0.304	0.868	9,379	4,301	717	14,397	418	2,210	239	59.7
			FPC-R3-5	16,368	36	0.296	0.906	5,695	5,894	518	12,107	358	2,111	438	398
	EDC-U		EDC-U-1	27,814	27	0.155	0.762	4,086	3,441	358	7,885	12,903	4,875	502	143
			EDC-U-2	28,029	26	0.184	0.791	5,878	1,147	0	7,025	3,943	4,875	430	71.7
			EDC-U-3	39,211	31	0.256	0.874	8,961	1,434	10,538	20,932	5,806	9,749	1,864	0
			EDC-U-4	9,032	36	0.317	0.912	3,441	1,523	806	5,771	1,326	1,111	358	35.8
			EDC-U-5	7,860	31	0.360	0.910	1,382	794	1,126	3,303	1,357	1,920	205	102
	HAC-R1	Exposed	HAC-R1-1	52,067	25	0.248	0.839	3,133	0	10,067	13,200	2,733	32,467	133	1,333
			HAC-R1-2	52,133	24	0.203	0.794	3,000	0	13,933	16,933	1,133	31,200	0	1,600
			HAC-R1-3	60,933	36	0.196	0.858	3,333	0	7,733	11,067	6,333	38,800	600	1,267
			HAC-R1-4	28,267	30	0.376	0.911	2,667	0	5,200	7,867	1,133	15,933	400	267
			HAC-R1-5	28,933	28	0.342	0.896	1,533	0	4,333	5,867	933	19,867	133	400
	HAC-U (HAC-R2)[b]		HAC-U-1	36,333	34	0.262	0.888	5,133	0	10,733	15,867	467	15,067	1,133	600
			HAC-U-2	28,267	30	0.362	0.908	3,933	66.7	7,067	11,067	1,867	10,533	1,400	200
			HAC-U-3	37,400	32	0.231	0.864	4,933	0	13,867	18,800	1,000	11,600	1,467	733
			HAC-U-4	39,200	32	0.288	0.891	4,933	0	13,467	18,400	733	15,261	1,933	1,473
			HAC-U-5	27,533	33	0.409	0.926	4,133	0	5,267	9,400	1,200	9,200	2,133	533
	HAC-R3		HAC-R3-1	18,278	29	0.348	0.901	11,222	111	2,722	14,056	0	2,056	1,056	389
			HAC-R3-2	18,500	24	0.155	0.730	9,000	333	6,111	15,444	0	2,000	833	111
			HAC-R3-3	22,800	18	0.161	0.654	5,133	133	16,933	22,200	0	467	0	133
			HAC-R3-4	20,889	18	0.193	0.713	5,500	0	14,611	20,111	0	667	0	0
			HAC-R3-5	10,933	18	0.142	0.610	1,900	33.3	8,367	10,300	33.3	333	200	66.7
2023	FPC-R3	Reference	FPC-R3-1	39,857	34	0.299	0.902	9,319	1,505	4,444	15,269	1,219	13,835	0	1,004
			FPC-R3-2	32,832	31	0.302	0.893	15,125	4,444	5,591	25,161	1,290	3,799	287	502
			FPC-R3-3	13,486	34	0.211	0.860	6,138	1,658	941	8,737	627	2,016	575	224
			FPC-R3-4	21,505	34	0.234	0.874	9,247	5,161	789	15,197	860	4,299	573	74.1
			FPC-R3-5	21,864	33	0.197	0.846	11,398	3,799	502	15,699	502	3,082	860	71.7
	EDC-U		EDC-U-1	15,278	24	0.234	0.822	2,419	134	5,376	7,930	1,703	4,884	134	269
			EDC-U-2	4,314	21	0.120	0.604	3,098	38.4	25.6	3,162	576	448	25.6	12.8
			EDC-U-3	20,131	23	0.181	0.760	5,675	239	478	6,392	8,602	3,644	179	0
			EDC-U-4	7,551	28	0.260	0.862	2,724	932	23.9	3,680	908	2,174	335	23.9
			EDC-U-5	4,036	23	0.400	0.891	611	0	13.3	624	664	1,686	119	26.6
	HAC-R1	Exposed	HAC-R1-1	18,944	29	0.328	0.895	3,333	0	3,000	6,333	1,167	8,722	111	333
			HAC-R1-2	28,467	32	0.237	0.868	3,867	0	5,667	9,533	1,067	14,467	600	267
			HAC-R1-3	16,967	28	0.389	0.908	3,133	0	1,700	4,833	867	8,900	600	133
			HAC-R1-4	20,800	25	0.238	0.832	1,000	0	467	1,467	1,267	13,733	0	200
			HAC-R1-5	16,667	25	0.495	0.919	2,000	0	2,500	4,500	1,222	8,722	444	111
	HAC-U (HAC-R2)[b]		HAC-U-1	29,067	31	0.411	0.921	4,000	0	5,000	9,000	867	13,067	2,000	533
			HAC-U-2	26,133	32	0.390	0.920	1,800	0	3,200	5,000	600	13,267	2,667	1,133
			HAC-U-3	29,267	33	0.357	0.915	2,933	0	5,467	8,400	600	14,533	4,200	333
			HAC-U-4	27,800	34	0.281	0.896	1,200	0	5,333	6,533	800	11,867	5,467	533
			HAC-U-5	50,000	39	0.129	0.802	3,533	0	5,733	9,267	1,000	30,533	5,067	1,200
	HAC-R3		HAC-R3-1	10,000	36	0.319	0.913	2,400	133	333	2,867	233	2,399	3,167	67.6
			HAC-R3-2	20,667	26	0.358	0.893	6,533	0	1,467	8,000	733	3,533	6,533	0
			HAC-R3-3	10,967	36	0.415	0.933	2,167	100	2,133	4,400	100.0	4,233	1,867	100
			HAC-R3-4	15,810	35	0.362	0.921	5,762	143	5,238	11,143	0	2,381	1,667	143
			HAC-R3-5	10,133	29	0.221	0.844	5,900	133	2,633	8,667	66.7	533	733	33.3

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Density (#/m^2)	Richness (# of taxa)	Simpson's Evenness	Simpson's Diversity	Ephemeroptera (#/m^2)	Plecoptera (#/m^2)	Trichoptera (#/m^2)	EPT (#/m^2)	Arachnida (#/m^2)	Chironomidae (#/m^2)	Elmidae (#/m^2)	Non-Chironomidae Diptera (#/m^2)
2024	FPC-R3	Reference	FPC-R3-1	30,466	37	0.120	0.776	5,090	1,219	1,434	7,742	430	7,168	71.7	860
			FPC-R3-2	16,743	30	0.218	0.847	8,090	1,382	2,867	12,340	973	1,946	205	102
			FPC-R3-3	20,789	31	0.288	0.888	10,693	3,465	1,434	15,591	538	2,628	956	179
			FPC-R3-4	16,743	31	0.201	0.839	9,473	2,458	358	12,289	870	1,690	1,178	154
			FPC-R3-5	7,253	29	0.210	0.836	3,943	1,560	190	5,693	211	358	822	63.2
	EDC-U		EDC-U-1	26,738	26	0.277	0.861	573	1,219	11,111	12,903	5,305	7,240	789	287
			EDC-U-2	7,455	31	0.260	0.876	1,971	538	1,559	4,068	394	2,079	627	179
			EDC-U-3	7,587	37	0.349	0.923	876	757	438	2,071	737	3,763	757	99.6
			EDC-U-4	10,394	35	0.248	0.885	1,323	469	414	2,206	276	3,888	303	82.7
			EDC-U-5	4,042	30	0.325	0.897	1,100	185	210	1,495	235	1,582	346	37.1
	HAC-R1	Exposed	HAC-R1-1	5,250	28	0.457	0.922	267	0	200	467	267	1,667	517	467
			HAC-R1-2	7,881	30	0.396	0.916	238	0	214	452	571	3,071	1,071	190
			HAC-R1-3	11,273	33	0.427	0.929	273	0	273	545	879	5,970	970	212
			HAC-R1-4	17,571	34	0.286	0.897	238	0	1,333	1,571	1,619	10,667	1,000	238
			HAC-R1-5	16,095	28	0.288	0.876	381	0	286	667	571	11,095	905	0
	HAC-U (HAC-R2)[b]		HAC-U-1	10,567	28	0.352	0.899	66.7	0	433	500	367	5,267	2,433	467
			HAC-U-2	13,292	27	0.266	0.861	958	0	125	1,083	1,542	3,417	4,958	250
			HAC-U-3	30,400	35	0.291	0.902	600	0	600	1,200	2,000	11,267	8,333	600
			HAC-U-4	36,200	31	0.323	0.900	733	0	467	1,200	1,533	17,867	8,000	400
			HAC-U-5	27,867	33	0.292	0.896	600	0	867	1,467	1,333	12,333	4,667	333
	HAC-R3		HAC-R3-1	12,000	29	0.139	0.751	1,519	148	185	1,852	74.1	1,481	6,593	222
			HAC-R3-2	17,389	33	0.261	0.884	6,111	389	833	7,333	167	3,444	3,778	167
			HAC-R3-3	7,517	42	0.252	0.906	1,650	83.3	1,117	2,850	33.3	2,000	1,967	66.7
			HAC-R3-4	7,452	35	0.241	0.882	1,310	47.6	1,429	2,786	0	1,476	2,381	71.4
			HAC-R3-5	4,985	28	0.216	0.835	1,030	15.2	1,061	2,106	30.3	439	1,985	15.2

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Oligochaeta (#/m^2)	Ephemeroptera (%)	Plecoptera (%)	Trichoptera (%)	EPT (%)	Arachnida (%)	Chironomidae (%)	Elmidae (%)	Non-Chironomidae Diptera (%)	Oligochaeta (%)	CA1 (29.0%)	CA2 (10.4%)	CA3 (7.9%)	Dry Weight Biomass (g/m^2 DW)	Wet Weight Biomass (g/m^2 WW)
2007	EDC-U (UER)[a]	Reference (Pre- Breach)	EDC-U-1	344	50.9	6.33	8.13	65.4	5.20	20.8	5.72	1.12	1.56	-0.466	0.149	0.394	-	-
			EDC-U-2	0	32.1	8.22	13.8	54.1	10.2	30.1	4.98	0.598	0	-0.648	0.483	0.485	-	-
			EDC-U-3	115	37.4	4.07	4.83	46.3	12.9	35.2	4.71	0.522	0.283	-0.664	0.248	0.505	-	-
			EDC-U-4	0	39.7	8.05	18.8	66.6	3.46	24.5	4.55	0.369	0	-0.905	0.246	0.694	-	-
			EDC-U-5	459	57.0	11.9	4.76	73.6	5.98	14.1	4.92	0.363	0.703	-0.968	0.574	0.810	-	-
	HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre- Breach)	HAC-U-1	344	41.3	6.56	4.20	52.1	2.53	29.1	6.38	0.654	0.491	-0.711	0.496	0.561	-	-
			HAC-U-2	746	41.0	5.80	4.40	51.2	23.4	15.4	5.76	1.19	2.20	-0.581	0.343	-0.0556	-	-
			HAC-U-3	459	42.5	7.57	3.93	54.0	4.27	31.1	7.54	0.813	1.63	-0.945	0.0995	0.243	-	-
			HAC-U-4	229	42.3	12.8	5.96	61.1	14.9	14.4	6.10	1.22	0.542	-0.888	0.526	0.168	-	-
			HAC-U-5	832	36.9	11.9	6.09	54.9	16.5	18.1	5.20	0.927	3.84	-0.687	0.474	0.315	-	-
2018	FPC-R3	Reference	FPC-R3-1	86.0	34.9	20.7	1.23	56.9	4.52	32.9	0.616	0	0.616	-1.15	-0.144	0.0621	1.17	22.9
			FPC-R3-2	430	4.79	5.35	0.563	10.7	1.41	70.1	0	2.25	3.38	-1.31	-0.530	-0.0817	0.358	1.86
			FPC-R3-3	358	14.5	32.1	1.21	47.8	0.966	29.5	6.76	0.725	4.83	-1.30	0.0726	0.0997	3.14	13.6
			FPC-R3-4	1,039	5.53	6.76	1.02	13.3	3.69	67.8	3.89	0.820	5.94	-1.52	-0.178	-0.176	2.55	11.6
			FPC-R3-5	677	2.29	7.45	0.860	10.6	0.573	58.5	1.72	2.58	9.74	-1.43	-0.431	0.186	0.434	2.13
	EDC-U		EDC-U-1	256	2.98	5.15	4.07	12.2	37.4	44.7	0.271	1.08	1.36	-0.803	-0.601	-0.453	3.03	20.2
			EDC-U-2	7.17	0	0	0	0	32.0	56.0	0	2.00	4.00	0.127	-1.38	0.822	0.0100	0.0710
			EDC-U-3	753	8.46	11.3	1.03	20.8	8.21	43.1	3.08	1.28	10.8	-0.578	-1.36	-0.357	3.70	14.6
			EDC-U-4	410	5.47	11.2	1.22	17.9	9.73	55.0	2.43	2.13	9.73	-0.508	-0.932	-0.277	0.177	1.37
			EDC-U-5	93.2	4.97	30.2	1.07	36.2	18.5	33.4	1.42	0.533	4.62	-0.726	-0.897	-0.287	0.0548	0.419
	HAC-R1	Exposed	HAC-R1-1	430	3.38	0.242	15.0	18.6	11.6	60.1	0	0	2.90	0.507	-0.707	0.633	0.502	4.50
			HAC-R1-2	205	1.64	0	15.6	17.2	6.83	66.9	0	0	1.09	0.735	-0.567	0.920	0.814	4.97
			HAC-R1-3	438	2.43	0.270	11.3	14.0	23.4	54.2	0	0.539	2.96	0.538	-0.948	0.636	0.434	2.27
			HAC-R1-4	1,505	0.563	0	18.0	18.6	7.61	60.9	0	0	5.92	0.677	-0.948	0.662	1.38	7.40
			HAC-R1-5	1,935	1.44	0	14.4	15.8	2.87	69.0	0	0	7.76	0.693	-0.884	0.803	0.889	4.51
	HAC-U (HAC-R2)[b]		HAC-U-1	12,545	0.387	0	12.5	12.9	0	63.1	0	1.03	22.6	0.962	-0.785	0.900	2.59	13.4
			HAC-U-2	6,165	1.81	0	14.9	16.7	0	61.4	0	5.98	15.6	0.860	-0.617	1.03	1.20	9.26
			HAC-U-3	5,233	1.92	0	12.3	14.2	0	65.4	0	2.88	17.6	0.795	-0.642	1.06	0.910	6.29
			HAC-U-4	12,545	0.478	0	5.57	6.05	0	62.3	0	0.637	27.9	0.800	-0.893	1.17	0.824	3.89
			HAC-U-5	3,154	2.16	0	11.9	14.0	0	61.2	0	12.4	11.9	0.795	-0.362	1.35	0.674	3.71
2019	FPC-R3	Reference	FPC-R3-1	151	9.97	10.6	0.965	21.5	6.11	54.7	0.965	2.25	2.57	-0.867	-0.345	0.241	1.11	5.00
			FPC-R3-2	263	31.1	8.89	2.72	42.7	8.64	33.1	1.73	0.741	2.72	-0.999	-0.233	0.196	5.51	28.5
			FPC-R3-3	161	26.8	11.9	0.265	39.0	0.796	48.5	3.98	0	2.39	-1.21	-0.212	0.180	0.201	1.05
			FPC-R3-4	143	43.2	25.0	0.617	68.8	1.23	24.4	0.926	0.926	2.47	-1.58	0.0377	-0.0473	0.186	0.953
			FPC-R3-5	430	27.9	12.3	0.633	40.8	7.28	31.3	2.53	0.949	5.70	-1.65	-0.0777	-0.221	0.992	5.22
	EDC-U		EDC-U-1	55.6	36.0	7.81	1.20	45.0	26.4	24.0	3.00	1.20	0.300	-0.738	0.128	-0.256	1.34	13.5
			EDC-U-2	357	49.5	5.71	0.317	55.6	5.71	27.6	2.54	2.86	4.76	-0.838	-0.0817	-0.269	0.336	1.63
			EDC-U-3	400	27.5	4.87	0	32.4	38.2	24.1	1.95	1.46	1.46	-0.892	-0.209	-0.0975	3.04	17.6
			EDC-U-4	1,167	32.0	6.58	0	38.6	7.52	40.1	4.08	0.627	8.78	-0.571	-0.221	0.115	0.462	2.50
			EDC-U-5	1,533	42.0	2.23	1.59	45.9	2.23	33.8	2.87	0.637	14.6	-0.515	0.233	-0.0647	0.287	1.56
	HAC-R1	Exposed	HAC-R1-1	533	32.5	0	25.2	57.8	14.4	23.2	0	0.748	1.50	0.858	-0.445	0.631	5.53	42.3
			HAC-R1-2	133	22.8	0	25.9	48.7	14.8	28.3	0	5.47	0.365	0.869	-0.396	0.634	5.05	30.5
			HAC-R1-3	267	23.6	0	22.1	45.7	7.61	42.4	0.597	1.79	0.597	0.555	-0.357	0.538	3.07	22.5
			HAC-R1-4	1,000	19.6	0	17.1	36.7	11.9	43.1	0	1.13	2.82	0.627	-0.429	0.668	1.93	12.1
			HAC-R1-5	267	24.3	0.265	32.0	56.6	1.06	31.8	0	8.99	1.06	0.614	-0.222	0.925	2.37	15.6
	HAC-U (HAC-R2)[b]		HAC-U-1	0	24.2	0	28.1	52.3	0.526	35.8	0.526	9.30	0	0.761	-0.0598	0.223	12.3	53.7
			HAC-U-2	4,600	16.9	0	22.5	39.4	0	49.0	0	3.31	8.16	0.749	0.0400	1.09	3.88	29.7
			HAC-U-3	3,667	16.3	0	24.5	40.9	0	48.2	0	4.37	6.33	0.734	-0.202	1.09	5.54	33.9
			HAC-U-4	3,200	14.3	0.163	27.0	41.5	0.489	45.1	0	4.56	7.82	0.662	-0.0472	1.04	2.99	19.7
			HAC-U-5	4,667	13.8	0	17.6	31.4	0.155	48.8	0.155	1.55	10.8	0.845	-0.250	0.690	1.85	11.7

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1 and HAC-U. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Oligochaeta (#/m^2)	Ephemeroptera (%)	Plecoptera (%)	Trichoptera (%)	EPT (%)	Arachnida (%)	Chironomidae (%)	Elmidae (%)	Non-Chironomidae Diptera (%)	Oligochaeta (%)	CA1 (29.0%)	CA2 (10.4%)	CA3 (7.9%)	Dry Weight Biomass (g/m^2 DW)	Wet Weight Biomass (g/m^2 WW)
2020	FPC-R3	Reference	FPC-R3-1	128	29.0	16.4	1.09	46.5	5.74	24.3	0	1.09	1.37	-0.742	-0.411	0.660	0.486	2.29
			FPC-R3-2	1,505	49.5	11.0	1.53	62.1	4.89	15.3	0	2.45	6.42	-1.10	-0.126	0.598	9.23	54.8
			FPC-R3-3	154	67.9	10.1	2.07	80.0	1.81	12.2	2.85	0.777	0.777	-1.11	0.415	0.404	0.696	3.84
			FPC-R3-4	143	39.4	20.1	1.53	61.1	5.85	21.9	2.29	1.27	2.54	-1.26	-0.0541	0.271	0.737	3.61
			FPC-R3-5	228	26.6	23.9	0.976	51.5	1.71	37.1	3.41	0.732	3.41	-1.28	-0.00411	-0.0550	0.199	0.621
	HAC-R1	Exposed	HAC-R1-1	400	5.70	0	15.4	21.1	43.5	25.7	0	1.55	1.04	0.822	-0.228	0.0627	1.54	17.7
			HAC-R1-2	1,667	4.30	0	2.15	6.45	52.7	23.7	0	0.538	3.36	0.618	-0.622	-0.191	3.33	12.6
			HAC-R1-3	400	5.68	0	11.4	17.0	34.8	39.5	0	1.23	1.48	0.445	-0.234	0.0408	2.52	13.8
			HAC-R1-4	467	10.2	0	9.70	19.9	32.1	37.8	0	2.24	1.74	0.641	-0.0882	0.203	8.89	47.2
			HAC-R1-5	1,133	4.81	0	7.30	12.1	44.1	34.2	0	0.932	2.64	0.779	-0.382	0.375	3.58	13.3
	HAC-U (HAC-R2)[b]		HAC-U-1	0	40.3	0	28.4	68.8	1.87	20.9	0	5.62	0	0.773	0.533	0.159	3.97	21.2
			HAC-U-2	66.7	38.3	0	13.6	51.9	1.54	17.6	0	26.9	0.309	0.774	0.467	0.288	1.53	10.3
			HAC-U-3	133	10.1	0	33.6	43.7	1.33	45.0	0	8.41	0.140	0.775	0.176	0.454	12.6	70.4
			HAC-U-4	533	8.52	0	42.4	51.0	2.05	39.0	0.158	4.10	1.26	0.731	0.235	0.145	4.87	23.3
			HAC-U-5	667	16.5	0	30.1	46.6	2.01	38.2	0.376	9.52	1.25	0.677	0.276	0.113	3.67	18.1
	HAC-R3		HAC-R3-1	95.2	30.8	1.76	54.5	87.1	0.293	9.97	0	2.05	0.587	0.396	0.789	-0.0208	0.900	4.65
			HAC-R3-2	0	28.9	1.18	44.0	74.0	0.295	20.1	2.95	2.36	0	0.182	1.06	-0.280	2.36	9.65
			HAC-R3-3	533	31.8	1.68	48.3	81.8	0	10.9	1.68	1.12	4.47	0.411	0.640	-0.00789	0.380	1.48
			HAC-R3-4	333	29.9	0.943	54.4	85.2	0.629	9.43	0	1.57	3.14	0.340	1.11	-0.224	0.573	2.67
			HAC-R3-5	3,100	27.0	1.19	32.0	60.2	0.297	6.82	4.15	0.890	27.6	0.200	0.892	-0.245	0.543	2.04
2021	FPC-R3	Reference	FPC-R3-1	71.7	9.20	2.08	0.890	12.2	0.890	64.4	0	0.297	0.593	-0.881	-0.517	-0.135	0.441	2.76
			FPC-R3-2	2,663	33.5	16.2	4.26	54.0	6.25	19.6	0.284	2.84	14.8	-0.786	0.0407	0.272	1.99	11.3
			FPC-R3-3	1,398	40.4	10.3	1.77	52.5	1.77	27.7	0	1.47	11.5	-1.14	-0.0983	0.0483	1.32	5.58
			FPC-R3-4	430	20.7	11.5	2.01	34.2	1.44	42.8	2.59	0.575	8.62	-1.05	-0.278	-0.143	1.29	5.22
			FPC-R3-5	258	51.0	13.4	1.65	66.0	4.36	21.8	4.51	0.902	1.35	-1.36	0.124	-0.0650	1.04	4.16
	EDC-U		EDC-U-1	215	5.50	2.14	4.89	12.5	32.7	46.5	1.71	0.620	2.75	-0.349	-0.792	-0.533	0.346	1.71
			EDC-U-2	151	19.6	5.56	4.39	29.5	10.2	45.0	0.877	0.877	6.14	-0.597	-0.885	-0.466	1.27	5.84
			EDC-U-3	1,061	12.4	2.34	1.67	16.4	12.0	42.5	0	2.68	24.8	-0.321	-1.31	-0.627	0.222	1.18
			EDC-U-4	330	21.8	2.64	0.990	25.4	5.61	56.1	0.330	1.65	7.59	-0.785	-1.08	-0.871	0.376	2.36
			EDC-U-5	252	19.9	3.67	1.53	25.1	25.7	36.4	4.28	0	6.73	-0.883	-0.920	-0.990	0.475	1.98
	HAC-R1	Exposed	HAC-R1-1	183	16.5	0	10.0	26.5	35.0	17.4	0	0.217	2.39	0.552	0.238	-0.000426	1.98	8.97
			HAC-R1-2	55.6	23.1	0	27.3	50.5	18.0	18.9	0.901	0	0.601	0.442	0.550	0.0255	2.84	11.3
			HAC-R1-3	0	20.9	0.282	5.93	27.1	40.7	22.6	0.565	0.282	0	0.531	-0.189	-0.207	1.63	7.11
			HAC-R1-4	100	25.0	0	5.31	30.3	32.2	22.2	0.312	0.312	0.938	0.436	0.406	-0.0124	1.07	4.74
			HAC-R1-5	167	28.4	1.20	4.49	34.1	24.6	34.1	0	0.299	1.50	0.415	0.277	0.275	6.80	19.8
	HAC-U (HAC-R2)[b]		HAC-U-1	0	48.6	0	27.0	75.5	1.88	18.5	0.313	0.940	0	0.551	0.611	0.166	2.80	15.0
			HAC-U-2	47.6	57.3	0	23.6	80.9	0.843	15.2	0.843	0.281	0.281	0.495	0.766	0.199	1.10	6.82
			HAC-U-3	185	53.2	0	19.1	72.3	1.18	18.2	0	1.76	1.47	0.652	0.476	-0.0168	4.06	15.8
			HAC-U-4	133	34.2	0	48.0	82.3	0.901	11.4	0	2.40	0.601	0.720	0.799	0.155	2.41	16.4
			HAC-U-5	143	28.4	0.299	46.9	75.5	0	13.7	2.69	1.79	0.896	0.662	0.373	0.0790	3.26	14.9
	HAC-R3		HAC-R3-1	133	35.8	3.00	53.2	92.0	0	3.25	0.250	1.25	0.500	-0.0503	0.983	-0.278	1.44	6.29
			HAC-R3-2	0	50.0	1.93	38.4	90.3	0	7.46	1.10	0.552	0	0.171	1.36	-0.460	1.22	5.54
			HAC-R3-3	0	16.3	1.84	69.3	87.4	0	11.0	0.613	0.920	0	0.0176	1.41	-0.420	2.89	9.22
			HAC-R3-4	0	17.4	2.36	33.9	53.7	0	46.0	0.295	0	0	0.302	1.28	0.0641	2.20	12.3
			HAC-R3-5	66.7	13.4	1.22	73.7	88.3	0	9.25	1.46	0.730	0.243	0.215	1.44	-0.611	5.48	33.2

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1 and HAC-U. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Oligochaeta (#/m^2)	Ephemeroptera (%)	Plecoptera (%)	Trichoptera (%)	EPT (%)	Arachnida (%)	Chironomidae (%)	Elmidae (%)	Non-Chironomidae Diptera (%)	Oligochaeta (%)	CA1 (29.0%)	CA2 (10.4%)	CA3 (7.9%)	Dry Weight Biomass (g/m^2 DW)	Wet Weight Biomass (g/m^2 WW)
2022	FPC-R3	Reference	FPC-R3-1	512	39.5	9.02	0.531	49.1	2.12	14.1	0	1.06	2.65	-0.364	-0.256	0.384	5.35	1.72
			FPC-R3-2	143	62.3	20.8	4.58	87.6	2.96	5.12	1.08	0.270	0.539	-0.562	0.0358	0.614	0.638	0.220
			FPC-R3-3	179	60.8	23.6	3.47	87.8	2.98	3.23	2.23	0.744	1.24	-1.24	0.226	0.483	4.21	1.97
			FPC-R3-4	179	51.0	23.4	3.90	78.2	2.27	12.0	1.30	0.325	0.974	-1.35	0.215	0.215	1.68	0.617
			FPC-R3-5	239	34.8	36.0	3.16	74.0	2.19	12.9	2.68	2.43	1.46	-1.05	0.281	0.406	2.64	1.39
	EDC-U		EDC-U-1	1,434	14.7	12.4	1.29	28.4	46.4	17.5	1.80	0.515	5.15	-0.986	0.0526	0.137	21.7	3.86
			EDC-U-2	215	21.0	4.09	0	25.1	14.1	17.4	1.53	0.256	0.767	-1.06	0.192	0.128	1.12	0.239
			EDC-U-3	645	22.9	3.66	26.9	53.4	14.8	24.9	4.75	0	1.65	-0.442	0.200	-0.0799	1.55	0.359
			EDC-U-4	305	38.1	16.9	8.93	63.9	14.7	12.3	3.97	0.397	3.37	-0.743	0.0724	0.0452	0.797	0.790
			EDC-U-5	179	17.6	10.1	14.3	42.0	17.3	24.4	2.61	1.30	2.28	-0.603	0.187	0.240	0.264	0.189
	HAC-R1	Exposed	HAC-R1-1	467	6.02	0	19.3	25.4	5.25	62.4	0.256	2.56	0.896	0.699	0.364	0.164	2.47	0.698
			HAC-R1-2	0	5.75	0	26.7	32.5	2.17	59.9	0	3.07	0	0.772	0.434	0.230	3.05	0.849
			HAC-R1-3	267	5.47	0	12.7	18.2	10.4	63.7	0.985	2.08	0.438	0.543	0.162	-0.00837	1.56	0.410
			HAC-R1-4	400	9.43	0	18.4	27.8	4.01	56.4	1.42	0.943	1.42	0.578	0.0297	-0.0447	2.43	0.555
			HAC-R1-5	333	5.30	0	15.0	20.3	3.23	68.7	0.461	1.38	1.15	0.699	0.0416	-0.114	1.17	0.328
	HAC-U (HAC-R2)[b]		HAC-U-1	66.7	14.1	0	29.5	43.7	1.28	41.5	3.12	1.65	0.183	0.459	0.551	-0.444	6.37	1.05
			HAC-U-2	133	13.9	0.236	25.0	39.1	6.60	37.3	4.95	0.708	0.472	0.633	0.304	-0.377	2.75	0.518
			HAC-U-3	133	13.2	0	37.1	50.3	2.67	31.0	3.92	1.96	0.357	0.573	0.593	-0.324	3.52	0.765
			HAC-U-4	66.7	12.6	0	34.4	46.9	1.87	38.9	4.93	3.76	0.170	0.588	0.490	-0.358	3.12	0.790
			HAC-U-5	200	15.0	0	19.1	34.1	4.36	33.4	7.75	1.94	0.726	0.622	0.0916	-0.354	7.06	1.44
	HAC-R3		HAC-R3-1	167	61.4	0.608	14.9	76.9	0	11.2	5.78	2.13	0.912	0.118	0.821	-0.948	2.69	0.622
			HAC-R3-2	55.6	48.6	1.80	33.0	83.5	0	10.8	4.50	0.601	0.300	0.0675	1.38	-0.435	1.34	0.493
			HAC-R3-3	0	22.5	0.585	74.3	97.4	0	2.05	0	0.585	0	0.382	1.64	0.168	1.71	0.365
			HAC-R3-4	111	26.3	0	70.0	96.3	0	3.19	0	0	0.532	0.276	1.25	-0.108	1.53	0.370
			HAC-R3-5	0	17.4	0.305	76.5	94.2	0.305	3.05	1.83	0.610	0	0.415	1.01	-0.839	0.467	0.154
2023	FPC-R3	Reference	FPC-R3-1	71.7	23.4	3.78	11.2	38.3	3.06	34.7	0	2.52	0.180	0.0302	-0.338	0.469	3.64	19.7
			FPC-R3-2	0	46.1	13.5	17.0	76.6	3.93	11.6	0.873	1.53	0	-0.478	0.217	0.705	1.36	8.27
			FPC-R3-3	134	45.5	12.3	6.98	64.8	4.65	14.9	4.26	1.66	0.997	-0.898	0.252	0.0973	0.959	5.23
			FPC-R3-4	71.7	43.0	24.0	3.67	70.7	4.00	20.0	2.67	0.345	0.333	-0.966	-0.0606	0.291	16.3	45.2
			FPC-R3-5	430	52.1	17.4	2.30	71.8	2.30	14.1	3.93	0.328	1.97	-1.16	0.250	0.361	2.20	9.69
	EDC-U		EDC-U-1	269	15.8	0.880	35.2	51.9	11.1	32.0	0.880	1.76	1.76	-0.865	-0.509	-0.582	0.941	5.00
			EDC-U-2	12.8	71.8	0.890	0.593	73.3	13.3	10.4	0.593	0.297	0.297	-1.17	-0.706	-0.614	0.184	1.42
			EDC-U-3	179	28.2	1.19	2.37	31.8	42.7	18.1	0.890	0	0.890	-0.567	-0.774	-0.963	0.442	5.03
			EDC-U-4	95.6	36.1	12.3	0.316	48.7	12.0	28.8	4.43	0.316	1.27	-0.705	-0.683	-0.404	0.342	2.46
			EDC-U-5	810	15.1	0	0.329	15.5	16.4	41.8	2.96	0.658	20.1	-0.465	-1.25	-0.714	0.139	1.03
	HAC-R1	Exposed	HAC-R1-1	222	17.6	0	15.8	33.4	6.16	46.0	0.587	1.76	1.17	0.442	-0.229	-0.304	3.38	14.6
			HAC-R1-2	66.7	13.6	0	19.9	33.5	3.75	50.8	2.11	0.937	0.234	0.472	-0.149	-0.433	4.79	22.3
			HAC-R1-3	1,000	18.5	0	10.0	28.5	5.11	52.5	3.54	0.786	5.89	0.472	-0.156	-0.605	1.40	8.23
			HAC-R1-4	3,400	4.81	0	2.24	7.05	6.09	66.0	0	0.962	16.4	0.639	-1.09	-0.270	1.55	7.40
			HAC-R1-5	333	12.0	0	15.0	27.0	7.33	52.3	2.67	0.667	2.00	0.702	-0.412	-0.755	0.578	1.93
	HAC-U (HAC-R2)[b]		HAC-U-1	0	13.8	0	17.2	31.0	2.98	45.0	6.88	1.83	0	0.645	0.0901	-0.749	2.43	8.53
			HAC-U-2	1,067	6.89	0	12.2	19.1	2.30	50.8	10.2	4.34	4.08	0.628	-0.0663	-0.566	1.66	8.30
			HAC-U-3	200	10.0	0	18.7	28.7	2.05	49.7	14.3	1.14	0.683	0.374	-0.226	-0.718	2.23	10.3
			HAC-U-4	200	4.32	0	19.2	23.5	2.88	42.7	19.7	1.92	0.719	0.596	0.0805	-0.646	7.61	28.2
			HAC-U-5	533	7.07	0	11.5	18.5	2.00	61.1	10.1	2.40	1.07	0.505	-0.0626	-0.326	7.68	36.3
	HAC-R3		HAC-R3-1	100	24.0	1.33	3.33	28.7	2.33	24.0	31.7	0.676	1.00	0.250	0.0277	-0.524	7.21	22.5
			HAC-R3-2	66.7	31.6	0	7.10	38.7	3.55	17.1	31.6	0	0.323	0.335	0.133	-0.666	2.10	7.85
			HAC-R3-3	66.7	19.8	0.912	19.4	40.1	0.912	38.6	17.0	0.912	0.608	0.248	0.167	-0.102	0.450	1.16
			HAC-R3-4	0	36.5	0.904	33.1	70.5	0	15.1	10.5	0.904	0	0.261	0.837	-0.570	3.16	16.2
			HAC-R3-5	0	58.2	1.32	26.0	85.5	0.658	5.26	7.24	0.329	0	0.0941	0.947	-0.674	-	-

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1 and HAC-U. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.1: Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Year	Area	Type	Station	Oligochaeta (#/m^2)	Ephemeroptera (%)	Plecoptera (%)	Trichoptera (%)	EPT (%)	Arachnida (%)	Chironomidae (%)	Elmidae (%)	Non-Chironomidae Diptera (%)	Oligochaeta (%)	CA1 (29.0%)	CA2 (10.4%)	CA3 (7.9%)	Dry Weight Biomass (g/m^2 DW)	Wet Weight Biomass (g/m^2 WW)
2024	FPC-R3	Reference	FPC-R3-1	573	16.7	4.00	4.71	25.4	1.41	23.5	0.235	2.82	1.88	-0.277	-0.0409	0.739	4.41	32.3
			FPC-R3-2	102	48.3	8.26	17.1	73.7	5.81	11.6	1.22	0.612	0.612	-0.471	0.232	0.448	9.47	40.1
			FPC-R3-3	59.7	51.4	16.7	6.90	75.0	2.59	12.6	4.60	0	0.287	-0.667	0.354	0.844	13.4	77.9
			FPC-R3-4	0	56.6	14.7	2.14	73.4	5.20	10.1	7.03	0.917	0	-1.21	0.0752	0.170	8.34	39.7
			FPC-R3-5	0	54.4	21.5	2.62	78.5	2.91	4.94	11.3	0.872	0	-1.20	0.439	0.369	0.936	3.11
	EDC-U		EDC-U-1	143	2.14	4.56	41.5	48.3	19.8	27.1	2.95	1.07	0.536	-0.826	-0.125	-0.771	2.14	8.27
			EDC-U-2	53.8	26.4	7.21	20.9	54.6	5.29	27.9	8.41	2.40	0.721	-0.791	0.0401	-0.815	0.891	6.04
			EDC-U-3	99.6	11.6	9.97	5.77	27.3	9.71	49.6	9.97	0	1.31	-0.809	-0.237	-0.657	0.273	1.76
			EDC-U-4	3,336	12.7	4.51	3.98	21.2	2.65	37.4	2.92	0.796	32.1	-0.721	-1.16	-0.354	4.20	19.3
			EDC-U-5	321	27.2	4.59	5.20	37.0	5.81	39.1	8.56	0.917	7.95	-0.969	-0.817	-0.694	2.93	12.6
	HAC-R1	Exposed	HAC-R1-1	450	5.08	0	3.81	8.89	5.08	31.8	9.84	8.89	8.57	0.705	-0.518	-0.922	1.16	4.37
			HAC-R1-2	452	3.02	0	2.72	5.74	7.25	39.0	13.6	2.42	5.74	0.600	-0.735	-0.410	1.34	5.05
			HAC-R1-3	1,636	2.42	0	2.42	4.84	7.80	53.0	8.60	1.88	14.5	0.348	-1.15	-0.545	1.02	5.48
			HAC-R1-4	1,619	1.36	0	7.59	8.94	9.21	60.7	5.69	1.36	9.21	0.540	-0.525	-0.208	3.95	13.8
			HAC-R1-5	524	2.37	0	1.78	4.14	3.55	68.9	5.62	0	3.25	0.457	-1.08	-0.787	1.73	6.47
	HAC-U (HAC-R2)[b]		HAC-U-1	66.7	0.631	0	4.10	4.73	3.47	49.8	23.0	4.42	0.631	0.798	-0.352	-0.795	0.730	5.25
			HAC-U-2	208	7.21	0	0.940	8.15	11.6	25.7	37.3	1.88	1.57	0.442	-0.838	-1.19	0.683	3.55
			HAC-U-3	400	1.97	0	1.97	3.95	6.58	37.1	27.4	1.97	1.32	0.581	-0.425	-0.620	2.41	12.0
			HAC-U-4	867	2.03	0	1.29	3.31	4.24	49.4	22.1	1.10	2.39	0.580	-0.722	-0.773	3.71	12.5
			HAC-U-5	1,400	2.15	0	3.11	5.26	4.78	44.3	16.8	1.20	5.02	0.645	-0.875	-0.738	2.37	10.3
	HAC-R3		HAC-R3-1	222	12.6	1.23	1.54	15.4	0.617	12.3	54.9	1.85	1.85	0.0969	-0.553	-0.791	1.42	5.36
			HAC-R3-2	444	35.1	2.24	4.79	42.2	0.958	19.8	21.7	0.958	2.56	0.00278	-0.223	-0.279	2.03	8.07
			HAC-R3-3	33.3	21.9	1.11	14.9	37.9	0.443	26.6	26.2	0.887	0.443	0.0764	0.0560	-0.308	0.960	4.09
			HAC-R3-4	119	17.6	0.639	19.2	37.4	0	19.8	31.9	0.958	1.60	0.262	-0.0877	-0.615	0.893	3.58
			HAC-R3-5	121	20.7	0.304	21.3	42.2	0.608	8.81	39.8	0.304	2.43	-0.189	0.444	-1.32	0.411	2.05

Notes: "-" = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the pre-breach sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Density (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	49,703	18,255	22,075	57,534	65,222
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	39,228	18,874	21,642	33,857	70,143
	2018	FPC-R3	Reference	5	11,710	4,489	6,949	12,724	17,491
		EDC-U	Reference	5	6,458	7,401	179	4,211	18,894
		HAC-R1	Exposed	5	19,750	5,229	14,775	18,740	25,448
		HAC-U (HAC-R2)[b]	Exposed	5	39,326	11,733	26,595	39,570	55,627
	2019	FPC-R3	Reference	5	7,132	1,593	5,806	6,756	9,677
		EDC-U	Reference	5	15,432	7,823	7,500	13,292	27,400
		HAC-R1	Exposed	5	35,493	6,914	25,200	35,667	44,667
		HAC-U (HAC-R2)[b]	Exposed	5	47,280	9,223	38,000	43,133	57,933
	2020	FPC-R3	Reference	5	12,978	8,095	5,634	9,370	23,441
		HAC-R1	Exposed	5	36,987	10,007	26,800	38,600	49,600
		HAC-U (HAC-R2)[b]	Exposed	5	45,996	31,112	17,778	42,267	95,133
		HAC-R3	Exposed	5	14,521	5,027	10,600	11,933	22,600
	2021	FPC-R3	Reference	5	13,262	5,645	4,989	12,151	19,068
		EDC-U	Reference	5	4,529	1,988	2,452	4,287	7,814
		HAC-R1	Exposed	5	10,103	1,652	7,667	10,667	11,800
		HAC-U (HAC-R2)[b]	Exposed	5	16,198	3,811	12,593	15,952	22,200
		HAC-R3	Exposed	5	22,411	4,691	16,143	21,733	27,400
	2022	FPC-R3	Reference	5	19,022	4,632	14,444	18,399	26,595
		EDC-U	Reference	5	22,389	13,544	7,860	27,814	39,211
		HAC-R1	Exposed	5	44,467	14,928	28,267	52,067	60,933
		HAC-U (HAC-R2)[b]	Exposed	5	33,747	5,441	27,533	36,333	39,200
		HAC-R3	Exposed	5	18,280	4,507	10,933	18,500	22,800
	2023	FPC-R3	Reference	5	25,909	10,399	13,486	21,864	39,857
		EDC-U	Reference	5	10,262	7,143	4,036	7,551	20,131
		HAC-R1	Exposed	5	20,369	4,824	16,667	18,944	28,467
		HAC-U (HAC-R2)[b]	Exposed	5	32,453	9,888	26,133	29,067	50,000
		HAC-R3	Exposed	5	13,515	4,656	10,000	10,967	20,667
	2024	FPC-R3	Reference	5	18,399	8,382	7,253	16,743	30,466
		EDC-U	Reference	5	11,243	8,950	4,042	7,587	26,738
		HAC-R1	Exposed	5	11,614	5,247	5,250	11,273	17,571
		HAC-U (HAC-R2)[b]	Exposed	5	23,665	11,173	10,567	27,867	36,200
		HAC-R3	Exposed	5	9,869	4,907	4,985	7,517	17,389
Richness (# of taxa)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	39	3.21	35	41	42
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	44	3.19	40	45	48
	2018	FPC-R3	Reference	5	31	4.28	26	30	35
		EDC-U	Reference	5	26	7.95	14	28	36
		HAC-R1	Exposed	5	21	1.87	18	21	23
		HAC-U (HAC-R2)[b]	Exposed	5	22	1.92	19	22	24
	2019	FPC-R3	Reference	5	30	3.67	27	28	34
		EDC-U	Reference	5	29	1.82	27	29	32
		HAC-R1	Exposed	5	26	2.59	23	27	29
		HAC-U (HAC-R2)[b]	Exposed	5	26	2.59	24	25	29
	2020	FPC-R3	Reference	5	33	3.42	30	31	37
		HAC-R1	Exposed	5	27	2.45	24	28	30
		HAC-U (HAC-R2)[b]	Exposed	5	27	4.06	22	27	31
		HAC-R3	Exposed	5	25	3.58	20	26	30
	2021	FPC-R3	Reference	5	32	6.46	21	34	37
		EDC-U	Reference	5	28	4.88	25	27	37
		HAC-R1	Exposed	5	31	2.70	26	31	33
		HAC-U (HAC-R2)[b]	Exposed	5	26	4.04	20	26	31
		HAC-R3	Exposed	5	24	3.32	21	24	29
	2022	FPC-R3	Reference	5	30	4.39	25	30	36
		EDC-U	Reference	5	30	3.96	26	31	36
		HAC-R1	Exposed	5	29	4.77	24	28	36
		HAC-U (HAC-R2)[b]	Exposed	5	32	1.48	30	32	34
		HAC-R3	Exposed	5	21	4.98	18	18	29
	2023	FPC-R3	Reference	5	33	1.30	31	34	34
		EDC-U	Reference	5	24	2.59	21	23	28
		HAC-R1	Exposed	5	28	2.95	25	28	32
		HAC-U (HAC-R2)[b]	Exposed	5	34	3.11	31	33	39
		HAC-R3	Exposed	5	32	4.62	26	35	36
	2024	FPC-R3	Reference	5	32	3.13	29	31	37
		EDC-U	Reference	5	32	4.32	26	31	37
		HAC-R1	Exposed	5	31	2.79	28	30	34
		HAC-U (HAC-R2)[b]	Exposed	5	31	3.35	27	31	35
		HAC-R3	Exposed	5	33	5.59	28	33	42
Simpson's Evenness	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.314	0.0900	0.229	0.274	0.423
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	0.269	0.0323	0.224	0.266	0.314
	2018	FPC-R3	Reference	5	0.333	0.0522	0.282	0.318	0.418
		EDC-U	Reference	5	0.309	0.110	0.185	0.350	0.410
		HAC-R1	Exposed	5	0.236	0.0325	0.200	0.249	0.273
		HAC-U (HAC-R2)[b]	Exposed	5	0.280	0.0572	0.204	0.273	0.365
	2019	FPC-R3	Reference	5	0.364	0.110	0.194	0.364	0.485
		EDC-U	Reference	5	0.266	0.0745	0.170	0.252	0.365
		HAC-R1	Exposed	5	0.365	0.0557	0.284	0.365	0.434
		HAC-U (HAC-R2)[b]	Exposed	5	0.423	0.0432	0.376	0.432	0.468
	2020	FPC-R3	Reference	5	0.266	0.0685	0.160	0.278	0.348
		HAC-R1	Exposed	5	0.192	0.0539	0.119	0.189	0.253
		HAC-U (HAC-R2)[b]	Exposed	5	0.259	0.0526	0.211	0.242	0.328
		HAC-R3	Exposed	5	0.292	0.0847	0.210	0.248	0.411
	2021	FPC-R3	Reference	5	0.332	0.0591	0.240	0.337	0.396
		EDC-U	Reference	5	0.308	0.0873	0.194	0.314	0.413
		HAC-R1	Exposed	5	0.209	0.0442	0.172	0.195	0.283
		HAC-U (HAC-R2)[b]	Exposed	5	0.270	0.0863	0.177	0.230	0.381
		HAC-R3	Exposed	5	0.220	0.151	0.107	0.182	0.478
	2022	FPC-R3	Reference	5	0.218	0.0777	0.137	0.196	0.304
		EDC-U	Reference	5	0.254	0.0864	0.155	0.256	0.360
		HAC-R1	Exposed	5	0.273	0.0820	0.196	0.248	0.376
		HAC-U (HAC-R2)[b]	Exposed	5	0.310	0.0736	0.231	0.288	0.409
		HAC-R3	Exposed	5	0.200	0.0849	0.142	0.161	0.348
	2023	FPC-R3	Reference	5	0.249	0.0493	0.197	0.234	0.302
		EDC-U	Reference	5	0.239	0.105	0.120	0.234	0.400
		HAC-R1	Exposed	5	0.337	0.109	0.237	0.328	0.495
		HAC-U (HAC-R2)[b]	Exposed	5	0.314	0.114	0.129	0.357	0.411
		HAC-R3	Exposed	5	0.335	0.0723	0.221	0.358	0.415
	2024	FPC-R3	Reference	5	0.207	0.0597	0.120	0.210	0.288
		EDC-U	Reference	5	0.292	0.0434	0.248	0.277	0.349
		HAC-R1	Exposed	5	0.371	0.0795	0.286	0.396	0.457
		HAC-U (HAC-R2)[b]	Exposed	5	0.305	0.0334	0.266	0.292	0.352
		HAC-R3	Exposed	5	0.222	0.0495	0.139	0.241	0.261

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Simpson's Diversity	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.913	0.0239	0.882	0.913	0.944
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	0.915	0.0117	0.894	0.920	0.922
	2018	FPC-R3	Reference	5	0.898	0.0247	0.863	0.895	0.932
		EDC-U	Reference	5	0.856	0.0524	0.784	0.859	0.911
		HAC-R1	Exposed	5	0.792	0.0430	0.727	0.809	0.829
		HAC-U (HAC-R2)[b]	Exposed	5	0.830	0.0318	0.777	0.846	0.856
	2019	FPC-R3	Reference	5	0.897	0.0475	0.816	0.919	0.932
		EDC-U	Reference	5	0.863	0.0406	0.804	0.876	0.905
		HAC-R1	Exposed	5	0.892	0.0258	0.847	0.904	0.909
		HAC-U (HAC-R2)[b]	Exposed	5	0.909	0.00138	0.907	0.909	0.911
	2020	FPC-R3	Reference	5	0.879	0.0302	0.826	0.885	0.904
		HAC-R1	Exposed	5	0.792	0.0626	0.699	0.782	0.857
		HAC-U (HAC-R2)[b]	Exposed	5	0.849	0.0423	0.802	0.851	0.902
		HAC-R3	Exposed	5	0.857	0.0286	0.839	0.841	0.906
	2021	FPC-R3	Reference	5	0.901	0.0219	0.870	0.913	0.923
		EDC-U	Reference	5	0.873	0.0477	0.809	0.882	0.926
		HAC-R1	Exposed	5	0.837	0.0401	0.776	0.834	0.886
		HAC-U (HAC-R2)[b]	Exposed	5	0.846	0.0261	0.818	0.839	0.878
		HAC-R3	Exposed	5	0.752	0.116	0.628	0.780	0.900
	2022	FPC-R3	Reference	5	0.825	0.0652	0.755	0.830	0.906
		EDC-U	Reference	5	0.850	0.0697	0.762	0.874	0.912
		HAC-R1	Exposed	5	0.860	0.0465	0.794	0.858	0.911
		HAC-U (HAC-R2)[b]	Exposed	5	0.895	0.0230	0.864	0.891	0.926
		HAC-R3	Exposed	5	0.722	0.111	0.610	0.713	0.901
	2023	FPC-R3	Reference	5	0.875	0.0228	0.846	0.874	0.902
		EDC-U	Reference	5	0.788	0.114	0.604	0.822	0.891
		HAC-R1	Exposed	5	0.885	0.0349	0.832	0.895	0.919
		HAC-U (HAC-R2)[b]	Exposed	5	0.891	0.0507	0.802	0.915	0.921
		HAC-R3	Exposed	5	0.901	0.0351	0.844	0.913	0.933
	2024	FPC-R3	Reference	5	0.837	0.0402	0.776	0.839	0.888
		EDC-U	Reference	5	0.888	0.0233	0.861	0.885	0.923
		HAC-R1	Exposed	5	0.908	0.0214	0.876	0.916	0.929
		HAC-U (HAC-R2)[b]	Exposed	5	0.892	0.0174	0.861	0.899	0.902
		HAC-R3	Exposed	5	0.851	0.0616	0.751	0.882	0.906
Ephemeroptera (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	21,429	10,168	11,240	18,473	37,172
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	16,146	8,014	7,986	13,878	28,986
	2018	FPC-R3	Reference	5	1,537	1,900	159	968	4,875
		EDC-U	Reference	5	297	269	0	230	591
		HAC-R1	Exposed	5	334	129	143	358	502
		HAC-U (HAC-R2)[b]	Exposed	5	459	230	215	573	717
	2019	FPC-R3	Reference	5	2,003	912	585	2,103	3,011
		EDC-U	Reference	5	5,313	1,679	3,714	4,400	7,533
		HAC-R1	Exposed	5	8,707	2,325	6,133	8,333	11,600
		HAC-U (HAC-R2)[b]	Exposed	5	8,000	1,921	5,867	9,200	9,533
	2020	FPC-R3	Reference	5	6,348	5,674	1,776	2,714	13,415
		HAC-R1	Exposed	5	2,133	427	1,533	2,133	2,733
		HAC-U (HAC-R2)[b]	Exposed	5	7,487	2,346	3,600	8,267	9,600
		HAC-R3	Exposed	5	4,307	1,468	3,033	3,800	6,533
	2021	FPC-R3	Reference	5	4,563	3,650	1,032	4,910	9,720
		EDC-U	Reference	5	627	215	430	530	946
		HAC-R1	Exposed	5	2,341	707	1,267	2,467	3,167
		HAC-U (HAC-R2)[b]	Exposed	5	7,000	1,887	4,524	6,704	9,714
		HAC-R3	Exposed	5	5,920	3,557	2,810	3,667	10,056
	2022	FPC-R3	Reference	5	9,609	4,132	5,695	8,781	16,559
		EDC-U	Reference	5	4,750	2,850	1,382	4,086	8,961
		HAC-R1	Exposed	5	2,733	713	1,533	3,000	3,333
		HAC-U (HAC-R2)[b]	Exposed	5	4,613	540	3,933	4,933	5,133
		HAC-R3	Exposed	5	6,551	3,625	1,900	5,500	11,222
	2023	FPC-R3	Reference	5	10,246	3,312	6,138	9,319	15,125
		EDC-U	Reference	5	2,905	1,820	611	2,724	5,675
		HAC-R1	Exposed	5	2,667	1,154	1,000	3,133	3,867
		HAC-U (HAC-R2)[b]	Exposed	5	2,693	1,172	1,200	2,933	4,000
		HAC-R3	Exposed	5	4,552	2,093	2,167	5,762	6,533
	2024	FPC-R3	Reference	5	7,458	2,867	3,943	8,090	10,693
		EDC-U	Reference	5	1,169	527	573	1,100	1,971
		HAC-R1	Exposed	5	279	59.0	238	267	381
		HAC-U (HAC-R2)[b]	Exposed	5	592	328	66.7	600	958
		HAC-R3	Exposed	5	2,324	2,130	1,030	1,519	6,111
Plecoptera (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	4,120	2,641	1,398	4,731	7,735
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	3,341	1,573	1,964	2,573	5,430
	2018	FPC-R3	Reference	5	1,532	1,056	518	1,183	2,896
		EDC-U	Reference	5	569	369	0	609	973
		HAC-R1	Exposed	5	15.1	20.8	0	0	39.8
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	935	311	623	860	1,452
		EDC-U	Reference	5	863	535	233	875	1,444
		HAC-R1	Exposed	5	13.3	29.8	0	0	66.7
		HAC-U (HAC-R2)[b]	Exposed	5	13.3	29.8	0	0	66.7
	2020	FPC-R3	Reference	5	1,769	548	1,133	1,597	2,581
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	197	80.9	100	200	286
	2021	FPC-R3	Reference	5	1,510	1,183	251	1,254	2,919
		EDC-U	Reference	5	131	25.4	100	136	167
		HAC-R1	Exposed	5	33.3	57.7	0	0	133
		HAC-U (HAC-R2)[b]	Exposed	5	9.52	21.3	0	0	47.6
		HAC-R3	Exposed	5	461	191	333	389	800
	2022	FPC-R3	Reference	5	4,172	1,681	1,741	4,301	5,894
		EDC-U	Reference	5	1,668	1,031	794	1,434	3,441
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	13.3	29.8	0	0	66.7
		HAC-R3	Exposed	5	122	130	0	111	333
	2023	FPC-R3	Reference	5	3,314	1,654	1,505	3,799	5,161
		EDC-U	Reference	5	269	382	0	134	932
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	102	59.2	0	133	143
	2024	FPC-R3	Reference	5	2,017	941	1,219	1,560	3,465
		EDC-U	Reference	5	633	386	185	538	1,219
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	137	149	15.2	83.3	389

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Trichoptera (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	5,338	4,433	1,796	3,104	11,882
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	1,876	806	1,108	1,491	2,943
	2018	FPC-R3	Reference	5	114	56.9	59.7	89.6	179
		EDC-U	Reference	5	182	328	0	51.2	768
		HAC-R1	Exposed	5	2,997	1,144	1,673	2,919	4,588
		HAC-U (HAC-R2)[b]	Exposed	5	4,430	1,896	2,509	3,656	6,953
	2019	FPC-R3	Reference	5	84.2	101	17.9	47.8	263
		EDC-U	Reference	5	82.5	104	0	23.8	222
		HAC-R1	Exposed	5	8,493	1,513	6,067	9,000	9,867
		HAC-U (HAC-R2)[b]	Exposed	5	11,240	2,470	7,600	11,067	14,200
	2020	FPC-R3	Reference	5	204	166	65.2	102	410
		HAC-R1	Exposed	5	3,160	1,760	1,067	3,067	5,933
		HAC-U (HAC-R2)[b]	Exposed	5	14,784	11,650	2,933	16,000	32,000
		HAC-R3	Exposed	5	6,785	2,570	3,600	5,767	9,933
	2021	FPC-R3	Reference	5	301	275	100	215	768
		EDC-U	Reference	5	132	142	43.0	71.7	382
		HAC-R1	Exposed	5	1,012	854	500	700	2,528
		HAC-U (HAC-R2)[b]	Exposed	5	5,627	3,391	2,407	4,000	10,667
		HAC-R3	Exposed	5	12,533	5,936	5,476	14,200	20,200
	2022	FPC-R3	Reference	5	611	406	102	518	1,219
		EDC-U	Reference	5	2,566	4,477	0	806	10,538
		HAC-R1	Exposed	5	8,253	3,889	4,333	7,733	13,933
		HAC-U (HAC-R2)[b]	Exposed	5	10,080	3,824	5,267	10,733	13,867
		HAC-R3	Exposed	5	9,749	5,911	2,722	8,367	16,933
	2023	FPC-R3	Reference	5	2,453	2,381	502	941	5,591
		EDC-U	Reference	5	1,183	2,352	13.3	25.6	5,376
		HAC-R1	Exposed	5	2,667	1,931	467	2,500	5,667
		HAC-U (HAC-R2)[b]	Exposed	5	4,947	1,011	3,200	5,333	5,733
		HAC-R3	Exposed	5	2,361	1,824	333	2,133	5,238
	2024	FPC-R3	Reference	5	1,257	1,073	190	1,434	2,867
		EDC-U	Reference	5	2,746	4,706	210	438	11,111
		HAC-R1	Exposed	5	461	489	200	273	1,333
		HAC-U (HAC-R2)[b]	Exposed	5	498	270	125	467	867
		HAC-R3	Exposed	5	925	465	185	1,061	1,429
EPT (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	30,886	14,464	14,434	31,154	48,011
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	21,363	9,923	11,878	17,333	36,530
	2018	FPC-R3	Reference	5	3,184	2,864	737	2,330	7,943
		EDC-U	Reference	5	1,048	870	0	755	2,304
		HAC-R1	Exposed	5	3,346	1,032	2,071	3,226	4,731
		HAC-U (HAC-R2)[b]	Exposed	5	4,889	1,909	2,724	4,229	7,168
	2019	FPC-R3	Reference	5	3,022	1,165	1,264	3,082	4,134
		EDC-U	Reference	5	6,258	2,173	4,167	5,125	8,867
		HAC-R1	Exposed	5	17,213	3,479	13,000	17,800	20,600
		HAC-U (HAC-R2)[b]	Exposed	5	19,253	4,072	13,533	19,867	23,667
	2020	FPC-R3	Reference	5	8,321	6,295	3,438	4,352	15,822
		HAC-R1	Exposed	5	5,293	1,799	3,200	5,200	8,133
		HAC-U (HAC-R2)[b]	Exposed	5	22,271	12,289	11,200	21,533	41,600
		HAC-R3	Exposed	5	11,289	4,051	6,767	9,767	16,733
	2021	FPC-R3	Reference	5	6,374	4,892	1,470	6,380	12,588
		EDC-U	Reference	5	890	173	703	941	1,104
		HAC-R1	Exposed	5	3,387	962	2,033	3,233	4,667
		HAC-U (HAC-R2)[b]	Exposed	5	12,636	3,618	9,111	12,048	18,267
		HAC-R3	Exposed	5	18,913	6,424	8,667	19,000	24,533
	2022	FPC-R3	Reference	5	14,392	5,283	9,473	12,688	23,297
		EDC-U	Reference	5	8,983	6,899	3,303	7,025	20,932
		HAC-R1	Exposed	5	10,987	4,365	5,867	11,067	16,933
		HAC-U (HAC-R2)[b]	Exposed	5	14,707	4,276	9,400	15,867	18,800
		HAC-R3	Exposed	5	16,422	4,770	10,300	15,444	22,200
	2023	FPC-R3	Reference	5	16,013	5,873	8,737	15,269	25,161
		EDC-U	Reference	5	4,358	2,861	624	3,680	7,930
		HAC-R1	Exposed	5	5,333	2,938	1,467	4,833	9,533
		HAC-U (HAC-R2)[b]	Exposed	5	7,640	1,821	5,000	8,400	9,267
		HAC-R3	Exposed	5	7,015	3,346	2,867	8,000	11,143
	2024	FPC-R3	Reference	5	10,731	3,967	5,693	12,289	15,591
		EDC-U	Reference	5	4,549	4,769	1,495	2,206	12,903
		HAC-R1	Exposed	5	741	472	452	545	1,571
		HAC-U (HAC-R2)[b]	Exposed	5	1,090	359	500	1,200	1,467
		HAC-R3	Exposed	5	3,385	2,248	1,852	2,786	7,333
Arachnida (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	3,660	1,985	1,147	3,900	5,849
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	4,153	2,893	1,204	3,563	7,914
	2018	FPC-R3	Reference	5	313	301	39.8	179	645
		EDC-U	Reference	5	1,696	3,008	57.4	410	7,066
		HAC-R1	Exposed	5	1,824	1,029	717	1,720	3,465
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	374	331	53.8	358	836
		EDC-U	Reference	5	3,403	4,381	233	1,000	10,467
		HAC-R1	Exposed	5	3,680	2,066	267	4,200	5,400
		HAC-U (HAC-R2)[b]	Exposed	5	93.3	101	0	66.7	200
	2020	FPC-R3	Reference	5	497	393	114	358	1,147
		HAC-R1	Exposed	5	15,973	7,250	8,600	16,800	26,133
		HAC-U (HAC-R2)[b]	Exposed	5	773	426	333	867	1,267
		HAC-R3	Exposed	5	42.9	27.8	0	47.6	66.7
	2021	FPC-R3	Reference	5	470	479	71.7	215	1,126
		EDC-U	Reference	5	906	968	244	516	2,557
		HAC-R1	Exposed	5	3,063	1,157	1,667	2,733	4,800
		HAC-U (HAC-R2)[b]	Exposed	5	148	93.6	0	148	250
		HAC-R3	Exposed	5	0	0	0	0	0
	2022	FPC-R3	Reference	5	481	174	358	418	789
		EDC-U	Reference	5	5,067	4,769	1,326	3,943	12,903
		HAC-R1	Exposed	5	2,453	2,287	933	1,133	6,333
		HAC-U (HAC-R2)[b]	Exposed	5	1,053	532	467	1,000	1,867
		HAC-R3	Exposed	5	6.67	14.9	0	0	33.3
	2023	FPC-R3	Reference	5	900	349	502	860	1,290
		EDC-U	Reference	5	2,490	3,445	576	908	8,602
		HAC-R1	Exposed	5	1,118	159	867	1,167	1,267
		HAC-U (HAC-R2)[b]	Exposed	5	773	174	600	800	1,000
		HAC-R3	Exposed	5	227	296	0	100.0	733
	2024	FPC-R3	Reference	5	604	315	211	538	973
		EDC-U	Reference	5	1,389	2,198	235	394	5,305
		HAC-R1	Exposed	5	781	516	267	571	1,619
		HAC-U (HAC-R2)[b]	Exposed	5	1,355	604	367	1,533	2,000
		HAC-R3	Exposed	5	60.9	64.7	0	33.3	167

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Chironomidae (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	12,166	5,205	4,585	14,265	17,319
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	8,883	6,687	3,928	6,079	20,416
	2018	FPC-R3	Reference	5	6,325	3,959	2,186	4,588	11,864
		EDC-U	Reference	5	2,910	3,314	100	2,317	8,449
		HAC-R1	Exposed	5	12,432	4,000	8,005	12,545	17,204
		HAC-U (HAC-R2)[b]	Exposed	5	24,645	7,382	16,272	24,301	35,125
	2019	FPC-R3	Reference	5	2,694	807	1,416	3,202	3,280
		EDC-U	Reference	5	4,397	1,724	2,071	4,444	6,600
		HAC-R1	Exposed	5	12,160	4,778	8,000	10,333	18,933
		HAC-U (HAC-R2)[b]	Exposed	5	21,747	6,142	13,600	21,067	27,933
	2020	FPC-R3	Reference	5	2,396	834	1,233	2,407	3,584
		HAC-R1	Exposed	5	11,427	1,941	9,933	10,667	14,667
		HAC-U (HAC-R2)[b]	Exposed	5	17,424	16,021	3,722	16,467	42,800
		HAC-R3	Exposed	5	1,844	1,537	767	1,300	4,533
	2021	FPC-R3	Reference	5	4,195	2,133	2,136	3,533	7,778
		EDC-U	Reference	5	2,072	1,008	1,104	1,821	3,631
		HAC-R1	Exposed	5	2,383	948	1,333	2,367	3,800
		HAC-U (HAC-R2)[b]	Exposed	5	2,410	162	2,190	2,458	2,571
		HAC-R3	Exposed	5	2,946	2,597	867	2,400	7,429
	2022	FPC-R3	Reference	5	1,773	876	466	2,111	2,714
		EDC-U	Reference	5	4,506	3,390	1,111	4,875	9,749
		HAC-R1	Exposed	5	27,653	9,460	15,933	31,200	38,800
		HAC-U (HAC-R2)[b]	Exposed	5	12,332	2,722	9,200	11,600	15,261
		HAC-R3	Exposed	5	1,104	851	333	667	2,056
	2023	FPC-R3	Reference	5	5,406	4,789	2,016	3,799	13,835
		EDC-U	Reference	5	2,567	1,728	448	2,174	4,884
		HAC-R1	Exposed	5	10,909	2,925	8,722	8,900	14,467
		HAC-U (HAC-R2)[b]	Exposed	5	16,653	7,817	11,867	13,267	30,533
		HAC-R3	Exposed	5	2,616	1,405	533	2,399	4,233
	2024	FPC-R3	Reference	5	2,758	2,599	358	1,946	7,168
		EDC-U	Reference	5	3,710	2,218	1,582	3,763	7,240
		HAC-R1	Exposed	5	6,494	4,298	1,667	5,970	11,095
		HAC-U (HAC-R2)[b]	Exposed	5	10,030	5,802	3,417	11,267	17,867
		HAC-R3	Exposed	5	1,768	1,095	439	1,481	3,444
Elmidae (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	2,424	812	1,262	2,867	3,211
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	2,451	1,247	1,125	2,125	4,473
	2018	FPC-R3	Reference	5	278	297	0	119	681
		EDC-U	Reference	5	79.5	84.6	0	51.2	215
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	148	92.3	53.8	167	269
		EDC-U	Reference	5	424	168	190	533	556
		HAC-R1	Exposed	5	53.3	119	0	0	267
		HAC-U (HAC-R2)[b]	Exposed	5	53.3	86.9	0	0	200
	2020	FPC-R3	Reference	5	184	233	0	129	563
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	53.3	86.9	0	0	200
		HAC-R3	Exposed	5	267	294	0	200	667
	2021	FPC-R3	Reference	5	208	368	0	51.2	860
		EDC-U	Reference	5	66.0	75.1	0	21.5	161
		HAC-R1	Exposed	5	36.7	38.0	0	33.3	83.3
		HAC-U (HAC-R2)[b]	Exposed	5	123	181	0	41.7	429
		HAC-R3	Exposed	5	174	144	47.6	133	400
	2022	FPC-R3	Reference	5	257	162	0	287	438
		EDC-U	Reference	5	672	675	205	430	1,864
		HAC-R1	Exposed	5	253	242	0	133	600
		HAC-U (HAC-R2)[b]	Exposed	5	1,613	409	1,133	1,467	2,133
		HAC-R3	Exposed	5	418	494	0	200	1,056
	2023	FPC-R3	Reference	5	459	327	0	573	860
		EDC-U	Reference	5	159	113	25.6	134	335
		HAC-R1	Exposed	5	351	280	0	444	600
		HAC-U (HAC-R2)[b]	Exposed	5	3,880	1,503	2,000	4,200	5,467
		HAC-R3	Exposed	5	2,793	2,264	733	1,867	6,533
	2024	FPC-R3	Reference	5	646	483	71.7	822	1,178
		EDC-U	Reference	5	564	227	303	627	789
		HAC-R1	Exposed	5	893	218	517	970	1,071
		HAC-U (HAC-R2)[b]	Exposed	5	5,678	2,475	2,433	4,958	8,333
		HAC-R3	Exposed	5	3,341	1,963	1,967	2,381	6,593
Non-Chironomidae Diptera (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	254	51.8	211	237	344
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	361	140	201	401	516
	2018	FPC-R3	Reference	5	133	112	0	143	287
		EDC-U	Reference	5	79.7	81.2	3.58	89.6	205
		HAC-R1	Exposed	5	15.9	35.6	0	0	79.7
		HAC-U (HAC-R2)[b]	Exposed	5	1,477	1,296	287	860	3,297
	2019	FPC-R3	Reference	5	65.8	47.3	0	71.7	132
		EDC-U	Reference	5	197	134	66.7	214	400
		HAC-R1	Exposed	5	1,147	927	267	800	2,267
		HAC-U (HAC-R2)[b]	Exposed	5	2,093	1,049	667	1,867	3,533
	2020	FPC-R3	Reference	5	190	218	48.9	102	573
		HAC-R1	Exposed	5	440	153	267	400	600
		HAC-U (HAC-R2)[b]	Exposed	5	4,320	2,916	1,000	5,067	8,000
		HAC-R3	Exposed	5	253	180	100.0	167	533
	2021	FPC-R3	Reference	5	186	196	28.7	172	512
		EDC-U	Reference	5	51.3	44.6	0	48.4	115
		HAC-R1	Exposed	5	23.3	14.9	0	33.3	33.3
		HAC-U (HAC-R2)[b]	Exposed	5	243	186	47.6	222	533
		HAC-R3	Exposed	5	169	123	0	200	333
	2022	FPC-R3	Reference	5	168	141	59.7	108	398
		EDC-U	Reference	5	70.7	55.9	0	71.7	143
		HAC-R1	Exposed	5	973	599	267	1,267	1,600
		HAC-U (HAC-R2)[b]	Exposed	5	708	470	200	600	1,473
		HAC-R3	Exposed	5	140	148	0	111	389
	2023	FPC-R3	Reference	5	375	393	71.7	224	1,004
		EDC-U	Reference	5	66.4	114	0	23.9	269
		HAC-R1	Exposed	5	209	92.4	111	200	333
		HAC-U (HAC-R2)[b]	Exposed	5	747	393	333	533	1,200
		HAC-R3	Exposed	5	68.8	55.8	0	67.6	143
	2024	FPC-R3	Reference	5	272	332	63.2	154	860
		EDC-U	Reference	5	137	98.2	37.1	99.6	287
		HAC-R1	Exposed	5	221	166	0	212	467
		HAC-U (HAC-R2)[b]	Exposed	5	410	133	250	400	600
		HAC-R3	Exposed	5	108	83.9	15.2	71.4	222

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Oligochaeta (#/m²)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	184	208	0	115	459
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	522	258	229	459	832
	2018	FPC-R3	Reference	5	518	360	86.0	430	1,039
		EDC-U	Reference	5	304	295	7.17	256	753
		HAC-R1	Exposed	5	903	767	205	438	1,935
		HAC-U (HAC-R2)[b]	Exposed	5	7,928	4,353	3,154	6,165	12,545
	2019	FPC-R3	Reference	5	230	122	143	161	430
		EDC-U	Reference	5	703	619	55.6	400	1,533
		HAC-R1	Exposed	5	440	345	133	267	1,000
		HAC-U (HAC-R2)[b]	Exposed	5	3,227	1,908	0	3,667	4,667
	2020	FPC-R3	Reference	5	432	601	128	154	1,505
		HAC-R1	Exposed	5	813	568	400	467	1,667
		HAC-U (HAC-R2)[b]	Exposed	5	280	300	0	133	667
		HAC-R3	Exposed	5	812	1,296	0	333	3,100
	2021	FPC-R3	Reference	5	964	1,079	71.7	430	2,663
		EDC-U	Reference	5	402	374	151	252	1,061
		HAC-R1	Exposed	5	101	76.4	0	100	183
		HAC-U (HAC-R2)[b]	Exposed	5	102	75.7	0	133	185
		HAC-R3	Exposed	5	40.0	59.6	0	0	133
	2022	FPC-R3	Reference	5	251	150	143	179	512
		EDC-U	Reference	5	556	524	179	305	1,434
		HAC-R1	Exposed	5	293	180	0	333	467
		HAC-U (HAC-R2)[b]	Exposed	5	120	55.8	66.7	133	200
		HAC-R3	Exposed	5	66.7	72.4	0	55.6	167
	2023	FPC-R3	Reference	5	142	168	0	71.7	430
		EDC-U	Reference	5	273	315	12.8	179	810
		HAC-R1	Exposed	5	1,004	1,386	66.7	333	3,400
		HAC-U (HAC-R2)[b]	Exposed	5	400	419	0	200	1,067
		HAC-R3	Exposed	5	46.7	44.7	0	66.7	100
	2024	FPC-R3	Reference	5	147	242	0	59.7	573
		EDC-U	Reference	5	791	1,426	53.8	143	3,336
		HAC-R1	Exposed	5	936	632	450	524	1,636
		HAC-U (HAC-R2)[b]	Exposed	5	588	545	66.7	400	1,400
		HAC-R3	Exposed	5	188	158	33.3	121	444
Ephemeroptera (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	43.4	10.2	32.1	39.7	57.0
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	40.8	2.28	36.9	41.3	42.5
	2018	FPC-R3	Reference	5	12.4	13.4	2.29	5.53	34.9
		EDC-U	Reference	5	4.38	3.14	0	4.97	8.46
		HAC-R1	Exposed	5	1.89	1.07	0.563	1.64	3.38
		HAC-U (HAC-R2)[b]	Exposed	5	1.35	0.849	0.387	1.81	2.16
	2019	FPC-R3	Reference	5	27.8	11.9	9.97	27.9	43.2
		EDC-U	Reference	5	37.4	8.63	27.5	36.0	49.5
		HAC-R1	Exposed	5	24.6	4.80	19.6	23.6	32.5
		HAC-U (HAC-R2)[b]	Exposed	5	17.1	4.18	13.8	16.3	24.2
	2020	FPC-R3	Reference	5	42.5	16.9	26.6	39.4	67.9
		HAC-R1	Exposed	5	6.14	2.35	4.30	5.68	10.2
		HAC-U (HAC-R2)[b]	Exposed	5	22.8	15.4	8.52	16.5	40.3
		HAC-R3	Exposed	5	29.7	1.85	27.0	29.9	31.8
	2021	FPC-R3	Reference	5	31.0	16.4	9.20	33.5	51.0
		EDC-U	Reference	5	15.8	6.79	5.50	19.6	21.8
		HAC-R1	Exposed	5	22.8	4.47	16.5	23.1	28.4
		HAC-U (HAC-R2)[b]	Exposed	5	44.3	12.5	28.4	48.6	57.3
		HAC-R3	Exposed	5	26.6	15.8	13.4	17.4	50.0
	2022	FPC-R3	Reference	5	49.7	12.3	34.8	51.0	62.3
		EDC-U	Reference	5	22.8	9.09	14.7	21.0	38.1
		HAC-R1	Exposed	5	6.40	1.72	5.30	5.75	9.43
		HAC-U (HAC-R2)[b]	Exposed	5	13.8	0.926	12.6	13.9	15.0
		HAC-R3	Exposed	5	35.2	18.9	17.4	26.3	61.4
	2023	FPC-R3	Reference	5	42.0	10.9	23.4	45.5	52.1
		EDC-U	Reference	5	33.4	23.2	15.1	28.2	71.8
		HAC-R1	Exposed	5	13.3	5.46	4.81	13.6	18.5
		HAC-U (HAC-R2)[b]	Exposed	5	8.41	3.61	4.32	7.07	13.8
		HAC-R3	Exposed	5	34.0	15.0	19.8	31.6	58.2
	2024	FPC-R3	Reference	5	45.5	16.4	16.7	51.4	56.6
		EDC-U	Reference	5	16.0	10.7	2.14	12.7	27.2
		HAC-R1	Exposed	5	2.85	1.38	1.36	2.42	5.08
		HAC-U (HAC-R2)[b]	Exposed	5	2.80	2.54	0.631	2.03	7.21
		HAC-R3	Exposed	5	21.6	8.38	12.6	20.7	35.1
Plecoptera (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	7.71	2.86	4.07	8.05	11.9
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	8.93	3.21	5.80	7.57	12.8
	2018	FPC-R3	Reference	5	14.5	11.6	5.35	7.45	32.1
		EDC-U	Reference	5	11.6	11.4	0	11.2	30.2
		HAC-R1	Exposed	5	0.102	0.140	0	0	0.270
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	13.8	6.43	8.89	11.9	25.0
		EDC-U	Reference	5	5.44	2.10	2.23	5.71	7.81
		HAC-R1	Exposed	5	0.0529	0.118	0	0	0.265
		HAC-U (HAC-R2)[b]	Exposed	5	0.0326	0.0728	0	0	0.163
	2020	FPC-R3	Reference	5	16.3	5.89	10.1	16.4	23.9
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	1.35	0.352	0.943	1.19	1.76
	2021	FPC-R3	Reference	5	10.7	5.30	2.08	11.5	16.2
		EDC-U	Reference	5	3.27	1.41	2.14	2.64	5.56
		HAC-R1	Exposed	5	0.296	0.519	0	0	1.20
		HAC-U (HAC-R2)[b]	Exposed	5	0.0597	0.133	0	0	0.299
		HAC-R3	Exposed	5	2.07	0.661	1.22	1.93	3.00
	2022	FPC-R3	Reference	5	22.6	9.61	9.02	23.4	36.0
		EDC-U	Reference	5	9.42	5.62	3.66	10.1	16.9
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0.0472	0.105	0	0	0.236
		HAC-R3	Exposed	5	0.660	0.684	0	0.585	1.80
	2023	FPC-R3	Reference	5	14.2	7.40	3.78	13.5	24.0
		EDC-U	Reference	5	3.06	5.21	0	0.890	12.3
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	0.893	0.541	0	0.912	1.33
	2024	FPC-R3	Reference	5	13.0	6.93	4.00	14.7	21.5
		EDC-U	Reference	5	6.17	2.42	4.51	4.59	9.97
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
		HAC-R3	Exposed	5	1.10	0.734	0.304	1.11	2.24

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Trichoptera (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	10.1	6.12	4.76	8.13	18.8
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	4.92	1.03	3.93	4.40	6.09
	2018	FPC-R3	Reference	5	0.977	0.276	0.563	1.02	1.23
		EDC-U	Reference	5	1.47	1.53	0	1.07	4.07
		HAC-R1	Exposed	5	14.8	2.41	11.3	15.0	18.0
		HAC-U (HAC-R2)[b]	Exposed	5	11.4	3.47	5.57	12.3	14.9
	2019	FPC-R3	Reference	5	1.04	0.969	0.265	0.633	2.72
		EDC-U	Reference	5	0.622	0.732	0	0.317	1.59
		HAC-R1	Exposed	5	24.5	5.45	17.1	25.2	32.0
		HAC-U (HAC-R2)[b]	Exposed	5	23.9	4.16	17.6	24.5	28.1
	2020	FPC-R3	Reference	5	1.44	0.434	0.976	1.53	2.07
		HAC-R1	Exposed	5	9.18	4.91	2.15	9.70	15.4
		HAC-U (HAC-R2)[b]	Exposed	5	29.6	10.5	13.6	30.1	42.4
		HAC-R3	Exposed	5	46.6	9.30	32.0	48.3	54.5
	2021	FPC-R3	Reference	5	2.12	1.27	0.890	1.77	4.26
		EDC-U	Reference	5	2.69	1.80	0.990	1.67	4.89
		HAC-R1	Exposed	5	10.6	9.58	4.49	5.93	27.3
		HAC-U (HAC-R2)[b]	Exposed	5	32.9	13.6	19.1	27.0	48.0
		HAC-R3	Exposed	5	53.7	17.8	33.9	53.2	73.7
	2022	FPC-R3	Reference	5	3.13	1.55	0.531	3.47	4.58
		EDC-U	Reference	5	10.3	11.0	0	8.93	26.9
		HAC-R1	Exposed	5	18.4	5.35	12.7	18.4	26.7
		HAC-U (HAC-R2)[b]	Exposed	5	29.0	7.20	19.1	29.5	37.1
		HAC-R3	Exposed	5	53.7	28.0	14.9	70.0	76.5
	2023	FPC-R3	Reference	5	8.22	5.99	2.30	6.98	17.0
		EDC-U	Reference	5	7.76	15.4	0.316	0.593	35.2
		HAC-R1	Exposed	5	12.6	6.77	2.24	15.0	19.9
		HAC-U (HAC-R2)[b]	Exposed	5	15.8	3.64	11.5	17.2	19.2
		HAC-R3	Exposed	5	17.8	12.5	3.33	19.4	33.1
	2024	FPC-R3	Reference	5	6.70	6.13	2.14	4.71	17.1
		EDC-U	Reference	5	15.5	16.1	3.98	5.77	41.5
		HAC-R1	Exposed	5	3.66	2.31	1.78	2.72	7.59
		HAC-U (HAC-R2)[b]	Exposed	5	2.28	1.31	0.940	1.97	4.10
		HAC-R3	Exposed	5	12.3	8.75	1.54	14.9	21.3
EPT (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	61.2	10.9	46.3	65.4	73.6
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	54.6	3.89	51.2	54.0	61.1
	2018	FPC-R3	Reference	5	27.9	22.6	10.6	13.3	56.9
		EDC-U	Reference	5	17.4	13.2	0	17.9	36.2
		HAC-R1	Exposed	5	16.8	1.96	14.0	17.2	18.6
		HAC-U (HAC-R2)[b]	Exposed	5	12.8	4.00	6.05	14.0	16.7
	2019	FPC-R3	Reference	5	42.6	16.9	21.5	40.8	68.8
		EDC-U	Reference	5	43.5	8.69	32.4	45.0	55.6
		HAC-R1	Exposed	5	49.1	8.61	36.7	48.7	57.8
		HAC-U (HAC-R2)[b]	Exposed	5	41.1	7.46	31.4	40.9	52.3
	2020	FPC-R3	Reference	5	60.2	12.9	46.5	61.1	80.0
		HAC-R1	Exposed	5	15.3	6.04	6.45	17.0	21.1
		HAC-U (HAC-R2)[b]	Exposed	5	52.4	9.73	43.7	51.0	68.8
		HAC-R3	Exposed	5	77.7	11.0	60.2	81.8	87.1
	2021	FPC-R3	Reference	5	43.8	21.0	12.2	52.5	66.0
		EDC-U	Reference	5	21.8	7.05	12.5	25.1	29.5
		HAC-R1	Exposed	5	33.7	9.84	26.5	30.3	50.5
		HAC-U (HAC-R2)[b]	Exposed	5	77.3	4.14	72.3	75.5	82.3
		HAC-R3	Exposed	5	82.3	16.1	53.7	88.3	92.0
	2022	FPC-R3	Reference	5	75.3	15.9	49.1	78.2	87.8
		EDC-U	Reference	5	42.5	16.4	25.1	42.0	63.9
		HAC-R1	Exposed	5	24.8	5.77	18.2	25.4	32.5
		HAC-U (HAC-R2)[b]	Exposed	5	42.8	6.36	34.1	43.7	50.3
		HAC-R3	Exposed	5	89.7	9.01	76.9	94.2	97.4
	2023	FPC-R3	Reference	5	64.4	15.2	38.3	70.7	76.6
		EDC-U	Reference	5	44.2	21.8	15.5	48.7	73.3
		HAC-R1	Exposed	5	25.9	10.9	7.05	28.5	33.5
		HAC-U (HAC-R2)[b]	Exposed	5	24.2	5.57	18.5	23.5	31.0
		HAC-R3	Exposed	5	52.7	24.1	28.7	40.1	85.5
	2024	FPC-R3	Reference	5	65.2	22.3	25.4	73.7	78.5
		EDC-U	Reference	5	37.7	13.9	21.2	37.0	54.6
		HAC-R1	Exposed	5	6.51	2.27	4.14	5.74	8.94
		HAC-U (HAC-R2)[b]	Exposed	5	5.08	1.87	3.31	4.73	8.15
		HAC-R3	Exposed	5	35.0	11.2	15.4	37.9	42.2
Arachnida (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	7.54	3.88	3.46	5.98	12.9
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	12.3	8.76	2.53	14.9	23.4
	2018	FPC-R3	Reference	5	2.23	1.76	0.573	1.41	4.52
		EDC-U	Reference	5	21.2	13.1	8.21	18.5	37.4
		HAC-R1	Exposed	5	10.5	7.89	2.87	7.61	23.4
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	4.81	3.58	0.796	6.11	8.64
		EDC-U	Reference	5	16.0	15.6	2.23	7.52	38.2
		HAC-R1	Exposed	5	9.94	5.73	1.06	11.9	14.8
		HAC-U (HAC-R2)[b]	Exposed	5	0.234	0.258	0	0.155	0.526
	2020	FPC-R3	Reference	5	4.00	2.08	1.71	4.89	5.85
		HAC-R1	Exposed	5	41.4	8.20	32.1	43.5	52.7
		HAC-U (HAC-R2)[b]	Exposed	5	1.76	0.312	1.33	1.87	2.05
		HAC-R3	Exposed	5	0.303	0.223	0	0.295	0.629
	2021	FPC-R3	Reference	5	2.94	2.28	0.890	1.77	6.25
		EDC-U	Reference	5	17.3	11.4	5.61	12.0	32.7
		HAC-R1	Exposed	5	30.1	8.90	18.0	32.2	40.7
		HAC-U (HAC-R2)[b]	Exposed	5	0.960	0.677	0	0.901	1.88
		HAC-R3	Exposed	5	0	0	0	0	0
	2022	FPC-R3	Reference	5	2.51	0.429	2.12	2.27	2.98
		EDC-U	Reference	5	21.4	14.0	14.1	14.8	46.4
		HAC-R1	Exposed	5	5.01	3.21	2.17	4.01	10.4
		HAC-U (HAC-R2)[b]	Exposed	5	3.36	2.15	1.28	2.67	6.60
		HAC-R3	Exposed	5	0.0610	0.136	0	0	0.305
	2023	FPC-R3	Reference	5	3.59	0.918	2.30	3.93	4.65
		EDC-U	Reference	5	19.1	13.3	11.1	13.3	42.7
		HAC-R1	Exposed	5	5.69	1.34	3.75	6.09	7.33
		HAC-U (HAC-R2)[b]	Exposed	5	2.44	0.461	2.00	2.30	2.98
		HAC-R3	Exposed	5	1.49	1.43	0	0.912	3.55
	2024	FPC-R3	Reference	5	3.58	1.85	1.41	2.91	5.81
		EDC-U	Reference	5	8.66	6.74	2.65	5.81	19.8
		HAC-R1	Exposed	5	6.58	2.25	3.55	7.25	9.21
		HAC-U (HAC-R2)[b]	Exposed	5	6.13	3.26	3.47	4.78	11.6
		HAC-R3	Exposed	5	0.525	0.348	0	0.608	0.958

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Chironomidae (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	24.9	8.19	14.1	24.5	35.2
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	21.6	7.89	14.4	18.1	31.1
	2018	FPC-R3	Reference	5	51.8	19.3	29.5	58.5	70.1
		EDC-U	Reference	5	46.4	9.35	33.4	44.7	56.0
		HAC-R1	Exposed	5	62.2	5.89	54.2	60.9	69.0
		HAC-U (HAC-R2)[b]	Exposed	5	62.7	1.70	61.2	62.3	65.4
	2019	FPC-R3	Reference	5	38.4	12.7	24.4	33.1	54.7
		EDC-U	Reference	5	29.9	6.95	24.0	27.6	40.1
		HAC-R1	Exposed	5	33.7	8.78	23.2	31.8	43.1
		HAC-U (HAC-R2)[b]	Exposed	5	45.4	5.60	35.8	48.2	49.0
	2020	FPC-R3	Reference	5	22.1	9.67	12.2	21.9	37.1
		HAC-R1	Exposed	5	32.2	7.13	23.7	34.2	39.5
		HAC-U (HAC-R2)[b]	Exposed	5	32.1	12.1	17.6	38.2	45.0
		HAC-R3	Exposed	5	11.4	5.05	6.82	9.97	20.1
	2021	FPC-R3	Reference	5	35.3	18.6	19.6	27.7	64.4
		EDC-U	Reference	5	45.3	7.17	36.4	45.0	56.1
		HAC-R1	Exposed	5	23.1	6.57	17.4	22.2	34.1
		HAC-U (HAC-R2)[b]	Exposed	5	15.4	3.02	11.4	15.2	18.5
		HAC-R3	Exposed	5	15.4	17.4	3.25	9.25	46.0
	2022	FPC-R3	Reference	5	9.46	4.93	3.23	12.0	14.1
		EDC-U	Reference	5	19.3	5.32	12.3	17.5	24.9
		HAC-R1	Exposed	5	62.2	4.57	56.4	62.4	68.7
		HAC-U (HAC-R2)[b]	Exposed	5	36.4	4.21	31.0	37.3	41.5
		HAC-R3	Exposed	5	6.07	4.55	2.05	3.19	11.2
	2023	FPC-R3	Reference	5	19.1	9.27	11.6	14.9	34.7
		EDC-U	Reference	5	26.2	12.2	10.4	28.8	41.8
		HAC-R1	Exposed	5	53.5	7.45	46.0	52.3	66.0
		HAC-U (HAC-R2)[b]	Exposed	5	49.8	7.11	42.7	49.7	61.1
		HAC-R3	Exposed	5	20.0	12.4	5.26	17.1	38.6
	2024	FPC-R3	Reference	5	12.6	6.81	4.94	11.6	23.5
		EDC-U	Reference	5	36.2	9.25	27.1	37.4	49.6
		HAC-R1	Exposed	5	50.7	15.3	31.8	53.0	68.9
		HAC-U (HAC-R2)[b]	Exposed	5	41.2	10.1	25.7	44.3	49.8
		HAC-R3	Exposed	5	17.5	6.99	8.81	19.8	26.6
Elmidae (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	4.98	0.448	4.55	4.92	5.72
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	6.19	0.869	5.20	6.10	7.54
	2018	FPC-R3	Reference	5	2.60	2.76	0	1.72	6.76
		EDC-U	Reference	5	1.44	1.33	0	1.42	3.08
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0	0	0	0	0
	2019	FPC-R3	Reference	5	2.03	1.27	0.926	1.73	3.98
		EDC-U	Reference	5	2.89	0.780	1.95	2.87	4.08
		HAC-R1	Exposed	5	0.119	0.267	0	0	0.597
		HAC-U (HAC-R2)[b]	Exposed	5	0.136	0.228	0	0	0.526
	2020	FPC-R3	Reference	5	1.71	1.61	0	2.29	3.41
		HAC-R1	Exposed	5	0	0	0	0	0
		HAC-U (HAC-R2)[b]	Exposed	5	0.107	0.165	0	0	0.376
		HAC-R3	Exposed	5	1.76	1.83	0	1.68	4.15
	2021	FPC-R3	Reference	5	1.48	2.01	0	0.284	4.51
		EDC-U	Reference	5	1.44	1.72	0	0.877	4.28
		HAC-R1	Exposed	5	0.356	0.386	0	0.312	0.901
		HAC-U (HAC-R2)[b]	Exposed	5	0.769	1.13	0	0.313	2.69
		HAC-R3	Exposed	5	0.745	0.526	0.250	0.613	1.46
	2022	FPC-R3	Reference	5	1.46	1.05	0	1.30	2.68
		EDC-U	Reference	5	2.93	1.39	1.53	2.61	4.75
		HAC-R1	Exposed	5	0.623	0.572	0	0.461	1.42
		HAC-U (HAC-R2)[b]	Exposed	5	4.93	1.75	3.12	4.93	7.75
		HAC-R3	Exposed	5	2.42	2.63	0	1.83	5.78
	2023	FPC-R3	Reference	5	2.35	1.87	0	2.67	4.26
		EDC-U	Reference	5	1.95	1.68	0.593	0.890	4.43
		HAC-R1	Exposed	5	1.78	1.46	0	2.11	3.54
		HAC-U (HAC-R2)[b]	Exposed	5	12.2	4.92	6.88	10.2	19.7
		HAC-R3	Exposed	5	19.6	11.5	7.24	17.0	31.7
	2024	FPC-R3	Reference	5	4.89	4.51	0.235	4.60	11.3
		EDC-U	Reference	5	6.56	3.37	2.92	8.41	9.97
		HAC-R1	Exposed	5	8.67	3.31	5.62	8.60	13.6
		HAC-U (HAC-R2)[b]	Exposed	5	25.3	7.70	16.8	23.0	37.3
		HAC-R3	Exposed	5	34.9	13.1	21.7	31.9	54.9
Non-Chironomidae Diptera (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.594	0.310	0.363	0.522	1.12
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	0.960	0.242	0.654	0.927	1.22
	2018	FPC-R3	Reference	5	1.28	1.09	0	0.820	2.58
		EDC-U	Reference	5	1.41	0.662	0.533	1.28	2.13
		HAC-R1	Exposed	5	0.108	0.241	0	0	0.539
		HAC-U (HAC-R2)[b]	Exposed	5	4.59	4.85	0.637	2.88	12.4
	2019	FPC-R3	Reference	5	0.973	0.812	0	0.926	2.25
		EDC-U	Reference	5	1.36	0.913	0.627	1.20	2.86
		HAC-R1	Exposed	5	3.63	3.54	0.748	1.79	8.99
		HAC-U (HAC-R2)[b]	Exposed	5	4.62	2.88	1.55	4.37	9.30
	2020	FPC-R3	Reference	5	1.26	0.698	0.732	1.09	2.45
		HAC-R1	Exposed	5	1.30	0.646	0.538	1.23	2.24
		HAC-U (HAC-R2)[b]	Exposed	5	10.9	9.17	4.10	8.41	26.9
		HAC-R3	Exposed	5	1.60	0.616	0.890	1.57	2.36
	2021	FPC-R3	Reference	5	1.22	1.01	0.297	0.902	2.84
		EDC-U	Reference	5	1.16	1.03	0	0.877	2.68
		HAC-R1	Exposed	5	0.222	0.130	0	0.282	0.312
		HAC-U (HAC-R2)[b]	Exposed	5	1.44	0.829	0.281	1.76	2.40
		HAC-R3	Exposed	5	0.691	0.465	0	0.730	1.25
	2022	FPC-R3	Reference	5	0.967	0.881	0.270	0.744	2.43
		EDC-U	Reference	5	0.494	0.491	0	0.397	1.30
		HAC-R1	Exposed	5	2.01	0.860	0.943	2.08	3.07
		HAC-U (HAC-R2)[b]	Exposed	5	2.00	1.10	0.708	1.94	3.76
		HAC-R3	Exposed	5	0.785	0.794	0	0.601	2.13
	2023	FPC-R3	Reference	5	1.28	0.938	0.328	1.53	2.52
		EDC-U	Reference	5	0.606	0.686	0	0.316	1.76
		HAC-R1	Exposed	5	1.02	0.429	0.667	0.937	1.76
		HAC-U (HAC-R2)[b]	Exposed	5	2.33	1.21	1.14	1.92	4.34
		HAC-R3	Exposed	5	0.564	0.394	0	0.676	0.912
	2024	FPC-R3	Reference	5	1.22	0.906	0.612	0.872	2.82
		EDC-U	Reference	5	1.30	0.646	0.796	1.07	2.40
		HAC-R1	Exposed	5	2.91	3.46	0	1.88	8.89
		HAC-U (HAC-R2)[b]	Exposed	5	2.11	1.34	1.10	1.88	4.42
		HAC-R3	Exposed	5	0.992	0.554	0.304	0.958	1.85

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
Oligochaeta (%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.509	0.654	0	0.283	1.56
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	1.74	1.38	0.491	1.63	3.84
	2018	FPC-R3	Reference	5	4.90	3.36	0.616	4.83	9.74
		EDC-U	Reference	5	6.09	4.00	1.36	4.62	10.8
		HAC-R1	Exposed	5	4.13	2.67	1.09	2.96	7.76
		HAC-U (HAC-R2)[b]	Exposed	5	19.1	6.24	11.9	17.6	27.9
	2019	FPC-R3	Reference	5	3.17	1.42	2.39	2.57	5.70
		EDC-U	Reference	5	5.99	5.86	0.300	4.76	14.6
		HAC-R1	Exposed	5	1.27	0.973	0.365	1.06	2.82
		HAC-U (HAC-R2)[b]	Exposed	5	6.62	4.04	0	7.82	10.8
	2020	FPC-R3	Reference	5	2.90	2.22	0.777	2.54	6.42
		HAC-R1	Exposed	5	2.05	0.937	1.04	1.74	3.36
		HAC-U (HAC-R2)[b]	Exposed	5	0.593	0.617	0	0.309	1.26
		HAC-R3	Exposed	5	7.16	11.6	0	3.14	27.6
	2021	FPC-R3	Reference	5	7.37	6.24	0.593	8.62	14.8
		EDC-U	Reference	5	9.59	8.67	2.75	6.73	24.8
		HAC-R1	Exposed	5	1.09	0.910	0	0.938	2.39
		HAC-U (HAC-R2)[b]	Exposed	5	0.650	0.569	0	0.601	1.47
		HAC-R3	Exposed	5	0.149	0.223	0	0	0.500
	2022	FPC-R3	Reference	5	1.37	0.793	0.539	1.24	2.65
		EDC-U	Reference	5	2.64	1.69	0.767	2.28	5.15
		HAC-R1	Exposed	5	0.780	0.566	0	0.896	1.42
		HAC-U (HAC-R2)[b]	Exposed	5	0.382	0.230	0.170	0.357	0.726
		HAC-R3	Exposed	5	0.349	0.386	0	0.300	0.912
	2023	FPC-R3	Reference	5	0.695	0.804	0	0.333	1.97
		EDC-U	Reference	5	4.86	8.52	0.297	1.27	20.1
		HAC-R1	Exposed	5	5.13	6.63	0.234	2.00	16.4
		HAC-U (HAC-R2)[b]	Exposed	5	1.31	1.60	0	0.719	4.08
		HAC-R3	Exposed	5	0.386	0.427	0	0.323	1.00
	2024	FPC-R3	Reference	5	0.556	0.783	0	0.287	1.88
		EDC-U	Reference	5	8.52	13.5	0.536	1.31	32.1
		HAC-R1	Exposed	5	8.26	4.23	3.25	8.57	14.5
		HAC-U (HAC-R2)[b]	Exposed	5	2.19	1.71	0.631	1.57	5.02
		HAC-R3	Exposed	5	1.78	0.844	0.443	1.85	2.56
CA1 (29.0%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	-0.730	0.205	0	-0.664	-0.466
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	-0.763	0.150	0	-0.711	-0.581
	2018	FPC-R3	Reference	5	-1.34	0.138	0	-1.31	-1.15
		EDC-U	Reference	5	-0.498	0.368	0	-0.578	0.127
		HAC-R1	Exposed	5	0.630	0.101	0.507	0.677	0.735
		HAC-U (HAC-R2)[b]	Exposed	5	0.842	0.0724	0.795	0.800	0.962
	2019	FPC-R3	Reference	5	-1.26	0.345	0	-1.21	-0.867
		EDC-U	Reference	5	-0.711	0.164	0	-0.738	-0.515
		HAC-R1	Exposed	5	0.704	0.148	0.555	0.627	0.869
		HAC-U (HAC-R2)[b]	Exposed	5	0.750	0.0655	0.662	0.749	0.845
	2020	FPC-R3	Reference	5	-1.10	0.216	0	-1.11	-0.742
		HAC-R1	Exposed	5	0.661	0.149	0.445	0.641	0.822
		HAC-U (HAC-R2)[b]	Exposed	5	0.746	0.0429	0.677	0.773	0.775
		HAC-R3	Exposed	5	0.306	0.108	0.182	0.340	0.411
	2021	FPC-R3	Reference	5	-1.04	0.224	0	-1.05	-0.786
		EDC-U	Reference	5	-0.587	0.252	0	-0.597	-0.321
		HAC-R1	Exposed	5	0.475	0.0617	0.415	0.442	0.552
		HAC-U (HAC-R2)[b]	Exposed	5	0.616	0.0910	0.495	0.652	0.720
		HAC-R3	Exposed	5	0.131	0.145	0	0.171	0.302
	2022	FPC-R3	Reference	5	-0.914	0.432	0	-1.05	-0.364
		EDC-U	Reference	5	-0.766	0.258	0	-0.743	-0.442
		HAC-R1	Exposed	5	0.658	0.0949	0.543	0.699	0.772
		HAC-U (HAC-R2)[b]	Exposed	5	0.575	0.0696	0.459	0.588	0.633
		HAC-R3	Exposed	5	0.252	0.155	0.0675	0.276	0.415
	2023	FPC-R3	Reference	5	-0.695	0.476	0	-0.898	0.0302
		EDC-U	Reference	5	-0.755	0.278	0	-0.705	-0.465
		HAC-R1	Exposed	5	0.545	0.117	0.442	0.472	0.702
		HAC-U (HAC-R2)[b]	Exposed	5	0.550	0.112	0.374	0.596	0.645
		HAC-R3	Exposed	5	0.237	0.0879	0.0941	0.250	0.335
	2024	FPC-R3	Reference	5	-0.766	0.426	0	-0.667	-0.277
		EDC-U	Reference	5	-0.823	0.0907	0	-0.809	-0.721
		HAC-R1	Exposed	5	0.530	0.136	0.348	0.540	0.705
		HAC-U (HAC-R2)[b]	Exposed	5	0.609	0.129	0.442	0.581	0.798
		HAC-R3	Exposed	5	0.0498	0.164	0	0.0764	0.262
CA2 (10.4%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.340	0.179	0.149	0.248	0.574
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	0.388	0.176	0.0995	0.474	0.526
	2018	FPC-R3	Reference	5	-0.242	0.240	0	-0.178	0.0726
		EDC-U	Reference	5	-1.03	0.333	0	-0.932	-0.601
		HAC-R1	Exposed	5	-0.811	0.168	0	-0.884	-0.567
		HAC-U (HAC-R2)[b]	Exposed	5	-0.660	0.201	0	-0.642	-0.362
	2019	FPC-R3	Reference	5	-0.166	0.148	0	-0.212	0.0377
		EDC-U	Reference	5	-0.0304	0.203	0	-0.0817	0.233
		HAC-R1	Exposed	5	-0.370	0.0892	0	-0.396	-0.222
		HAC-U (HAC-R2)[b]	Exposed	5	-0.104	0.119	0	-0.0598	0.0400
	2020	FPC-R3	Reference	5	-0.0362	0.297	0	-0.0541	0.415
		HAC-R1	Exposed	5	-0.311	0.203	0	-0.234	-0.0882
		HAC-U (HAC-R2)[b]	Exposed	5	0.338	0.154	0.176	0.276	0.533
		HAC-R3	Exposed	5	0.899	0.194	0.640	0.892	1.11
	2021	FPC-R3	Reference	5	-0.146	0.257	0	-0.0983	0.124
		EDC-U	Reference	5	-0.996	0.201	0	-0.920	-0.792
		HAC-R1	Exposed	5	0.256	0.277	0	0.277	0.550
		HAC-U (HAC-R2)[b]	Exposed	5	0.605	0.183	0.373	0.611	0.799
		HAC-R3	Exposed	5	1.30	0.184	0.983	1.36	1.44
	2022	FPC-R3	Reference	5	0.100	0.219	0	0.215	0.281
		EDC-U	Reference	5	0.141	0.0720	0.0526	0.187	0.200
		HAC-R1	Exposed	5	0.206	0.185	0.0297	0.162	0.434
		HAC-U (HAC-R2)[b]	Exposed	5	0.406	0.208	0.0916	0.490	0.593
		HAC-R3	Exposed	5	1.22	0.320	0.821	1.25	1.64
	2023	FPC-R3	Reference	5	0.0639	0.260	0	0.217	0.252
		EDC-U	Reference	5	-0.784	0.278	0	-0.706	-0.509
		HAC-R1	Exposed	5	-0.407	0.395	0	-0.229	-0.149
		HAC-U (HAC-R2)[b]	Exposed	5	-0.0369	0.130	0	-0.0626	0.0901
		HAC-R3	Exposed	5	0.422	0.434	0.0277	0.167	0.947
	2024	FPC-R3	Reference	5	0.212	0.197	0	0.232	0.439
		EDC-U	Reference	5	-0.460	0.507	0	-0.237	0.0401
		HAC-R1	Exposed	5	-0.801	0.299	0	-0.735	-0.518
		HAC-U (HAC-R2)[b]	Exposed	5	-0.642	0.240	0	-0.722	-0.352
		HAC-R3	Exposed	5	-0.0728	0.367	0	-0.0877	0.444

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.2: Summary Statistics of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Year	Area	Type	n	Mean	Standard Deviation	Minimum	Median	Maximum
CA3 (7.9%)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	0.578	0.169	0.394	0.505	0.810
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	0.246	0.224	0	0.243	0.561
	2018	FPC-R3	Reference	5	0.0180	0.145	0	0.0621	0.186
		EDC-U	Reference	5	-0.110	0.526	0	-0.287	0.822
		HAC-R1	Exposed	5	0.731	0.127	0.633	0.662	0.920
		HAC-U (HAC-R2)[b]	Exposed	5	1.10	0.167	0.900	1.06	1.35
	2019	FPC-R3	Reference	5	0.0697	0.197	0	0.180	0.241
		EDC-U	Reference	5	-0.114	0.158	0	-0.0975	0.115
		HAC-R1	Exposed	5	0.679	0.146	0.538	0.634	0.925
		HAC-U (HAC-R2)[b]	Exposed	5	0.826	0.377	0.223	1.04	1.09
	2020	FPC-R3	Reference	5	0.376	0.286	0	0.404	0.660
		HAC-R1	Exposed	5	0.0981	0.210	0	0.0627	0.375
		HAC-U (HAC-R2)[b]	Exposed	5	0.232	0.141	0.113	0.159	0.454
		HAC-R3	Exposed	5	-0.155	0.130	0	-0.224	-0.00789
	2021	FPC-R3	Reference	5	-0.00456	0.173	0	-0.0650	0.272
		EDC-U	Reference	5	-0.697	0.225	0	-0.627	-0.466
		HAC-R1	Exposed	5	0.0160	0.172	0	-0.000426	0.275
		HAC-U (HAC-R2)[b]	Exposed	5	0.117	0.0866	0	0.155	0.199
		HAC-R3	Exposed	5	-0.341	0.256	0	-0.420	0.0641
	2022	FPC-R3	Reference	5	0.421	0.146	0.215	0.406	0.614
		EDC-U	Reference	5	0.0942	0.119	0	0.128	0.240
		HAC-R1	Exposed	5	0.0454	0.146	0	-0.00837	0.230
		HAC-U (HAC-R2)[b]	Exposed	5	-0.371	0.0449	0	-0.358	-0.324
		HAC-R3	Exposed	5	-0.432	0.474	0	-0.435	0.168
	2023	FPC-R3	Reference	5	0.385	0.225	0.0973	0.361	0.705
		EDC-U	Reference	5	-0.655	0.205	0	-0.614	-0.404
		HAC-R1	Exposed	5	-0.473	0.205	0	-0.433	-0.270
		HAC-U (HAC-R2)[b]	Exposed	5	-0.601	0.169	0	-0.646	-0.326
		HAC-R3	Exposed	5	-0.507	0.235	0	-0.570	-0.102
	2024	FPC-R3	Reference	5	0.514	0.275	0.170	0.448	0.844
		EDC-U	Reference	5	-0.658	0.181	0	-0.694	-0.354
		HAC-R1	Exposed	5	-0.575	0.286	0	-0.545	-0.208
		HAC-U (HAC-R2)[b]	Exposed	5	-0.823	0.215	0	-0.773	-0.620
		HAC-R3	Exposed	5	-0.662	0.424	0	-0.615	-0.279
Dry Weight Benthic Biomass (g/m² DW)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	-	-	-	-	-
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	-	-	-	-	-
	2018	FPC-R3	Reference	5	1.53	1.26	0.358	1.17	3.14
		EDC-U	Reference	5	1.39	1.81	0.0100	0.177	3.70
		HAC-R1	Exposed	5	0.804	0.378	0.434	0.814	1.38
		HAC-U (HAC-R2)[b]	Exposed	5	1.24	0.778	0.674	0.910	2.59
	2019	FPC-R3	Reference	5	1.60	2.23	0.186	0.992	5.51
		EDC-U	Reference	5	1.09	1.17	0.287	0.462	3.04
		HAC-R1	Exposed	5	3.59	1.62	1.93	3.07	5.53
		HAC-U (HAC-R2)[b]	Exposed	5	5.31	4.13	1.85	3.88	12.3
	2020	FPC-R3	Reference	5	2.27	3.89	0.199	0.696	9.23
		HAC-R1	Exposed	5	3.97	2.86	1.54	3.33	8.89
		HAC-U (HAC-R2)[b]	Exposed	5	5.33	4.26	1.53	3.97	12.6
		HAC-R3	Exposed	5	0.951	0.810	0.380	0.573	2.36
	2021	FPC-R3	Reference	5	1.22	0.557	0.441	1.29	1.99
		EDC-U	Reference	5	0.537	0.417	0.222	0.376	1.27
		HAC-R1	Exposed	5	2.86	2.29	1.07	1.98	6.80
		HAC-U (HAC-R2)[b]	Exposed	5	2.73	1.09	1.10	2.80	4.06
		HAC-R3	Exposed	5	2.64	1.72	1.22	2.20	5.48
	2022	FPC-R3	Reference	5	2.90	1.90	0.638	2.64	5.35
		EDC-U	Reference	5	5.09	9.32	0.264	1.12	21.7
		HAC-R1	Exposed	5	2.13	0.758	1.17	2.43	3.05
		HAC-U (HAC-R2)[b]	Exposed	5	4.57	2.00	2.75	3.52	7.06
		HAC-R3	Exposed	5	1.55	0.799	0.467	1.53	2.69
	2023	FPC-R3	Reference	5	4.89	6.46	0.959	2.20	16.3
		EDC-U	Reference	5	0.410	0.321	0.139	0.342	0.941
		HAC-R1	Exposed	5	2.34	1.71	0.578	1.55	4.79
		HAC-U (HAC-R2)[b]	Exposed	5	4.32	3.05	1.66	2.43	7.68
		HAC-R3	Exposed	5	3.23	2.88	0.450	2.63	7.21
	2024	FPC-R3	Reference	5	7.30	4.78	0.936	8.34	13.4
		EDC-U	Reference	5	2.09	1.57	0.273	2.14	4.20
		HAC-R1	Exposed	5	1.84	1.21	1.02	1.34	3.95
		HAC-U (HAC-R2)[b]	Exposed	5	1.98	1.28	0.683	2.37	3.71
		HAC-R3	Exposed	5	1.14	0.611	0.411	0.960	2.03
Wet Weight Benthic Biomass (g/m² WW)	2007	EDC-U (UER)[a]	Reference (Pre-Breach)	5	-	-	-	-	-
		HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre-Breach)	5	-	-	-	-	-
	2018	FPC-R3	Reference	5	10.4	8.79	1.86	11.6	22.9
		EDC-U	Reference	5	7.35	9.43	0.0710	1.37	20.2
		HAC-R1	Exposed	5	4.73	1.82	2.27	4.51	7.40
		HAC-U (HAC-R2)[b]	Exposed	5	7.30	4.07	3.71	6.29	13.4
	2019	FPC-R3	Reference	5	8.15	11.6	0.953	5.00	28.5
		EDC-U	Reference	5	7.36	7.62	1.56	2.50	17.6
		HAC-R1	Exposed	5	24.6	12.1	12.1	22.5	42.3
		HAC-U (HAC-R2)[b]	Exposed	5	29.7	15.9	11.7	29.7	53.7
	2020	FPC-R3	Reference	5	13.0	23.4	0.621	3.61	54.8
		HAC-R1	Exposed	5	20.9	14.8	12.6	13.8	47.2
		HAC-U (HAC-R2)[b]	Exposed	5	28.7	23.9	10.3	21.2	70.4
		HAC-R3	Exposed	5	4.10	3.33	1.48	2.67	9.65
	2021	FPC-R3	Reference	5	5.80	3.26	2.76	5.22	11.3
		EDC-U	Reference	5	2.61	1.86	1.18	1.98	5.84
		HAC-R1	Exposed	5	10.4	5.78	4.74	8.97	19.8
		HAC-U (HAC-R2)[b]	Exposed	5	13.8	3.94	6.82	15.0	16.4
		HAC-R3	Exposed	5	13.3	11.5	5.54	9.22	33.2
	2022	FPC-R3	Reference	5	1.18	0.741	0.220	1.39	1.97
		EDC-U	Reference	5	1.09	1.57	0.189	0.359	3.86
		HAC-R1	Exposed	5	0.568	0.211	0.328	0.555	0.849
		HAC-U (HAC-R2)[b]	Exposed	5	0.913	0.351	0.518	0.790	1.44
		HAC-R3	Exposed	5	0.401	0.174	0.154	0.370	0.622
	2023	FPC-R3	Reference	5	17.6	16.3	5.23	9.69	45.2
		EDC-U	Reference	5	2.99	1.92	1.03	2.46	5.03
		HAC-R1	Exposed	5	10.9	7.80	1.93	8.23	22.3
		HAC-U (HAC-R2)[b]	Exposed	5	18.3	13.0	8.30	10.3	36.3
		HAC-R3	Exposed	5	11.9	9.38	1.16	12.0	22.5
	2024	FPC-R3	Reference	5	38.6	26.7	3.11	39.7	77.9
		EDC-U	Reference	5	9.60	6.70	1.76	8.27	19.3
		HAC-R1	Exposed	5	7.02	3.84	4.37	5.48	13.8
		HAC-U (HAC-R2)[b]	Exposed	5	8.71	4.07	3.55	10.3	12.5
		HAC-R3	Exposed	5	4.63	2.26	2.05	4.09	8.07

Notes: " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1 and HAC-U (HAC-R2). Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] UHC is the historical sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3, and UER is the historical sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

Table D.4.3: Benthic Invertebrate Community Supporting Measures for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Year	Area	Type	Station	Mean Water Depth (cm)	Mean Water Velocity (m/s)	Median Substrate Size (cm)	Water Quality				
							Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductivity (µS/cm)	pH
2007	EDC-U (UER)[a]	Reference (Pre- Breach)	UER-1	5	0.110	-	11.6	9.92	91.3	90.0	6.57
			UER-2	6	0.120	-	12.7	11.04	104.0	79.0	6.62
			UER-3	5	0.120	-	10.7	10.45	94.5	92.0	6.54
			UER-4	5	0.150	-	10.6	10.20	91.5	86.0	6.58
			UER-5	5	0.100	-	10.0	9.84	87.2	89.0	6.47
	HAC-U (UHC; HAC-R2)[a,b]	Exposed (Pre- Breach)	UHC-1	7	0.060	-	13.7	9.81	94.5	235.0	7.41
			UHC-2	7	0.060	-	13.5	9.52	91.4	242.0	7.86
			UHC-3	10	0.060	-	12.8	10.25	97.0	242.0	7.62
			UHC-4	9	0.080	-	12.6	10.40	97.9	240.0	7.52
			UHC-5	8	0.060	-	12.1	10.33	96.1	239.0	7.49
2018	FPC-R3	Reference	FPC-R3-1	4	0.047	3.5	9.5	8.92	78.9	117.5	7.81
			FPC-R3-2	7	0.040	2.1	11.8	7.96	73.0	124.6	7.39
			FPC-R3-3	4	0.067	2.9	12.3	6.22	58.2	127.4	7.51
			FPC-R3-4	4	0.070	2.4	12.1	8.99	83.6	129.8	7.44
			FPC-R3-5	6	0.040	2.5	11.8	9.16	84.0	129.4	7.58
	EDC-U		EDC-U-1	15	0	4.8	14.8	10.36	102.4	91.6	7.52
			EDC-U-2	20	0	5.5	11.5	8.88	81.5	88.1	7.65
			EDC-U-3	18	0	4.7	15.2	10.04	100.1	94.1	7.41
			EDC-U-4	24	0.003	4.6	12.5	8.86	82.0	90.0	7.59
			EDC-U-5	20	0.007	4.8	11.8	7.33	68.1	90.6	7.74
	HAC-R1	Exposed	HAC-R1-1	21	0.170	4.8	16.8	9.32	96.2	240.9	8.60
			HAC-R1-2	22	0.160	6.6	16.8	9.42	97.0	241.1	8.14
			HAC-R1-3	24	0.173	5.7	16.5	9.21	94.7	240.8	8.24
			HAC-R1-4	22	0.133	4.6	16.0	9.10	92.2	237.5	8.28
			HAC-R1-5	21	0.157	5.0	14.6	8.71	85.1	231.3	8.04
	HAC-U (HAC-R2)		HAC-U-1	18	0.220	5.4	16.7	10.92	112.8	258.8	8.45
			HAC-U-2	18	0.250	5.1	15.4	9.76	97.5	254.7	8.56
			HAC-U-3	20	0.250	5.9	13.5	10.30	99.3	248.2	8.18
			HAC-U-4	21	0.200	5.8	16.7	10.75	111.2	256.9	8.53
			HAC-U-5	21	0.190	5.2	15.6	8.88	89.2	255.2	8.56
2019	FPC-R3	Reference	FPC-R3-1	12	0.073	3.2	13.5	7.08	67.9	119.1	7.44
			FPC-R3-2	9	0.113	6.3	13.1	7.04	67.0	122.1	7.60
			FPC-R3-3	12	0.113	4.4	15.3	6.99	69.7	130.2	7.38
			FPC-R3-4	12	0.093	4.6	15.1	7.18	71.4	130.0	7.53
			FPC-R3-5	11	0.120	5.6	14.5	7.17	70.4	128.4	7.83
	EDC-U		EDC-U-1	18	0.437	4.4	18.4	6.39	68.1	102.1	7.63
			EDC-U-2	23	0.507	2.9	18.4	6.38	67.9	101.5	7.60
			EDC-U-3	19	0.503	4.0	21.4	6.52	73.7	107.6	7.05
			EDC-U-4	18	0.470	3.7	21.0	6.48	72.2	107.0	7.11
			EDC-U-5	18	0.443	5.1	20.1	6.58	72.2	105.0	7.30
	HAC-R1	Exposed	HAC-R1-1	25	0.403	4.8	16.4	7.15	73.5	230.0	8.10
			HAC-R1-2	24	0.450	5.2	16.4	6.85	70.1	230.6	8.01
			HAC-R1-3	19	0.443	5.0	16.5	6.25	64.0	238.7	7.90
			HAC-R1-4	19	0.363	5.0	18.3	8.74	92.4	242.5	8.15
			HAC-R1-5	18	0.393	5.0	18.1	8.69	91.8	241.4	8.08
	HAC-U (HAC-R2)		HAC-U-1	21	0.497	4.6	16.9	7.76	80.1	267.1	7.68
			HAC-U-2	19	0.463	4.9	16.6	8.50	87.2	262.3	8.15
			HAC-U-3	19	0.470	4.7	16.3	7.45	76.3	262.5	8.04
			HAC-U-4	20	0.433	4.7	16.3	7.31	74.6	262.9	7.83
			HAC-U-5	19	0.407	5.1	19.8	9.30	102.1	276.5	8.32
2020[c]	FPC-R3	Reference	FPC-R3-1	15	0.103	4.2	12.5	5.94	55.7	103.0	7.07
			FPC-R3-2	12	0.167	5.3	11.9	6.44	60.1	106.4	7.19
			FPC-R3-3	10	0.233	5.1	11.4	8.55	78.5	109.6	7.36
			FPC-R3-4	19	0.100	4.6	10.8	8.60	77.6	109.0	7.39
			FPC-R3-5	15	0.125	6.6	10.4	9.06	81.2	110.4	7.54
	HAC-R1	Exposed	HAC-R1-1	24	0.277	4.5	16.6	8.79	90.1	303.8	8.29
			HAC-R1-2	25	0.213	4.2	16.6	8.91	91.6	-	8.31
			HAC-R1-3	23	0.253	5.3	16.5	9.71	99.4	191.0	8.19
			HAC-R1-4	25	0.237	4.0	16.7	9.51	97.7	194.0	8.21
			HAC-R1-5	23	0.230	4.6	16.8	10.15	104.7	194.0	8.19
	HAC-U (HAC-R2)		HAC-U-1	20	0.440	4.6	14.8	9.68	95.8	214.0	7.93
			HAC-U-2	20	0.497	4.0	14.2	9.09	88.6	211.0	7.83
			HAC-U-3	24	0.433	4.8	13.5	8.61	82.9	209.0	7.74
			HAC-U-4	23	0.447	3.7	18.2	10.22	107.8	226.0	8.43
			HAC-U-5	24	0.477	3.7	17.9	10.12	106.7	224.0	8.51
	HAC-R3		HAC-R3-1	21	0.437	4.5	16.5	9.65	98.9	253.0	8.32
			HAC-R3-2	22	0.397	4.3	15.9	9.90	100.0	251.0	8.31
			HAC-R3-3	21	0.430	4.7	14.6	8.67	85.2	260.0	7.97
			HAC-R3-4	22	0.433	3.6	14.7	8.98	88.5	255.0	7.96
			HAC-R3-5	20	0.430	4.8	16.2	9.26	94.3	228.0	8.22
2021	FPC-R3	Reference	FPC-R3-1	5	0.020	4.4	15.9	3.41	34.4	227.0	7.05
			FPC-R3-2	4	0.050	6.6	15.0	5.65	36.1	166.0	7.22
			FPC-R3-3	8	0.053	4.2	14.2	6.63	64.7	157.0	7.48
			FPC-R3-4	7	0.047	3.9	14.2	7.27	71.1	191.0	7.19
			FPC-R3-5	5	0.103	3.5	14.0	7.35	71.4	156.0	7.40
	EDC-U		EDC-U-1	9	0	6.3	15.7	5.94	59.9	141.4	7.40
			EDC-U-2	11	0	6.5	15.1	3.21	31.9	150.6	7.33
			EDC-U-3	13	0	4.2	15.7	2.52	25.4	157.3	7.14
			EDC-U-4	8	0	4.8	15.9	3.61	36.4	139.7	7.24
			EDC-U-5	11	0	6.1	14.6	1.95	19.3	141.4	7.07

Note: "-" indicates no data.

[a] UHC is the pre-breach sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

[c] Benthic invertebrate community sampling was not completed at the upper Edney Creek reference area (EDC-U) in 2020 due to habitat differences relative to the remediated areas (HAC-R1 and HAC-U; Minnow 2021a).

Table D.4.3: Benthic Invertebrate Community Supporting Measures for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Year	Area	Type	Station	Mean Water Depth (cm)	Mean Water Velocity (m/s)	Median Substrate Size (cm)	Water Quality				
							Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	Specific Conductivity (µS/cm)	pH
2021	HAC-R1	Exposed	HAC-R1-1	22	0.20	5.1	20.5	8.92	99.5	242.0	8.63
			HAC-R1-2	21	0.19	5.4	19.7	10.21	112.0	241.0	8.55
			HAC-R1-3	18	0.16	5.1	18.8	9.27	98.7	243.0	8.44
			HAC-R1-4	20	0.19	5.9	18.1	8.55	90.6	244.0	8.27
			HAC-R1-5	19	0.18	5.5	17.5	7.90	82.7	243.0	8.11
	HAC-U (HAC-R2)		HAC-U-1	18	0.38	4.7	16.3	10.49	106.0	297.0	8.26
			HAC-U-2	18	0.40	4.1	15.7	9.73	97.9	238.6	8.24
			HAC-U-3	21	0.26	3.8	19.8	10.39	113.8	253.2	8.72
			HAC-U-4	19	0.37	3.5	18.9	10.45	112.6	250.0	8.13
			HAC-U-5	20	0.41	4.5	18.1	10.83	114.0	245.4	8.77
	HAC-R3		HAC-R3-1	17	0.39	4.9	20.4	9.92	110.1	301.0	8.91
			HAC-R3-2	19	0.39	3.7	20.0	10.60	116.7	302.3	8.85
			HAC-R3-3	20	0.35	4.0	17.9	9.00	94.9	319.4	8.19
			HAC-R3-4	21	0.41	6.2	17.7	9.00	94.4	307.0	8.32
			HAC-R3-5	21	0.32	5.5	17.9	9.87	104.3	307.7	8.57
	FPC-R3	Reference	FPC-R3-1	8	0.18	5.7	16.3	4.57	46.6	149.7	7.22
			FPC-R3-2	6	0.24	6.5	14.4	5.96	58.6	155.4	7.26
			FPC-R3-3	7	0.22	3.6	13.4	7.79	74.8	161.1	7.71
			FPC-R3-4	7	0.30	5.5	12.7	8.12	76.7	161.2	7.64
			FPC-R3-5	5	0.21	6.5	12.0	8.76	79.4	161.3	7.69
	EDC-U		EDC-U-1	14	0.29	5.5	13.1	8.05	76.6	125.2	7.58
			EDC-U-2	9	0.40	6.0	16.0	8.55	86.7	111.1	7.67
			EDC-U-3	11	0.38	5.3	15.9	8.65	87.4	125.9	7.72
			EDC-U-4	12	0.32	5.2	15.0	8.56	84.9	126.2	7.59
			EDC-U-5	14	0.30	6.6	13.9	8.72	84.5	69.5	7.61
2022	HAC-R1	Exposed	HAC-R1-1	46	0.25	5.3	20.5	9.42	102.1	226.7	8.79
			HAC-R1-2	37	0.31	4.8	20.4	10.30	114.1	226.9	8.81
			HAC-R1-3	40	0.15	5.6	20.3	10.17	112.4	226.4	8.54
			HAC-R1-4	40	0.19	4.5	20.2	10.03	110.8	-	8.54
			HAC-R1-5	26	0.18	6.2	19.9	8.85	97.2	225.5	8.53
	HAC-U (HAC-R2)		HAC-U-1	37	0.33	5.8	19.5	7.92	86.2	245.0	8.40
			HAC-U-2	37	0.27	5.5	18.9	8.10	87.2	241.3	8.37
			HAC-U-3	34	0.35	6.0	18.1	8.23	87.1	237.1	8.32
			HAC-U-4	31	0.70	4.9	16.5	8.00	82.0	230.3	8.17
			HAC-U-5	25	0.65	4.9	16.2	7.35	74.9	229.1	8.10
	HAC-R3		HAC-R3-1	25	0.38	4.3	17.9	7.15	80.9	277.7	8.24
			HAC-R3-2	27	0.47	4.6	17.1	8.24	85.6	277.7	8.22
			HAC-R3-3	23	0.56	5.0	20.1	7.52	84.0	280.2	8.63
			HAC-R3-4	22	0.50	4.0	20.2	7.43	81.6	279.2	8.37
			HAC-R3-5	23	0.47	5.6	20.3	7.67	85.0	280.7	8.50
2023	FPC-R3	Reference	FPC-R3-1	4	0.24	5.1	15.4	5.61	56.0	132.3	7.13
			FPC-R3-2	5	0.34	6.4	14.3	7.54	74.1	135.1	7.36
			FPC-R3-3	4	0.28	3.8	12.9	8.64	81.9	139.7	7.53
			FPC-R3-4	5	0.29	4.1	12.4	8.45	89.6	140.6	7.43
			FPC-R3-5	4	0.24	5.4	12.1	8.73	81.2	141.1	7.39
	EDC-U	Reference	EDC-U-1	8	0	4.7	13.8	3.83	37.2	129.0	7.27
			EDC-U-2	11	0	5.8	16.1	3.07	31.3	125.5	6.99
			EDC-U-3	11	0	5.0	15.3	1.64	16.4	140.5	6.87
			EDC-U-4	6	0	5.5	14.5	2.03	20.0	129.6	6.72
			EDC-U-5	5	0	4.8	14.3	1.39	13.6	133.5	6.75
	HAC-R1	Exposed	HAC-R1-1	36	0.32	5.6	17.5	7.02	73.5	240.5	8.51
			HAC-R1-2	30	0.29	5.7	17.4	8.48	88.9	240.5	8.41
			HAC-R1-3	31	0.30	6.2	17.3	8.31	86.3	241.6	8.37
			HAC-R1-4	37	0.20	5.2	16.8	9.49	100.0	241.6	8.33
			HAC-R1-5	29	0.26	5.8	16.6	9.15	94.4	241.9	8.30
	HAC-U (HAC-R2)		HAC-U-1	29	0.31	6.0	19.0	8.35	90.0	260.4	8.35
			HAC-U-2	31	0.30	6.9	18.8	8.59	92.1	260.1	8.64
			HAC-U-3	35	0.37	4.9	17.7	8.86	93.0	260.1	8.37
			HAC-U-4	33	0.34	5.0	16.8	8.31	86.0	262.4	8.20
			HAC-U-5	31	0.32	5.1	15.6	8.78	86.8	265.8	8.22
	HAC-R3		HAC-R3-1	27	0.26	4.5	17.4	8.83	92.2	260.9	8.10
			HAC-R3-2	33	0.31	5.9	16.8	8.66	89.3	261.6	9.34
			HAC-R3-3	23	0.35	3.2	16.1	8.03	81.8	270.0	8.15
			HAC-R3-4	25	0.32	3.9	15.7	8.01	80.7	272.2	7.95
			HAC-R3-5	21	0.40	3.9	15.6	8.31	83.8	274.4	8.00
2024	FPC-R3	Reference	FPC-R3-1	5	0.13	4.8	16.8	4.54	46.5	152.1	7.11
			FPC-R3-2	5	0.16	4.1	15.8	5.42	55.0	173.6	7.39
			FPC-R3-3	5	0.17	4.6	15.0	7.76	77.2	177.2	7.57
			FPC-R3-4	5	0.16	4.1	14.5	7.95	77.2	177.4	7.54
			FPC-R3-5	5	0.17	3.6	13.9	7.45	71.8	177.0	7.47
	EDC-U	Reference	EDC-U-1	9	0	6.0	12.7	7.54	69.5	152.5	7.47
			EDC-U-2	10	0	4.5	14.0	3.72	36.0	154.5	7.19
			EDC-U-3	10	0	6.4	19.9	5.60	61.0	154.8	7.26
			EDC-U-4	9	0	5.8	16.4	4.98	49.4	147.2	7.02
			EDC-U-5	10	0	5.5	14.8	2.15	21.5	151.4	6.92
	HAC-R1	Exposed	HAC-R1-1	27	0.21	4.3	16.8	8.27	75.2	242.0	7.91
			HAC-R1-2	33	0.21	3.4	16.6	8.14	83.5	243.6	7.83
			HAC-R1-3	34	0.22	4.3	16.4	8.14	83.5	243.3	7.82
			HAC-R1-4	28	0.20	4.4	16.2	7.55	76.8	240.1	7.54
			HAC-R1-5	27	0.17	5.5	18.5	9.38	100.2	244.0	8.20
	HAC-U (HAC-R2)		HAC-U-1	26	0.23	4.3	12.5	10.13	109.8	278.4	8.54
			HAC-U-2	27	0.19	3.9	18.3	10.44	111.0	280.6	8.46
			HAC-U-3	30	0.17	4.5	16.5	10.45	107.3	284.3	8.33
			HAC-U-4	29	0.18	5.2	16.2	10.35	105.4	287.6	8.20
			HAC-U-5	38	0.15	5.5	-	-	-	-	-
	HAC-R3		HAC-R3-1	21	0.18	6.5	19.1	9.92	107.3	297.7	8.91
			HAC-R3-2	23	0.22	5.2	18.8	9.54	103.2	299.3	8.93
			HAC-R3-3	21	0.16	6.2	18.8	9.37	101.2	311.2	8.51
			HAC-R3-4	20	0.18	4.9	18.4	9.05	97.1	315.4	8.03
			HAC-R3-5	22	0.17	4.5	18.2	9.30	99.5	319.2	7.52

Note: "-" indicates no data.

[a] UHC is the pre-breach sampling area associated with HAC-R1, HAC-U (HAC-R2), and HAC-R3. UER is the pre-breach sampling area associated with EDC-U.

[b] HAC-R2 is the alternate name used for the HAC-U sampling area for HRWG reporting.

[c] Benthic invertebrate community sampling was not completed at the upper Edney Creek reference area (EDC-U) in 2020 due to habitat differences relative to the remediated areas (HAC-R1 and HAC-U; Minnow 2021a).

APPENDIX D.5
PERIPHYTON AND BENTHIC INVERTEBRATE TISSUE QUALITY

Table D.5.1: Periphyton Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference												
		Upper Edney Creek (EDC-U)												
		EDC-U_PERT-1	EDC-U_PERT-2	EDC-U_PERT-3	EDC-U_PERT-4	EDC-U_PERT-5	EDC-U_PERT-6	EDC-U_PERT-7	EDC-U_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24					
Moisture	mg/kg dw	80.8	83.2	82.2	78.9	84.4	86.8	84.2	75.1	82	3.66	75.1	82.7	86.8
Aluminum	mg/kg dw	3,000	4,640	8,880	4,480	8,810	5,190	7,210	10,700	6,614	2,687	3,000	6,200	10,700
Antimony	mg/kg dw	0.126	0.0930	0.102	0.108	0.107	0.0790	0.101	0.0570	0.0966	0.0208	0.0570	0.102	0.126
Arsenic	mg/kg dw	9.78	6.18	11.7	9.74	14.7	8.04	9.90	11.5	10.2	2.55	6.18	9.84	14.7
Barium	mg/kg dw	208	150	297	313	372	155	168	142	226	89.0	142	188	372
Beryllium	mg/kg dw	0.122	0.156	0.297	0.207	0.299	0.187	0.234	0.312	0.227	0.0711	0.122	0.220	0.312
Bismuth	mg/kg dw	0.0270	0.0370	0.0560	0.0350	0.0710	0.0420	0.0570	0.0650	0.0488	0.0157	0.0270	0.0490	0.0710
Boron	mg/kg dw	68.8	49.7	45.5	54.7	42.6	36.5	31.7	18.8	43.5	15.2	18.8	44.0	68.8
Cadmium	mg/kg dw	0.875	0.466	0.846	0.693	1.29	0.508	0.724	0.343	0.718	0.297	0.343	0.708	1.29
Calcium	mg/kg dw	11,500	12,000	11,500	11,400	11,800	9,500	9,540	7,610	10,606	1,555	7,610	11,450	12,000
Cesium	mg/kg dw	0.292	0.308	0.505	0.286	0.583	0.360	0.499	0.724	0.445	0.160	0.286	0.430	0.724
Chromium	mg/kg dw	8.18	15.7	25.1	17.2	28.0	23.3	23.2	45.0	23.2	10.8	8.18	23.2	45.0
Cobalt	mg/kg dw	13.5	9.80	19.0	17.6	25.4	13.8	16.6	13.3	16.1	4.74	9.80	15.2	25.4
Copper	mg/kg dw	21.6	22.0	28.4	23.0	35.6	21.8	35.0	23.1	26.3	5.96	21.6	23.0	35.6
Iron	mg/kg dw	7,320	9,730	20,000	12,200	19,600	12,200	15,400	23,100	14,944	5,534	7,320	13,800	23,100
Lead	mg/kg dw	1.44	1.80	3.26	1.77	3.49	2.27	2.91	4.08	2.63	0.948	1.44	2.59	4.08
Lithium	mg/kg dw	2.00	3.64	8.37	3.40	6.68	4.08	6.03	8.88	5.38	2.49	2.00	5.06	8.88
Magnesium	mg/kg dw	2,870	3,710	4,940	3,620	4,670	3,310	3,990	4,840	3,994	758	2,870	3,850	4,940
Manganese	mg/kg dw	6,240	4,360	8,510	8,480	11,800	4,710	6,340	3,250	6,711	2,781	3,250	6,290	11,800
Mercury	mg/kg dw	0.0412	0.0459	0.0610	0.0533	0.0851	0.0583	0.0670	0.0680	0.0600	0.0139	0.0412	0.0596	0.0851
Molybdenum	mg/kg dw	3.40	2.62	2.20	2.72	3.20	2.62	2.09	0.770	2.45	0.812	0.770	2.62	3.40
Nickel	mg/kg dw	30.8	23.8	39.8	32.0	43.3	25.3	38.5	23.7	32.2	7.68	23.7	31.4	43.3
Phosphorus	mg/kg dw	1,940	1,560	1,680	1,980	2,280	1,680	1,930	1,210	1,782	323	1,210	1,805	2,280
Potassium	mg/kg dw	4,610	4,380	2,830	4,930	4,100	3,730	3,760	1,310	3,706	1,161	1,310	3,930	4,930
Rubidium	mg/kg dw	8.30	10.0	9.33	9.95	12.1	10.4	10.4	8.51	9.87	1.20	8.30	9.98	12.1
Selenium	mg/kg dw	0.280	0.300	0.340	0.330	0.620	0.310	0.490	0.370	0.380	0.117	0.280	0.335	0.620
Silver	mg/kg dw	0.0447	0.0970	0.0762	0.0507	0.0909	0.410	0.0941	0.0925	0.120	0.119	0.0447	0.0917	0.410
Sodium	mg/kg dw	382	240	399	173	186	171	158	181	236	98.3	158	184	399
Strontium	mg/kg dw	83.7	78.0	87.7	89.2	99.7	65.1	71.5	61.6	79.6	13.0	61.6	80.8	99.7
Tellurium	mg/kg dw	<0.033	<0.036	<0.064	<0.058	<0.069	<0.043	<0.072	<0.023	<0.023	-	<0.023	<0.023	<0.072
Thallium	mg/kg dw	0.100	0.0709	0.110	0.0955	0.167	0.0843	0.115	0.0894	0.104	0.0291	0.0709	0.0978	0.167
Tin	mg/kg dw	<0.17	<0.18	<0.32	<0.29	<0.34	<0.21	<0.36	0.120	0.120	-	0.120	0.120	0.120
Titanium	mg/kg dw	111	163	323	293	228	246	274	473	264	109	111	260	473
Uranium	mg/kg dw	0.395	0.276	0.476	0.382	0.590	0.343	0.602	0.646	0.464	0.136	0.276	0.436	0.646
Vanadium	mg/kg dw	19.1	20.4	50.2	25.2	43.7	29.3	34.9	50.9	34.2	12.8	19.1	32.1	50.9
Zinc	mg/kg dw	83.4	56.4	76.9	78.4	88.2	47.8	66.0	56.9	69.2	14.6	47.8	71.5	88.2
Zirconium	mg/kg dw	3.22	4.53	6.70	5.42	5.80	5.20	5.68	6.91	5.43	1.18	3.22	5.55	6.91

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.1: **Periphyton Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 1 (HAC-R1)												
		HAC-R1_PERT-1	HAC-R1_PERT-2	HAC-R1_PERT-3	HAC-R1_PERT-4	HAC-R1_PERT-5	HAC-R1_PERT-6	HAC-R1_PERT-7	HAC-R1_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24					
Moisture	mg/kg dw	64.5	64.4	63.9	64.9	59.9	63.0	63.4	64.8	63.6	1.64	59.9	64.2	64.9
Aluminum	mg/kg dw	718	410	1,470	1,380	814	642	413	574	803	409	410	680	1,470
Antimony	mg/kg dw	0.0650	0.0610	0.0810	0.0940	0.0700	0.0690	0.0570	0.0510	0.0685	0.0137	0.0510	0.0670	0.0940
Arsenic	mg/kg dw	1.71	1.56	3.73	1.95	1.54	1.64	1.41	1.31	1.86	0.781	1.31	1.60	3.73
Barium	mg/kg dw	61.8	62.2	79.6	150	67.0	72.8	67.0	60.2	77.6	30.0	60.2	67.0	150
Beryllium	mg/kg dw	0.0390	0.0160	0.0480	0.0340	0.0310	0.0260	0.0200	0.0220	0.0295	0.0107	0.0160	0.0285	0.0480
Bismuth	mg/kg dw	<0.017	<0.015	<0.018	<0.018	<0.015	<0.013	<0.014	<0.017	<0.013	-	<0.013	<0.013	<0.018
Boron	mg/kg dw	251	241	259	235	240	301	199	250	247	28.3	199	246	301
Cadmium	mg/kg dw	0.102	0.105	0.0880	0.156	0.121	0.125	0.114	0.101	0.114	0.0207	0.0880	0.110	0.156
Calcium	mg/kg dw	213,000	223,000	225,000	198,000	208,000	216,000	236,000	201,000	215,000	12,784	198,000	214,500	236,000
Cesium	mg/kg dw	0.128	0.0797	0.183	0.414	0.127	0.109	0.0930	0.107	0.155	0.109	0.0797	0.118	0.414
Chromium	mg/kg dw	1.01	0.960	1.34	1.52	1.44	0.660	0.630	0.830	1.05	0.347	0.630	0.985	1.52
Cobalt	mg/kg dw	1.00	0.819	1.59	1.62	1.09	1.03	0.775	0.796	1.09	0.338	0.775	1.01	1.62
Copper	mg/kg dw	32.2	18.8	25.9	32.8	31.6	26.8	29.4	29.5	28.4	4.59	18.8	29.4	32.8
Iron	mg/kg dw	1,170	716	1,980	1,960	1,300	1,020	715	972	1,229	499	715	1,095	1,980
Lead	mg/kg dw	0.305	0.178	0.374	0.572	0.303	0.194	0.163	0.213	0.288	0.137	0.163	0.258	0.572
Lithium	mg/kg dw	<0.84	<0.76	1.64	1.27	0.800	0.910	<0.69	<0.84	0.932	0.338	<0.69	0.800	1.64
Magnesium	mg/kg dw	2,280	1,990	2,670	2,390	2,380	2,300	2,220	2,180	2,301	196	1,990	2,290	2,670
Manganese	mg/kg dw	808	913	954	1,450	1,270	1,450	1,110	848	1,100	262	808	1,032	1,450
Mercury	mg/kg dw	0.00580	<0.005	0.00560	0.00540	0.0111	<0.005	<0.005	0.00540	0.00604	0.00208	<0.005	0.00540	0.0111
Molybdenum	mg/kg dw	1.11	0.867	1.36	1.19	0.958	0.971	0.930	0.922	1.04	0.168	0.867	0.964	1.36
Nickel	mg/kg dw	2.09	2.05	1.98	2.50	2.06	2.15	2.33	2.27	2.18	0.175	1.98	2.12	2.50
Phosphorus	mg/kg dw	646	545	644	781	583	651	589	539	622	78.0	539	616	781
Potassium	mg/kg dw	3,610	2,620	3,530	4,530	3,150	3,340	3,170	2,510	3,308	631	2,510	3,255	4,530
Rubidium	mg/kg dw	3.67	2.44	3.74	5.47	3.27	3.46	3.20	2.65	3.49	0.922	2.44	3.36	5.47
Selenium	mg/kg dw	1.82	1.91	1.24	1.49	1.54	1.69	1.81	1.88	1.67	0.232	1.24	1.75	1.91
Silver	mg/kg dw	0.00770	<0.005	0.0100	0.00800	0.0100	0.00630	0.00620	0.00650	0.00746	0.00164	<0.005	0.00710	0.0100
Sodium	mg/kg dw	364	190	311	349	282	264	236	237	279	59.7	190	273	364
Strontium	mg/kg dw	473	482	512	442	481	479	506	459	479	22.8	442	480	512
Tellurium	mg/kg dw	<0.034	<0.031	<0.035	<0.037	<0.03	<0.026	<0.028	<0.034	<0.026	-	<0.026	<0.026	<0.037
Thallium	mg/kg dw	0.00490	0.00340	0.00450	0.00850	0.00410	0.00410	0.00440	0.00400	0.00474	0.00158	0.00340	0.00425	0.00850
Tin	mg/kg dw	<0.17	<0.15	<0.18	<0.18	<0.15	<0.13	<0.14	<0.17	<0.13	-	<0.13	<0.13	<0.18
Titanium	mg/kg dw	72.2	39.9	115	89.6	61.8	58.0	35.0	44.7	64.5	27.1	35.0	59.9	115
Uranium	mg/kg dw	0.0965	0.0734	0.102	0.102	0.0866	0.0804	0.0799	0.0751	0.0870	0.0117	0.0734	0.0835	0.102
Vanadium	mg/kg dw	4.98	2.83	8.85	6.33	4.87	4.36	2.90	3.41	4.82	2.01	2.83	4.62	8.85
Zinc	mg/kg dw	8.00	6.40	20.6	17.2	8.30	6.30	5.00	5.20	9.62	5.91	5.00	7.20	20.6
Zirconium	mg/kg dw	0.630	0.480	1.05	0.640	0.720	0.640	0.500	0.600	0.658	0.177	0.480	0.635	1.05

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.1: **Periphyton Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2])												
		HAC-U_PERT-1	HAC-U_PERT-2	HAC-U_PERT-3	HAC-U_PERT-4	HAC-U_PERT-5	HAC-U_PERT-6	HAC-U_PERT-7	HAC-U_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		13-Aug-24	13-Aug-24	13-Aug-24	12-Aug-24	12-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	64.5	60.9	57.3	59.2	54.6	61.3	66.7	61.2	60.7	3.82	54.6	61.0	66.7
Aluminum	mg/kg dw	190	338	271	335	1,180	494	172	2,100	635	675	172	336	2,100
Antimony	mg/kg dw	0.0790	0.0960	0.0880	0.0740	0.0720	0.0550	0.0710	0.136	0.0839	0.0243	0.0550	0.0765	0.136
Arsenic	mg/kg dw	1.33	2.01	1.51	1.51	2.24	1.35	1.67	2.93	1.82	0.550	1.33	1.59	2.93
Barium	mg/kg dw	90.8	127	116	97.8	109	79.4	94.5	848	195	264	79.4	103	848
Beryllium	mg/kg dw	<0.016	<0.037	0.0150	0.0150	0.0430	0.0140	<0.015	<0.037	0.0181	0.0109	0.0140	0.0150	0.0430
Bismuth	mg/kg dw	<0.016	<0.037	<0.015	<0.012	<0.013	<0.012	<0.015	<0.037	<0.012	-	<0.012	<0.012	<0.037
Boron	mg/kg dw	254	264	277	250	106	176	214	186	216	57.6	106	232	277
Cadmium	mg/kg dw	0.125	0.178	0.149	0.146	0.149	0.107	0.130	0.252	0.154	0.0446	0.107	0.148	0.252
Calcium	mg/kg dw	211,000	224,000	213,000	231,000	221,000	182,000	234,000	207,000	215,375	16,501	182,000	217,000	234,000
Cesium	mg/kg dw	0.0704	0.0665	0.0831	0.0678	0.104	0.0666	0.0887	0.111	0.0823	0.0177	0.0665	0.0768	0.111
Chromium	mg/kg dw	0.400	<0.74	0.420	0.720	1.12	0.910	0.380	<0.73	0.614	0.306	0.380	0.420	1.12
Cobalt	mg/kg dw	0.608	1.16	0.707	0.646	1.62	0.962	0.571	3.30	1.20	0.921	0.571	0.834	3.30
Copper	mg/kg dw	12.8	21.3	18.8	21.8	62.6	17.9	18.3	1,100	159	380	12.8	20.0	1,100
Iron	mg/kg dw	331	566	495	455	1,480	761	345	2,190	828	664	331	530	2,190
Lead	mg/kg dw	0.118	0.211	0.187	0.126	0.237	0.0800	0.145	2.10	0.400	0.689	0.0800	0.166	2.10
Lithium	mg/kg dw	<0.78	<1.84	<0.74	<0.62	1.38	0.810	<0.76	<1.83	0.778	0.347	<0.62	<0.715	1.38
Magnesium	mg/kg dw	2,140	2,320	2,260	2,360	3,160	2,180	2,260	2,810	2,436	358	2,140	2,290	3,160
Manganese	mg/kg dw	3,190	4,880	3,280	2,930	2,430	2,120	2,880	6,520	3,529	1,460	2,120	3,060	6,520
Mercury	mg/kg dw	<0.005	<0.005	<0.005	<0.005	0.00540	<0.005	<0.005	0.0114	0.00585	0.00281	<0.005	<0.0052	0.0114
Molybdenum	mg/kg dw	0.671	0.724	0.688	0.716	0.525	0.557	0.686	1.13	0.712	0.184	0.525	0.687	1.13
Nickel	mg/kg dw	1.33	1.91	1.71	1.90	1.84	1.71	1.16	3.69	1.91	0.770	1.16	1.78	3.69
Phosphorus	mg/kg dw	506	616	561	564	651	520	607	1,010	629	161	506	586	1,010
Potassium	mg/kg dw	2,820	2,940	2,780	2,500	1,480	2,530	3,400	3,270	2,715	591	1,480	2,800	3,400
Rubidium	mg/kg dw	2.68	2.86	2.66	2.39	2.01	2.41	3.38	3.78	2.77	0.570	2.01	2.67	3.78
Selenium	mg/kg dw	2.20	2.52	2.57	3.08	1.96	1.50	2.63	2.08	2.32	0.486	1.50	2.36	3.08
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	0.0107	<0.005	<0.005	0.00730	0.00600	0.00159	<0.005	<0.00615	0.0107
Sodium	mg/kg dw	167	165	197	212	220	163	182	229	192	26.4	163	190	229
Strontium	mg/kg dw	467	492	483	511	483	410	501	488	479	30.9	410	486	511
Tellurium	mg/kg dw	<0.031	<0.074	<0.03	<0.025	<0.026	<0.025	<0.03	0.0860	0.0326	-	<0.025	<0.0555	0.0860
Thallium	mg/kg dw	0.00420	<0.0074	0.00400	0.00530	0.00610	0.00270	0.00390	<0.0073	0.00437	0.00137	0.00270	0.00410	0.00610
Tin	mg/kg dw	<0.16	<0.37	<0.15	<0.12	<0.13	<0.12	<0.15	<0.37	<0.12	-	<0.12	<0.12	<0.37
Titanium	mg/kg dw	13.3	25.0	24.1	17.7	162	31.7	16.1	58.1	43.5	49.9	13.3	24.6	162
Uranium	mg/kg dw	0.0844	0.0825	0.0856	0.0943	0.0927	0.0699	0.0902	0.135	0.0918	0.0190	0.0699	0.0879	0.135
Vanadium	mg/kg dw	2.40	3.42	2.85	2.89	6.60	3.24	2.54	12.3	4.53	3.41	2.40	3.06	12.3
Zinc	mg/kg dw	4.90	9.40	5.00	4.30	12.7	4.20	3.70	12.2	7.05	3.77	3.70	4.95	12.7
Zirconium	mg/kg dw	0.370	<0.74	0.370	0.380	0.470	0.410	0.330	<0.73	0.388	0.0549	0.330	0.375	0.470

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.2: **Caddisfly Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Reference												
		Upper Edney Creek (EDC-U)												
		EDC-U_INVTRI-1	EDC-U_INVTRI-2	EDC-U_INVTRI-3	EDC-U_INVTRI-4	EDC-U_INVTRI-5	EDC-U_INVTRI-6	EDC-U_INVTRI-7	EDC-U_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24					
Moisture	mg/kg dw	77.7	77.2	77.6	77.3	78.9	76.8	76.7	78.5	77.6	0.775	76.7	77.5	78.9
Aluminum	mg/kg dw	38.4	65.3	91.8	185	48.6	75.9	40.2	43.1	73.5	48.9	38.4	57	185
Antimony	mg/kg dw	<0.01	<0.01	0.0110	0.0130	0.0110	0.0130	0.0110	0.0120	0.0114	0.000939	<0.01	0.0110	0.0130
Arsenic	mg/kg dw	0.505	0.496	0.622	0.499	0.381	0.373	0.296	0.902	0.509	0.188	0.296	0.498	0.902
Barium	mg/kg dw	7.74	9.78	19.6	12.0	5.52	4.34	5.69	4.71	8.67	5.15	4.34	6.72	19.6
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0480	0.0420	0.142	0.0620	0.0430	0.0330	0.0560	0.0170	0.0554	0.0376	0.0170	0.0455	0.142
Calcium	mg/kg dw	1,040	780	678	676	671	739	602	582	721	144	582	677	1,040
Cesium	mg/kg dw	<0.005	<0.005	0.00600	0.0128	<0.005	0.00550	<0.005	<0.005	0.00616	0.00293	<0.005	<0.00525	0.0128
Chromium	mg/kg dw	0.300	0.250	0.340	0.660	<0.2	0.330	<0.2	0.210	0.311	0.154	<0.2	0.275	0.660
Cobalt	mg/kg dw	0.644	0.923	1.60	1.03	1.19	1.14	0.593	0.814	0.992	0.327	0.593	0.976	1.60
Copper	mg/kg dw	14.6	17.0	15.5	15.8	16.6	16.6	16.4	19.1	16.4	1.32	14.6	16.5	19.1
Iron	mg/kg dw	146	436	400	534	278	268	198	992	406	269	146	339	992
Lead	mg/kg dw	<0.05	0.0520	0.0550	0.0960	0.0570	0.0620	0.0540	<0.05	0.0595	0.0153	<0.05	0.0545	0.0960
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,230	1,200	1,290	1,160	1,340	1,160	1,230	1,110	1,215	74.6	1,110	1,215	1,340
Manganese	mg/kg dw	288	560	974	532	746	483	418	461	558	213	288	508	974
Mercury	mg/kg dw	0.0273	0.0707	0.0560	0.0665	0.0551	0.0527	0.0613	0.0573	0.0559	0.0130	0.0273	0.0566	0.0707
Molybdenum	mg/kg dw	5.17	2.65	2.07	1.91	2.21	1.68	1.89	1.55	2.39	1.17	1.55	1.99	5.17
Nickel	mg/kg dw	0.610	0.450	1.00	0.730	0.290	0.330	0.230	0.230	0.484	0.276	0.230	0.390	1.00
Phosphorus	mg/kg dw	9,070	7,790	7,640	7,670	8,290	7,910	8,340	7,410	8,015	532	7,410	7,850	9,070
Potassium	mg/kg dw	7,280	6,100	7,440	6,840	7,230	7,510	6,910	6,520	6,979	486	6,100	7,070	7,510
Rubidium	mg/kg dw	1.84	1.24	1.44	1.86	1.49	1.21	1.68	1.12	1.48	0.287	1.12	1.46	1.86
Selenium	mg/kg dw	0.570	0.790	0.860	0.960	0.850	1.11	0.980	1.01	0.891	0.165	0.570	0.910	1.11
Silver	mg/kg dw	0.0248	0.0264	0.0232	0.0238	0.0222	0.0204	0.0179	0.0187	0.0222	0.00297	0.0179	0.0227	0.0264
Sodium	mg/kg dw	2,750	2,680	3,030	2,090	2,900	2,500	2,630	2,580	2,645	283	2,090	2,655	3,030
Strontium	mg/kg dw	6.36	5.87	5.48	4.92	5.01	5.16	4.37	4.27	5.18	0.711	4.27	5.08	6.36
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	0.00210	0.00250	0.00280	<0.002	<0.002	<0.002	<0.002	0.00217	0.000306	<0.002	<0.00205	0.00280
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.58	2.02	2.72	7.41	1.59	2.81	1.57	1.41	2.64	2.00	1.41	1.80	7.41
Uranium	mg/kg dw	0.0128	0.0121	0.0220	0.0218	0.00860	0.00760	0.00610	0.00680	0.0122	0.00643	0.00610	0.0104	0.0220
Vanadium	mg/kg dw	0.260	0.430	0.470	0.840	0.360	0.430	0.220	0.720	0.466	0.214	0.220	0.430	0.840
Zinc	mg/kg dw	101	105	160	99.8	116	88.6	111	115	112	21.4	88.6	108	160
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.2: **Caddisfly Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 1 (HAC-R1)												
		HAC-R1_INVTRI-1	HAC-R1_INVTRI-2	HAC-R1_INVTRI-3	HAC-R1_INVTRI-4	HAC-R1_INVTRI-5	HAC-R1_INVTRI-6	HAC-R1_INVTRI-7	HAC-R1_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24					
Moisture	mg/kg dw	75.0	76.0	75.0	60.7	75.7	78.7	77.1	75.9	74.3	5.61	60.7	75.8	78.7
Aluminum	mg/kg dw	75.0	85.1	49.7	36.0	45.5	46.8	58.1	57.0	56.6	16.2	36.0	53.4	85.1
Antimony	mg/kg dw	0.0290	0.0270	0.0210	0.0140	0.0210	0.0280	0.0230	0.0210	0.0230	0.00493	0.0140	0.0220	0.0290
Arsenic	mg/kg dw	0.326	0.416	0.309	0.298	0.426	0.354	0.376	0.366	0.359	0.0469	0.298	0.360	0.426
Barium	mg/kg dw	2.03	1.67	1.42	1.43	1.84	1.47	1.96	1.51	1.67	0.247	1.42	1.59	2.03
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1
Cadmium	mg/kg dw	<0.01	0.0110	<0.01	<0.01	0.0110	0.0110	<0.01	<0.01	0.0104	0	<0.01	<0.0105	0.0110
Calcium	mg/kg dw	470	585	582	522	654	644	615	700	596	74.2	470	600	700
Cesium	mg/kg dw	0.00970	0.0101	0.00890	0.00620	0.00850	0.00970	0.0113	0.0120	0.00955	0.00178	0.00620	0.00970	0.0120
Chromium	mg/kg dw	<0.2	0.300	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.212	-	<0.2	<0.25	0.300
Cobalt	mg/kg dw	0.109	0.154	0.102	0.0560	0.0710	0.0790	0.100	0.0800	0.0939	0.0300	0.0560	0.0900	0.154
Copper	mg/kg dw	18.5	19.5	17.2	10.4	17.8	20.2	20.3	18.3	17.8	3.18	10.4	18.4	20.3
Iron	mg/kg dw	181	225	146	108	134	144	182	209	166	39.8	108	164	225
Lead	mg/kg dw	<0.05	0.0820	0.0510	0.267	<0.05	<0.05	<0.05	<0.05	0.0812	0.0866	<0.05	<0.0505	0.267
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,100	1,060	1,010	636	1,180	1,230	1,270	1,360	1,106	222	636	1,140	1,360
Manganese	mg/kg dw	62.2	99.7	75.2	66.8	88.4	81.0	109	98.9	85.2	16.7	62.2	84.7	109
Mercury	mg/kg dw	0.0636	0.0699	0.0485	0.0552	0.0537	0.0456	0.0788	0.0559	0.0589	0.0112	0.0456	0.0556	0.0788
Molybdenum	mg/kg dw	5.35	8.02	6.16	5.48	6.36	7.97	7.26	7.83	6.80	1.11	5.35	6.81	8.02
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2
Phosphorus	mg/kg dw	7,570	7,040	7,540	5,020	7,900	8,150	8,210	8,200	7,454	1,064	5,020	7,735	8,210
Potassium	mg/kg dw	6,560	5,920	6,720	3,820	7,170	7,620	7,640	7,380	6,604	1,268	3,820	6,945	7,640
Rubidium	mg/kg dw	1.31	1.10	1.49	1.04	1.51	1.76	1.67	1.30	1.40	0.256	1.04	1.40	1.76
Selenium	mg/kg dw	10.9	11.2	10.5	6.91	10.8	16.4	13.8	13.2	11.7	2.80	6.91	11.0	16.4
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005
Sodium	mg/kg dw	2,100	2,210	1,980	1,140	2,510	2,620	2,630	2,870	2,258	543	1,140	2,360	2,870
Strontium	mg/kg dw	3.28	3.53	4.43	3.40	4.73	4.39	4.06	4.66	4.06	0.583	3.28	4.22	4.73
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	8.66	4.98	3.45	2.80	4.02	3.43	4.09	6.07	4.69	1.90	2.80	4.06	8.66
Uranium	mg/kg dw	0.00420	0.00410	0.00360	0.00210	0.00310	0.00350	0.00470	0.00410	0.00368	0.000805	0.00210	0.00385	0.00470
Vanadium	mg/kg dw	0.360	0.460	0.290	0.210	0.300	0.300	0.340	0.360	0.328	0.0723	0.210	0.320	0.460
Zinc	mg/kg dw	102	103	80.3	71.5	87.3	101	112	107	95.5	14.2	71.5	102	112
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.2: **Caddisfly Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2])												
		HAC-U_INVTRI-1	HAC-U_INVTRI-2	HAC-U_INVTRI-3	HAC-U_INVTRI-4	HAC-U_INVTRI-5	HAC-U_INVTRI-6	HAC-U_INVTRI-7	HAC-U_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	77.3	70.9	77.5	75.1	77.6	73.9	73.4	73.6	74.9	2.41	70.9	74.5	77.6
Aluminum	mg/kg dw	21.1	11.4	62.2	83.5	38.3	30.0	198	5.80	56.3	62.9	5.80	34.2	198
Antimony	mg/kg dw	0.0160	0.0120	0.0150	0.0220	0.0220	<0.01	0.0120	0.0160	0.0156	0.00420	<0.01	0.0155	0.0220
Arsenic	mg/kg dw	0.341	0.302	0.713	0.574	0.497	0.481	0.470	0.238	0.452	0.154	0.238	0.476	0.713
Barium	mg/kg dw	2.09	1.50	5.00	15.0	4.18	4.29	5.64	2.59	5.04	4.28	1.50	4.24	15.0
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	4.10	<1	<1	<1	1.39	-	<1	<2.55	4.10
Cadmium	mg/kg dw	0.0110	<0.01	0.0440	0.110	0.0430	0.0370	0.0260	0.0110	0.0365	0.0332	<0.01	0.0315	0.110
Calcium	mg/kg dw	963	430	1,170	908	3,400	663	918	687	1,142	940	430	913	3,400
Cesium	mg/kg dw	0.00870	<0.005	0.0129	0.0135	0.00950	0.0112	0.0322	<0.005	0.0122	0.00812	<0.005	0.0104	0.0322
Chromium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2
Cobalt	mg/kg dw	0.0560	0.0450	0.378	0.210	0.124	0.0830	0.284	0.0430	0.153	0.125	0.0430	0.104	0.378
Copper	mg/kg dw	20.5	15.6	33.5	20.9	22.0	22.9	21.9	18.1	21.9	5.25	15.6	21.4	33.5
Iron	mg/kg dw	114	77.1	188	206	131	105	284	75.3	148	72.8	75.3	122	284
Lead	mg/kg dw	<0.05	<0.05	<0.05	0.0520	<0.05	<0.05	<0.05	<0.05	0.0503	-	<0.05	<0.051	0.0520
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,260	910	1,340	1,180	1,090	1,070	1,250	936	1,130	155	910	1,135	1,340
Manganese	mg/kg dw	104	81.2	276	1,170	386	230	272	159	335	352	81.2	251	1,170
Mercury	mg/kg dw	0.0622	0.0360	0.0445	0.0649	0.0625	0.0241	0.0645	0.0846	0.0554	0.0193	0.0241	0.0624	0.0846
Molybdenum	mg/kg dw	10.1	4.50	18.5	5.82	7.21	5.64	11.8	7.32	8.86	4.58	4.50	7.26	18.5
Nickel	mg/kg dw	<0.2	<0.2	0.210	0.260	<0.2	<0.2	<0.2	<0.2	0.209	0.0234	<0.2	<0.205	0.260
Phosphorus	mg/kg dw	8,080	5,750	9,300	7,440	7,370	6,900	7,820	7,140	7,475	1,017	5,750	7,405	9,300
Potassium	mg/kg dw	7,420	5,500	6,710	6,900	7,440	5,750	6,170	5,560	6,431	797	5,500	6,440	7,440
Rubidium	mg/kg dw	1.50	0.820	1.33	1.34	1.36	1.05	1.45	1.06	1.24	0.236	0.820	1.34	1.50
Selenium	mg/kg dw	16.7	9.89	16.2	11.0	12.3	12.0	20.1	13.8	14.0	3.43	9.89	13.0	20.1
Silver	mg/kg dw	<0.005	<0.005	0.0166	<0.005	<0.005	<0.005	<0.005	<0.005	0.00645	-	<0.005	<0.0108	0.0166
Sodium	mg/kg dw	2,610	1,920	2,660	2,250	2,210	2,580	2,210	1,920	2,295	296	1,920	2,230	2,660
Strontium	mg/kg dw	4.06	2.72	7.39	6.64	10.5	4.52	5.60	3.86	5.66	2.48	2.72	5.06	10.5
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	0.00310	<0.002	<0.002	<0.002	<0.002	<0.002	0.00214	-	<0.002	<0.00255	0.00310
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.45	0.850	3.66	5.09	2.20	1.76	24.9	<0.5	5.05	8.22	<0.5	1.98	24.9
Uranium	mg/kg dw	0.00260	0.00230	0.0264	0.0242	0.0109	0.0102	0.0250	0.00250	0.0130	0.0107	0.00230	0.0106	0.0264
Vanadium	mg/kg dw	0.210	0.120	0.810	0.630	0.390	0.260	1.16	<0.1	0.460	0.378	<0.1	0.325	1.16
Zinc	mg/kg dw	99.3	69.8	124	90.1	90.0	92.5	108	91.2	95.6	15.7	69.8	91.8	124
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.3: **Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Reference												
		Upper Edney Creek (EDC-U)												
		EDC-U_INV-1	EDC-U_INV-2	EDC-U_INV-3	EDC-U_INV-4	EDC-U_INV-5	EDC-U_INV-6	EDC-U_INV-7	EDC-U_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24					
Moisture	mg/kg dw	87.6	71.4	86.9	87.9	87.2	78.4	86.2	83.2	83.6	5.87	71.4	86.5	87.9
Aluminum	mg/kg dw	1,690	203	715	1,280	1,240	1,050	2,830	432	1,180	823	203	1,145	2,830
Antimony	mg/kg dw	0.0440	0.0120	0.0250	0.0330	0.0490	0.0260	0.0500	0.0200	0.0324	0.0141	0.0120	0.0295	0.0500
Arsenic	mg/kg dw	1.81	0.721	1.62	2.18	1.92	1.83	3.83	1.08	1.87	0.922	0.721	1.82	3.83
Barium	mg/kg dw	22.7	10.9	13.5	30.9	25.6	17.7	44.7	18.5	23.1	10.9	10.9	20.6	44.7
Beryllium	mg/kg dw	0.0440	<0.01	0.0230	0.0360	0.0390	0.0340	0.0870	0.0140	0.0359	0.0236	<0.01	0.0350	0.0870
Bismuth	mg/kg dw	0.0120	<0.01	<0.01	<0.01	<0.01	<0.01	0.0180	<0.01	0.0112	0.00281	<0.01	<0.011	0.0180
Boron	mg/kg dw	1.40	2.60	1.40	1.30	1.30	<1	1.80	1.70	1.56	0.452	<1	1.40	2.60
Cadmium	mg/kg dw	5.19	0.657	4.46	3.73	3.45	1.01	3.84	1.75	3.01	1.66	0.657	3.59	5.19
Calcium	mg/kg dw	4,390	3,680	2,670	3,850	4,320	1,820	14,500	2,160	4,674	4,087	1,820	3,765	14,500
Cesium	mg/kg dw	0.130	0.0148	0.0582	0.0934	0.0950	0.0647	0.188	0.0290	0.0841	0.0561	0.0148	0.0790	0.188
Chromium	mg/kg dw	4.64	0.650	2.38	3.66	3.60	2.72	8.09	1.59	3.42	2.27	0.650	3.16	8.09
Cobalt	mg/kg dw	2.57	1.06	3.42	4.80	3.45	1.89	4.40	1.78	2.92	1.32	1.06	3.00	4.80
Copper	mg/kg dw	35.3	23.7	26.7	29.3	27.7	24.9	60.2	20.2	31.0	12.6	20.2	27.2	60.2
Iron	mg/kg dw	2,550	539	1,590	2,740	2,420	2,190	5,180	1,110	2,290	1,394	539	2,305	5,180
Lead	mg/kg dw	0.538	0.0790	0.291	0.375	0.469	0.385	1.00	0.192	0.416	0.278	0.0790	0.380	1.00
Lithium	mg/kg dw	1.35	<0.5	0.590	0.950	0.960	0.830	2.18	<0.5	0.982	0.555	<0.5	0.890	2.18
Magnesium	mg/kg dw	2,830	4,600	2,180	2,540	2,360	1,310	3,250	1,840	2,614	997	1,310	2,450	4,600
Manganese	mg/kg dw	636	888	701	1,560	1,080	631	1,250	504	906	364	504	794	1,560
Mercury	mg/kg dw	0.0920	0.0238	0.0849	0.127	0.108	0.132	0.0899	0.107	0.0956	0.0336	0.0238	0.0995	0.132
Molybdenum	mg/kg dw	0.979	0.397	1.03	1.03	1.10	0.306	1.02	0.712	0.822	0.313	0.306	1.00	1.10
Nickel	mg/kg dw	4.08	1.68	2.65	3.74	3.54	2.82	6.64	1.92	3.38	1.56	1.68	3.18	6.64
Phosphorus	mg/kg dw	12,800	11,400	10,000	12,300	11,100	7,200	10,800	9,990	10,699	1,727	7,200	10,950	12,800
Potassium	mg/kg dw	10,500	4,580	8,110	10,300	9,000	7,150	8,770	9,080	8,436	1,898	4,580	8,885	10,500
Rubidium	mg/kg dw	10.4	2.92	7.56	10.0	7.91	8.15	8.95	5.62	7.69	2.44	2.92	8.03	10.4
Selenium	mg/kg dw	1.90	0.480	1.34	1.76	1.34	1.40	1.39	1.57	1.40	0.425	0.480	1.40	1.90
Silver	mg/kg dw	0.232	0.101	0.245	0.220	0.206	0.135	0.658	0.120	0.240	0.178	0.101	0.213	0.658
Sodium	mg/kg dw	5,960	2,160	6,110	6,310	5,150	5,590	4,730	6,720	5,341	1,435	2,160	5,775	6,720
Strontium	mg/kg dw	23.6	23.4	12.6	17.9	23.6	10.0	42.7	9.13	20.4	10.9	9.13	20.6	42.7
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0307	0.0107	0.0263	0.0252	0.0264	0.0201	0.0726	0.0118	0.0280	0.0194	0.0107	0.0258	0.0726
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	64.0	6.65	29.6	47.4	47.5	36.6	101	16.8	43.7	29.4	6.65	42.0	101
Uranium	mg/kg dw	0.196	0.0478	0.160	0.169	0.206	0.143	0.366	0.108	0.174	0.0925	0.0478	0.164	0.366
Vanadium	mg/kg dw	5.61	0.860	3.16	5.13	5.43	4.46	12.2	2.20	4.88	3.40	0.860	4.80	12.2
Zinc	mg/kg dw	275	218	206	214	240	114	175	171	202	48.7	114	210	275
Zirconium	mg/kg dw	1.22	<0.2	0.710	1.02	1.08	0.860	1.46	0.430	0.872	0.371	<0.2	0.940	1.46

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.3: **Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 1 (HAC-R1)												
		HAC-R1_INV-1	HAC-R1_INV-2	HAC-R1_INV-3	HAC-R1_INV-4	HAC-R1_INV-5	HAC-R1_INV-6	HAC-R1_INV-7	HAC-R1_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24					
Moisture	mg/kg dw	85.4	85.5	86.5	84.9	83.2	83.0	84.2	75.2	83.5	3.55	75.2	84.5	86.5
Aluminum	mg/kg dw	1,170	2,170	1,080	1,210	1,300	1,520	1,350	1,220	1,378	346	1,080	1,260	2,170
Antimony	mg/kg dw	0.0470	0.0590	0.0430	0.0510	0.0540	0.0420	0.0800	0.0680	0.0555	0.0131	0.0420	0.0525	0.0800
Arsenic	mg/kg dw	2.23	2.52	2.40	2.68	1.94	2.10	3.60	2.57	2.50	0.508	1.94	2.46	3.60
Barium	mg/kg dw	59.9	79.1	68.0	53.5	36.4	43.6	59.1	75.9	59.4	14.9	36.4	59.5	79.1
Beryllium	mg/kg dw	0.0420	0.0580	0.0410	0.0410	0.0480	0.0570	0.0490	0.0520	0.0485	0.00687	0.0410	0.0485	0.0580
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	4.10	4.10	3.20	2.80	2.10	3.70	2.80	3.50	3.29	0.700	2.10	3.35	4.10
Cadmium	mg/kg dw	1.27	1.09	1.76	2.19	1.20	1.78	2.67	1.78	1.72	0.535	1.09	1.77	2.67
Calcium	mg/kg dw	74,600	58,700	90,200	53,100	11,900	6,150	23,900	4,930	40,435	33,083	4,930	38,500	90,200
Cesium	mg/kg dw	0.169	0.425	0.162	0.165	0.154	0.188	0.179	0.134	0.197	0.0935	0.134	0.167	0.425
Chromium	mg/kg dw	2.02	2.35	1.56	1.71	1.60	1.93	1.75	1.90	1.85	0.257	1.56	1.82	2.35
Cobalt	mg/kg dw	2.10	2.87	2.01	2.20	1.98	2.26	2.14	1.98	2.19	0.292	1.98	2.12	2.87
Copper	mg/kg dw	116	142	120	175	178	170	236	147	160	38.6	116	158	236
Iron	mg/kg dw	1,850	3,120	1,830	1,980	2,100	2,460	2,220	1,910	2,184	433	1,830	2,040	3,120
Lead	mg/kg dw	0.425	0.694	0.412	0.504	0.492	0.622	0.459	0.590	0.525	0.101	0.412	0.498	0.694
Lithium	mg/kg dw	1.22	2.25	1.15	1.23	1.31	1.56	1.34	1.11	1.40	0.372	1.11	1.27	2.25
Magnesium	mg/kg dw	2,370	3,070	2,570	2,400	1,960	2,360	2,340	1,960	2,379	352	1,960	2,365	3,070
Manganese	mg/kg dw	890	1,300	953	1,160	1,180	1,240	1,550	1,520	1,224	236	890	1,210	1,550
Mercury	mg/kg dw	0.0626	0.0566	0.0799	0.0570	0.0693	0.0559	0.0744	0.0726	0.0660	0.00927	0.0559	0.0660	0.0799
Molybdenum	mg/kg dw	1.92	2.37	1.73	2.28	3.15	2.75	1.95	2.15	2.29	0.470	1.73	2.22	3.15
Nickel	mg/kg dw	2.03	2.92	1.85	2.47	2.62	2.90	3.19	2.67	2.58	0.455	1.85	2.64	3.19
Phosphorus	mg/kg dw	14,200	13,000	15,300	16,200	9,320	8,740	13,100	11,400	12,658	2,680	8,740	13,050	16,200
Potassium	mg/kg dw	8,130	7,820	8,950	8,990	9,110	7,940	9,130	10,200	8,784	790	7,820	8,970	10,200
Rubidium	mg/kg dw	7.80	7.89	8.43	7.58	3.52	4.35	6.64	5.88	6.51	1.79	3.52	7.11	8.43
Selenium	mg/kg dw	3.89	4.34	4.44	4.98	4.70	4.95	4.64	4.91	4.61	0.373	3.89	4.67	4.98
Silver	mg/kg dw	0.0216	0.0277	0.0236	0.0246	0.0357	0.0352	0.0311	0.0273	0.0284	0.00524	0.0216	0.0275	0.0357
Sodium	mg/kg dw	4,560	4,390	5,170	5,040	4,290	4,180	4,320	4,390	4,542	365	4,180	4,390	5,170
Strontium	mg/kg dw	449	356	543	325	56.7	29.4	135	28.2	240	204	28.2	230	543
Tellurium	mg/kg dw	0.0230	0.0200	0.0260	0.0200	<0.02	<0.02	<0.02	<0.02	0.0211	0.00241	0.0200	0.0200	0.0260
Thallium	mg/kg dw	0.0116	0.0142	0.0120	0.0103	0.00600	0.00760	0.00830	0.00620	0.00952	0.00297	0.00600	0.00930	0.0142
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	68.7	195	66.9	59.8	75.0	81.5	73.6	54.9	84.4	45.5	54.9	71.2	195
Uranium	mg/kg dw	0.0906	0.116	0.0943	0.109	0.0937	0.105	0.0979	0.0805	0.0984	0.0113	0.0805	0.0961	0.116
Vanadium	mg/kg dw	6.36	11.1	6.29	6.73	7.12	8.01	7.71	6.29	7.45	1.61	6.29	6.92	11.1
Zinc	mg/kg dw	95.8	108	103	113	124	119	127	121	114	10.9	95.8	116	127
Zirconium	mg/kg dw	0.750	0.820	0.830	0.540	0.740	0.920	0.760	0.680	0.755	0.113	0.540	0.755	0.920

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.3: **Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Upper Hazeltine Creek Reach 2 (HAC-U [HAC-R2])												
		HAC-U_INV-1	HAC-U_INV-2	HAC-U_INV-3	HAC-U_INV-4	HAC-U_INV-5	HAC-U_INV-6	HAC-U_INV-7	HAC-U_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	12-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	81.9	76.7	84.8	82.6	78.2	81.0	81.6	78.9	80.7	2.63	76.7	81.3	84.8
Aluminum	mg/kg dw	692	237	506	638	648	2,620	243	268	732	787	237	572	2,620
Antimony	mg/kg dw	0.0330	0.0290	0.0460	0.0510	0.0450	0.153	0.0400	0.0290	0.0532	0.0411	0.0290	0.0425	0.153
Arsenic	mg/kg dw	1.42	1.51	1.98	1.52	2.80	19.1	2.78	2.25	4.17	6.06	1.42	2.12	19.1
Barium	mg/kg dw	83.5	42.7	74.7	60.7	45.6	50.6	48.1	41.0	55.9	15.7	41.0	49.4	83.5
Beryllium	mg/kg dw	0.0190	<0.011	0.0210	0.0260	0.0240	0.104	<0.014	0.0120	0.0286	0.0317	<0.011	0.0200	0.104
Bismuth	mg/kg dw	<0.01	<0.011	<0.02	<0.01	<0.01	0.0270	<0.014	<0.01	0.0121	-	<0.01	<0.0185	0.0270
Boron	mg/kg dw	2.30	2.40	3.50	3.00	4.40	9.20	5.00	2.90	4.09	2.27	2.30	3.25	9.20
Cadmium	mg/kg dw	1.90	2.31	2.50	1.41	2.02	1.68	2.70	1.52	2.00	0.467	1.41	1.96	2.70
Calcium	mg/kg dw	3,350	16,800	7,340	4,570	24,000	16,600	17,300	33,600	15,445	10,279	3,350	16,700	33,600
Cesium	mg/kg dw	0.0541	0.0488	0.0815	0.0908	0.0942	0.484	0.0520	0.0503	0.119	0.149	0.0488	0.0678	0.484
Chromium	mg/kg dw	1.39	0.420	1.09	1.14	1.22	6.08	0.550	0.500	1.55	1.87	0.420	1.12	6.08
Cobalt	mg/kg dw	1.06	0.822	1.18	1.12	0.944	7.55	0.949	0.899	1.82	2.32	0.822	1.00	7.55
Copper	mg/kg dw	121	144	152	136	130	463	146	119	176	116	119	140	463
Iron	mg/kg dw	940	432	1,010	1,160	1,150	4,700	664	543	1,325	1,391	432	975	4,700
Lead	mg/kg dw	0.265	0.164	0.238	0.328	0.330	1.67	0.195	0.125	0.414	0.513	0.125	0.252	1.67
Lithium	mg/kg dw	<0.5	<0.57	<0.99	0.570	0.520	2.60	<0.7	<0.5	0.779	0.839	<0.5	0.520	2.60
Magnesium	mg/kg dw	1,710	1,360	2,070	1,930	2,670	11,600	2,760	1,740	3,230	3,415	1,360	2,000	11,600
Manganese	mg/kg dw	2,700	2,220	4,150	3,030	2,280	1,940	2,650	2,630	2,700	676	1,940	2,640	4,150
Mercury	mg/kg dw	0.103	0.0633	0.0987	0.0834	0.0918	0.132	0.104	0.0448	0.0901	0.0267	0.0448	0.0952	0.132
Molybdenum	mg/kg dw	2.09	1.46	3.13	5.23	1.79	4.71	1.84	1.43	2.71	1.50	1.43	1.96	5.23
Nickel	mg/kg dw	2.67	1.72	2.35	2.06	1.80	12.3	1.34	1.22	3.18	3.72	1.22	1.93	12.3
Phosphorus	mg/kg dw	9,100	9,620	11,700	9,460	11,900	29,500	13,200	9,310	12,974	6,845	9,100	10,660	29,500
Potassium	mg/kg dw	7,280	5,370	9,020	7,880	8,450	17,200	8,680	5,440	8,665	3,719	5,370	8,165	17,200
Rubidium	mg/kg dw	3.24	3.33	4.25	2.95	5.99	13.7	4.83	3.44	5.22	3.57	2.95	3.84	13.7
Selenium	mg/kg dw	5.86	3.52	6.76	8.20	11.0	19.9	16.0	5.37	9.58	5.71	3.52	7.48	19.9
Silver	mg/kg dw	0.0314	0.0248	0.0649	0.0578	0.0905	0.126	0.0831	0.0484	0.0659	0.0333	0.0248	0.0614	0.126
Sodium	mg/kg dw	2,870	2,150	4,090	4,090	5,780	7,340	6,120	2,670	4,389	1,855	2,150	4,090	7,340
Strontium	mg/kg dw	30.8	61.5	28.6	23.0	81.1	104	65.4	76.3	58.8	29.0	23.0	63.5	104
Tellurium	mg/kg dw	<0.02	<0.023	<0.04	<0.02	<0.02	<0.02	<0.028	<0.02	<0.02	-	<0.02	<0.02	<0.04
Thallium	mg/kg dw	0.00500	0.00480	0.00620	0.0148	0.00750	0.0581	0.00770	0.00640	0.0138	0.0182	0.00480	0.00695	0.0581
Tin	mg/kg dw	0.140	<0.11	<0.2	<0.1	<0.1	<0.1	<0.14	<0.1	0.106	-	<0.1	<0.12	0.140
Titanium	mg/kg dw	54.3	12.7	28.8	32.6	26.1	106	10.3	12.2	35.4	32.0	10.3	27.4	106
Uranium	mg/kg dw	0.0593	0.0502	0.0882	0.102	0.0924	0.534	0.0594	0.0780	0.133	0.163	0.0502	0.0831	0.534
Vanadium	mg/kg dw	3.22	1.91	3.96	4.34	4.09	13.9	2.13	2.21	4.47	3.93	1.91	3.59	13.9
Zinc	mg/kg dw	119	72.5	133	158	114	414	183	92.5	161	108	72.5	126	414
Zirconium	mg/kg dw	0.730	<0.23	0.410	0.480	<0.2	1.83	<0.28	<0.2	0.531	0.535	<0.2	0.305	1.83

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.5.4: Periphyton Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference												
		Lower Edney Creek (EDC-D [EDC-REF])												
		EDC-D_PERT-1	EDC-D_PERT-2	EDC-D_PERT-3	EDC-D_PERT-4	EDC-D_PERT-5	EDC-D_PERT-6	EDC-D_PERT-7	EDC-D_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	88.2	90.5	85.6	91.0	93.0	87.8	90.6	92.6	89.9	2.53	85.6	90.5	93.0
Aluminum	mg/kg dw	4,370	4,360	4,680	3,620	4,690	7,000	8,140	5,610	5,309	1,530	3,620	4,685	8,140
Antimony	mg/kg dw	0.0510	0.0420	0.0430	0.0610	0.0680	0.0630	0.0660	0.0990	0.0616	0.0181	0.0420	0.0620	0.0990
Arsenic	mg/kg dw	9.70	8.22	10.3	12.0	15.0	10.2	14.2	20.7	12.5	4.02	8.22	11.2	20.7
Barium	mg/kg dw	87.2	73.5	68.1	77.2	88.1	106	114	117	91.4	18.8	68.1	87.7	117
Beryllium	mg/kg dw	0.164	0.147	0.173	0.137	0.159	0.209	0.250	0.269	0.188	0.0489	0.137	0.168	0.269
Bismuth	mg/kg dw	0.0360	0.0330	0.0400	0.0320	0.0380	0.0540	0.0670	0.0480	0.0435	0.0121	0.0320	0.0390	0.0670
Boron	mg/kg dw	229	238	106	177	424	187	288	325	247	98.5	106	234	424
Cadmium	mg/kg dw	0.230	0.132	0.197	0.264	0.221	0.242	0.274	0.302	0.233	0.0523	0.132	0.236	0.302
Calcium	mg/kg dw	20,600	19,000	10,200	17,300	26,200	26,900	20,600	19,500	20,038	5,228	10,200	20,050	26,900
Cesium	mg/kg dw	0.724	0.692	0.789	0.573	0.747	1.02	1.17	0.894	0.826	0.193	0.573	0.768	1.17
Chromium	mg/kg dw	16.4	11.2	7.02	15.5	22.8	13.5	24.4	27.7	17.3	7.07	7.02	16.0	27.7
Cobalt	mg/kg dw	4.82	4.48	4.53	4.27	5.74	6.39	8.55	7.57	5.79	1.59	4.27	5.28	8.55
Copper	mg/kg dw	14.0	11.5	14.2	14.2	12.6	20.0	21.8	19.5	16.0	3.86	11.5	14.2	21.8
Iron	mg/kg dw	9,630	9,390	10,200	7,620	10,300	12,800	16,700	13,300	11,242	2,868	7,620	10,250	16,700
Lead	mg/kg dw	2.16	2.05	2.48	1.60	2.01	3.17	3.67	2.60	2.47	0.675	1.60	2.32	3.67
Lithium	mg/kg dw	4.70	4.46	4.75	3.69	4.41	6.66	8.60	5.15	5.30	1.58	3.69	4.72	8.60
Magnesium	mg/kg dw	3,180	3,240	2,920	3,260	4,230	4,560	5,340	3,840	3,821	836	2,920	3,550	5,340
Manganese	mg/kg dw	1,330	769	741	1,220	1,690	1,060	1,460	1,790	1,258	390	741	1,275	1,790
Mercury	mg/kg dw	0.0512	0.0426	0.0414	0.0350	0.0320	0.0540	0.0640	0.0480	0.0460	0.0105	0.0320	0.0453	0.0640
Molybdenum	mg/kg dw	1.12	0.655	1.10	1.69	1.61	1.04	0.898	1.43	1.19	0.357	0.655	1.11	1.69
Nickel	mg/kg dw	11.4	10.1	10.9	16.2	20.1	12.9	17.1	24.7	15.4	5.11	10.1	14.6	24.7
Phosphorus	mg/kg dw	1,410	920	1,300	1,700	1,720	1,390	1,470	1,820	1,466	288	920	1,440	1,820
Potassium	mg/kg dw	2,900	2,360	2,320	5,130	6,750	3,300	3,510	5,080	3,919	1,577	2,320	3,405	6,750
Rubidium	mg/kg dw	6.49	5.97	6.26	7.88	9.56	8.63	9.09	9.11	7.87	1.44	5.97	8.26	9.56
Selenium	mg/kg dw	1.04	0.600	1.10	1.08	0.800	0.890	0.960	1.20	0.959	0.192	0.600	1.00	1.20
Silver	mg/kg dw	0.0423	0.0372	0.0676	0.0398	0.0445	0.0576	0.0704	0.0539	0.0517	0.0127	0.0372	0.0492	0.0704
Sodium	mg/kg dw	352	439	300	429	673	411	439	492	442	110	300	434	673
Strontium	mg/kg dw	116	112	124	121	155	144	133	132	130	14.5	112	128	155
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0389	0.0351	0.0447	0.0504	0.0398	0.0545	0.0628	0.0474	0.0467	0.00911	0.0351	0.0460	0.0628
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1	<0.1	-	<0.1	<0.1	<0.2
Titanium	mg/kg dw	168	164	155	142	203	305	321	221	210	68.7	142	186	321
Uranium	mg/kg dw	0.237	0.182	0.236	0.209	0.206	0.343	0.342	0.258	0.252	0.0607	0.182	0.236	0.343
Vanadium	mg/kg dw	17.7	15.3	19.5	13.7	18.8	25.8	29.7	24.1	20.6	5.49	13.7	19.2	29.7
Zinc	mg/kg dw	33.7	24.3	27.6	43.0	34.1	46.1	47.5	80.8	42.1	17.7	24.3	38.6	80.8
Zirconium	mg/kg dw	3.48	3.44	2.71	3.85	4.69	4.76	5.65	5.79	4.30	1.11	2.71	4.27	5.79

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.4: Periphyton Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed												
		Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5])												
		HAC-D_PERT-1	HAC-D_PERT-2	HAC-D_PERT-3	HAC-D_PERT-4	HAC-D_PERT-5	HAC-D_PERT-6	HAC-D_PERT-7	HAC-D_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24					
Moisture	mg/kg dw	61.2	65.0	67.6	62.6	72.2	64.5	59.7	64.3	64.6	3.90	59.7	64.4	72.2
Aluminum	mg/kg dw	770	2,510	4,950	1,320	10,400	4,280	1,570	3,070	3,609	3,101	770	2,790	10,400
Antimony	mg/kg dw	0.0490	0.0680	0.0770	0.0720	0.106	0.128	0.167	0.140	0.101	0.0411	0.0490	0.0915	0.167
Arsenic	mg/kg dw	2.52	4.64	8.67	3.65	16.6	7.74	6.10	6.73	7.08	4.36	2.52	6.42	16.6
Barium	mg/kg dw	72.8	84.9	113	156	487	304	321	332	234	149	72.8	230	487
Beryllium	mg/kg dw	0.0310	0.0850	0.172	0.0460	0.381	0.136	0.0560	0.111	0.127	0.113	0.0310	0.0980	0.381
Bismuth	mg/kg dw	<0.013	0.0220	0.0510	<0.013	0.0980	<0.041	<0.04	<0.038	0.0306	0.0313	<0.013	0.0175	0.0980
Boron	mg/kg dw	210	236	156	226	148	224	231	182	202	35.0	148	217	236
Cadmium	mg/kg dw	0.461	0.431	0.369	0.540	0.842	0.697	0.788	0.675	0.600	0.175	0.369	0.608	0.842
Calcium	mg/kg dw	215,000	224,000	180,000	240,000	150,000	207,000	213,000	182,000	201,375	28,854	150,000	210,000	240,000
Cesium	mg/kg dw	0.182	0.477	0.809	0.316	1.45	0.442	0.363	0.441	0.560	0.402	0.182	0.442	1.45
Chromium	mg/kg dw	1.37	4.74	9.20	2.52	14.7	3.61	6.04	3.61	5.72	4.34	1.37	4.18	14.7
Cobalt	mg/kg dw	1.53	2.96	5.25	2.48	14.7	6.80	6.17	7.42	5.91	4.15	1.53	5.71	14.7
Copper	mg/kg dw	32.1	55.9	92.1	40.6	190	83.2	221	86.3	100	69.0	32.1	84.8	221
Iron	mg/kg dw	1,480	4,320	9,320	2,290	19,100	6,270	3,530	5,700	6,501	5,656	1,480	5,010	19,100
Lead	mg/kg dw	0.464	1.25	3.00	0.642	5.39	1.68	0.806	1.35	1.82	1.65	0.464	1.30	5.39
Lithium	mg/kg dw	0.840	2.83	5.49	1.48	10.2	3.44	<2.01	3.12	3.57	3.11	0.840	2.98	10.2
Magnesium	mg/kg dw	2,470	3,440	4,410	3,220	7,210	4,190	3,620	3,940	4,062	1,409	2,470	3,780	7,210
Manganese	mg/kg dw	846	870	1,390	2,980	15,900	11,300	12,800	12,300	7,298	6,345	846	7,140	15,900
Mercury	mg/kg dw	0.00850	0.0169	0.0311	0.0128	0.0742	0.0238	0.0188	0.0241	0.0263	0.0206	0.00850	0.0213	0.0742
Molybdenum	mg/kg dw	0.614	0.760	0.874	0.830	2.22	1.48	1.46	1.33	1.20	0.532	0.614	1.10	2.22
Nickel	mg/kg dw	2.99	6.15	10.2	4.51	23.9	8.95	8.28	9.76	9.34	6.41	2.99	8.62	23.9
Phosphorus	mg/kg dw	604	772	961	714	1,280	932	1,000	967	904	208	604	946	1,280
Potassium	mg/kg dw	2,340	3,320	3,120	3,530	3,880	3,170	3,750	3,500	3,326	478	2,340	3,410	3,880
Rubidium	mg/kg dw	2.77	5.05	6.67	4.59	10.7	4.71	4.74	5.11	5.54	2.34	2.77	4.89	10.7
Selenium	mg/kg dw	3.44	3.38	1.96	3.93	3.73	4.47	6.75	4.17	3.98	1.35	1.96	3.83	6.75
Silver	mg/kg dw	0.00840	0.0202	0.0478	0.0122	0.0325	0.0200	0.0134	0.0270	0.0227	0.0129	0.00840	0.0201	0.0478
Sodium	mg/kg dw	191	245	249	216	331	234	255	232	244	40.6	191	240	331
Strontium	mg/kg dw	429	480	421	479	394	481	455	419	445	33.6	394	442	481
Tellurium	mg/kg dw	<0.027	<0.033	0.0290	<0.027	<0.109	<0.082	<0.08	<0.077	0.0277	-	<0.027	<0.028	0.0290
Thallium	mg/kg dw	0.0199	0.0368	0.0639	0.0332	0.140	0.0854	0.0928	0.0856	0.0697	0.0395	0.0199	0.0746	0.140
Tin	mg/kg dw	<0.13	<0.16	0.120	<0.13	<0.54	<0.41	<0.4	<0.38	0.120	-	0.120	0.120	0.120
Titanium	mg/kg dw	41.0	126	238	63.2	117	153	68.2	169	122	65.0	41.0	122	238
Uranium	mg/kg dw	0.129	0.210	0.331	0.164	0.594	0.259	0.265	0.242	0.274	0.144	0.129	0.250	0.594
Vanadium	mg/kg dw	4.96	11.8	23.6	7.39	46.7	20.4	18.2	18.6	19.0	13.0	4.96	18.4	46.7
Zinc	mg/kg dw	11.8	18.5	28.3	14.8	61.1	25.7	23.3	23.8	25.9	15.3	11.8	23.6	61.1
Zirconium	mg/kg dw	0.710	1.96	3.77	1.03	6.78	2.24	1.03	1.92	2.43	2.00	0.710	1.94	6.78

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.4: Periphyton Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed												
		Lower Edney Creek (E1 [EDC-EXP])												
		E1_PERT-1	E1_PERT-2	E1_PERT-3	E1_PERT-4	E1_PERT-5	E1_PERT-6	E1_PERT-7	E1_PERT-8	Mean	Standard Deviation	Minimum	Median	Maximum
		8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	7-Aug-24	7-Aug-24					
Moisture	mg/kg dw	87.0	89.2	84.1	78.8	83.0	83.1	77.9	72.6	82	5.33	72.6	83.0	89.2
Aluminum	mg/kg dw	8,440	9,730	3,930	11,700	10,500	6,420	12,500	9,690	9,114	2,812	3,930	9,710	12,500
Antimony	mg/kg dw	0.0620	0.0800	0.0410	0.0720	0.0650	0.0700	0.0660	0.0680	0.0655	0.0113	0.0410	0.0670	0.0800
Arsenic	mg/kg dw	8.18	11.0	4.83	10.9	10.2	9.00	10.0	9.35	9.18	2.00	4.83	9.68	11.0
Barium	mg/kg dw	100	111	56.6	159	184	142	387	1,320	307	421	56.6	150	1,320
Beryllium	mg/kg dw	0.248	0.290	0.129	0.378	0.325	0.230	0.306	0.277	0.273	0.0740	0.129	0.284	0.378
Bismuth	mg/kg dw	0.0700	0.0820	0.0320	0.0870	0.103	0.0460	0.0590	0.0630	0.0678	0.0229	0.0320	0.0665	0.103
Boron	mg/kg dw	168	183	79.5	35.3	40.3	54.2	68.9	48.9	84.8	57.9	35.3	61.5	183
Cadmium	mg/kg dw	0.215	0.302	0.171	0.242	0.260	0.341	0.368	0.392	0.286	0.0776	0.171	0.281	0.392
Calcium	mg/kg dw	36,000	34,500	31,700	16,100	23,200	34,000	32,600	37,900	30,750	7,361	16,100	33,300	37,900
Cesium	mg/kg dw	1.03	1.30	0.537	1.45	1.22	0.800	1.06	0.842	1.03	0.297	0.537	1.04	1.45
Chromium	mg/kg dw	20.8	31.0	9.93	24.0	22.2	14.1	16.4	13.7	19.0	6.80	9.93	18.6	31.0
Cobalt	mg/kg dw	6.36	7.88	3.55	10.4	8.74	6.17	9.24	8.28	7.58	2.15	3.55	8.08	10.4
Copper	mg/kg dw	29.3	30.9	38.1	180	147	97.5	179	158	107	67	29.3	122	180
Iron	mg/kg dw	16,400	18,400	7,640	22,300	20,200	12,400	18,000	14,800	16,268	4,644	7,640	17,200	22,300
Lead	mg/kg dw	3.75	4.39	1.87	5.49	4.82	3.20	4.26	4.29	4.01	1.10	1.87	4.28	5.49
Lithium	mg/kg dw	10.3	11.6	4.62	12.1	10.5	6.48	8.71	7.45	8.97	2.63	4.62	9.51	12.1
Magnesium	mg/kg dw	5,360	6,050	2,930	6,520	5,770	4,100	6,170	5,020	5,240	1,203	2,930	5,565	6,520
Manganese	mg/kg dw	640	921	458	1,040	1,040	1,540	2,200	2,870	1,339	823	458	1,040	2,870
Mercury	mg/kg dw	0.0317	0.0460	0.0367	0.0552	0.0646	0.0811	0.0672	0.122	0.0631	0.0289	0.0317	0.0599	0.122
Molybdenum	mg/kg dw	0.692	0.763	0.384	1.15	0.799	0.974	0.782	1.25	0.849	0.273	0.384	0.790	1.25
Nickel	mg/kg dw	17.0	25.4	11.2	22.3	18.5	14.6	14.6	14.4	17.2	4.66	11.2	15.8	25.4
Phosphorus	mg/kg dw	1,300	1,440	1,010	1,150	1,160	1,800	1,560	1,660	1,385	277	1,010	1,370	1,800
Potassium	mg/kg dw	2,690	2,970	1,570	1,790	1,900	3,560	2,780	3,030	2,536	703	1,570	2,735	3,560
Rubidium	mg/kg dw	9.68	10.9	4.79	9.12	8.74	8.84	8.31	7.83	8.53	1.77	4.79	8.79	10.9
Selenium	mg/kg dw	0.650	0.810	0.380	0.740	0.830	1.12	0.710	0.880	0.765	0.211	0.380	0.775	1.12
Silver	mg/kg dw	0.0536	0.0625	0.0409	0.102	0.0920	0.0785	0.0789	0.123	0.0789	0.0267	0.0409	0.0787	0.123
Sodium	mg/kg dw	453	460	242	357	325	350	497	1,240	490	314	242	405	1,240
Strontium	mg/kg dw	148	156	124	104	127	136	238	228	158	49.2	104	142	238
Tellurium	mg/kg dw	<0.02	0.0220	<0.02	<0.029	0.0280	<0.02	<0.028	<0.034	0.0217	0.00365	<0.02	<0.021	0.0280
Thallium	mg/kg dw	0.0709	0.0794	0.0332	0.0721	0.0669	0.0524	0.0523	0.0523	0.0599	0.0150	0.0332	0.0596	0.0794
Tin	mg/kg dw	0.150	<0.2	<0.1	0.190	0.230	0.170	0.170	0.170	0.167	0.0275	<0.1	0.170	0.230
Titanium	mg/kg dw	348	403	157	604	509	293	495	557	421	150	157	449	604
Uranium	mg/kg dw	0.295	0.363	0.140	0.497	0.410	0.251	0.337	0.320	0.327	0.106	0.140	0.328	0.497
Vanadium	mg/kg dw	31.4	33.8	14.0	52.5	46.1	27.2	46.0	41.7	36.6	12.5	14.0	37.8	52.5
Zinc	mg/kg dw	53.1	63.9	26.8	55.7	48.8	113	42.3	71.2	59.4	25.5	26.8	54.4	113
Zirconium	mg/kg dw	5.74	6.15	2.67	8.34	6.28	3.67	7.26	6.32	5.80	1.83	2.67	6.22	8.34

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.5: **Caddisfly Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024**[a]

Analyte	Units	Reference												
		Lower Edney Creek (EDC-D [EDC-REF])												
		EDC-D_INVTRI-1	EDC-D_INVTRI-2	EDC-D_INVTRI-3	EDC-D_INVTRI-4	EDC-D_INVTRI-5	EDC-D_INVTRI-6	EDC-D_INVTRI-7	EDC-D_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	79.1	77.8	76.3	72.7	70.4	78.9	77.7	75.7	76.1	3.08	70.4	77.0	79.1
Aluminum	mg/kg dw	1,530	789	15.5	266	183	1,410	718	572	685	553	15.5	645	1,530
Antimony	mg/kg dw	0.0300	0.0330	<0.01	0.0150	0.0110	0.0350	0.0230	0.0200	0.0221	0.00973	<0.01	0.0215	0.0350
Arsenic	mg/kg dw	15.6	10.4	1.67	5.83	3.42	9.80	6.30	7.95	7.62	4.38	1.67	7.12	15.6
Barium	mg/kg dw	113	86.5	2.98	39.2	33.4	102	39.5	68.4	60.6	38.1	2.98	54	113
Beryllium	mg/kg dw	0.0640	0.0390	<0.01	0.0120	<0.01	0.0560	0.0270	0.0250	0.0304	0.0209	<0.01	0.0260	0.0640
Bismuth	mg/kg dw	0.0120	<0.01	<0.01	<0.01	<0.01	0.0110	<0.01	<0.01	0.0104	0.000468	<0.01	<0.0105	0.0120
Boron	mg/kg dw	8.40	4.70	<1	2.80	1.70	17.6	10.2	5.30	6.46	5.47	<1	5.00	17.6
Cadmium	mg/kg dw	0.187	0.280	0.0120	0.166	0.117	0.237	0.121	0.143	0.158	0.0816	0.0120	0.154	0.280
Calcium	mg/kg dw	2,640	2,080	925	888	807	2,550	1,610	1,450	1,619	739	807	1,530	2,640
Cesium	mg/kg dw	0.227	0.127	0.00870	0.0422	0.0319	0.198	0.117	0.0878	0.105	0.0784	0.00870	0.102	0.227
Chromium	mg/kg dw	4.64	2.73	<0.2	1.00	0.820	3.73	2.14	1.70	2.12	1.43	<0.2	1.92	4.64
Cobalt	mg/kg dw	3.24	2.37	0.116	1.01	0.580	2.76	1.63	1.59	1.66	1.08	0.116	1.61	3.24
Copper	mg/kg dw	19.6	22.3	16.1	17.7	15.1	21.6	17.7	17.7	18.5	2.52	15.1	17.7	22.3
Iron	mg/kg dw	3,050	1,720	134	683	420	2,660	1,440	1,210	1,415	1,037	134	1,325	3,050
Lead	mg/kg dw	0.641	0.498	<0.05	0.206	0.106	0.684	0.372	0.261	0.352	0.231	<0.05	0.316	0.684
Lithium	mg/kg dw	1.52	0.730	<0.5	<0.5	<0.5	1.36	0.720	0.530	0.795	0.421	<0.5	0.625	1.52
Magnesium	mg/kg dw	1,780	1,550	1,180	1,290	1,150	1,920	1,540	1,570	1,498	276	1,150	1,545	1,920
Manganese	mg/kg dw	1,000	1,050	72.4	553	326	946	437	687	634	351	72.4	620	1,050
Mercury	mg/kg dw	0.0688	0.0665	0.0458	0.0444	0.0386	0.0687	0.0579	0.0438	0.0543	0.0126	0.0386	0.0518	0.0688
Molybdenum	mg/kg dw	5.55	4.97	5.34	4.07	5.17	3.53	4.89	3.89	4.68	0.744	3.53	4.93	5.55
Nickel	mg/kg dw	6.39	4.99	<0.2	1.84	1.08	6.42	3.25	3.13	3.41	2.22	<0.2	3.19	6.42
Phosphorus	mg/kg dw	8,710	7,410	8,410	7,600	6,870	7,910	8,640	9,550	8,138	856	6,870	8,160	9,550
Potassium	mg/kg dw	14,600	10,500	6,740	8,790	6,540	14,600	10,700	10,800	10,409	3,081	6,540	10,600	14,600
Rubidium	mg/kg dw	6.41	4.02	1.48	3.16	2.01	6.50	4.08	4.29	3.99	1.82	1.48	4.05	6.50
Selenium	mg/kg dw	2.03	1.54	1.62	1.28	1.15	1.92	1.50	1.33	1.55	0.306	1.15	1.52	2.03
Silver	mg/kg dw	0.0380	0.0289	0.0142	0.0206	0.0175	0.0377	0.0232	0.0258	0.0257	0.00876	0.0142	0.0245	0.0380
Sodium	mg/kg dw	2,950	2,340	2,720	2,190	2,090	2,890	2,880	2,860	2,615	351	2,090	2,790	2,950
Strontium	mg/kg dw	19.4	14.2	7.05	7.29	6.04	17.6	12.1	10.1	11.7	5.02	6.04	11.1	19.4
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0169	0.0199	<0.002	0.00480	0.00310	0.0186	0.00980	0.00610	0.0102	0.00721	<0.002	0.00795	0.0199
Tin	mg/kg dw	0.210	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.114	-	<0.1	<0.155	0.210
Titanium	mg/kg dw	56.2	29.4	0.950	12.6	7.69	54.1	28.9	22.6	26.6	20.3	0.950	25.8	56.2
Uranium	mg/kg dw	0.136	0.104	0.00230	0.0316	0.0209	0.134	0.0762	0.0504	0.0694	0.0514	0.00230	0.0633	0.136
Vanadium	mg/kg dw	5.18	3.50	<0.1	1.15	0.750	5.23	2.68	2.15	2.59	1.85	<0.1	2.42	5.23
Zinc	mg/kg dw	125	167	98.6	148	127	120	109	179	134	28.1	98.6	126	179
Zirconium	mg/kg dw	1.46	0.740	<0.2	0.280	<0.2	1.45	0.730	0.530	0.699	0.505	<0.2	0.630	1.46

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.5: **Caddisfly Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024**[a]

Analyte	Units	Exposed												
		Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5])												
		HAC-D_INVTRI-1	HAC-D_INVTRI-2	HAC-D_INVTRI-3	HAC-D_INVTRI-4	HAC-D_INVTRI-5	HAC-D_INVTRI-6	HAC-D_INVTRI-7	HAC-D_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24					
Moisture	mg/kg dw	71.3	77.9	75.4	77.7	80.2	77.5	81.3	81.8	77.9	3.42	71.3	77.8	81.8
Aluminum	mg/kg dw	57.8	483	903	802	990	706	1,420	2,180	943	636	57.8	852	2,180
Antimony	mg/kg dw	0.0200	0.0270	0.0360	0.0490	0.0550	0.0490	0.0640	0.0640	0.0455	0.0164	0.0200	0.0490	0.0640
Arsenic	mg/kg dw	0.644	1.27	1.76	1.89	1.95	2.28	3.31	3.57	2.08	0.974	0.644	1.92	3.57
Barium	mg/kg dw	7.63	14.4	22.8	37.0	39.5	52.2	84.7	87.4	43.2	30.0	7.63	38.2	87.4
Beryllium	mg/kg dw	<0.01	0.0180	0.0290	0.0300	0.0360	0.0240	0.0550	0.0790	0.0351	0.0212	<0.01	0.0295	0.0790
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	0.0110	0.0110	<0.01	0.0190	0.0260	0.0134	0.00609	<0.01	0.0105	0.0260
Boron	mg/kg dw	<1	1.60	3.30	3.40	2.80	2.60	6.90	4.10	3.21	1.71	<1	3.05	6.90
Cadmium	mg/kg dw	0.0690	0.345	0.317	0.400	0.198	0.327	0.707	0.521	0.360	0.193	0.0690	0.336	0.707
Calcium	mg/kg dw	902	2,330	3,540	3,580	2,360	2,970	7,150	4,220	3,382	1,830	902	3,255	7,150
Cesium	mg/kg dw	0.0182	0.0907	0.128	0.145	0.168	0.111	0.247	0.381	0.161	0.110	0.0182	0.136	0.381
Chromium	mg/kg dw	<0.2	1.10	1.51	1.88	2.13	2.33	3.33	4.72	2.15	1.24	<0.2	2.00	4.72
Cobalt	mg/kg dw	0.252	1.12	1.42	1.68	1.45	1.66	2.92	3.23	1.72	0.956	0.252	1.56	3.23
Copper	mg/kg dw	15.3	43.5	57.6	68.0	53.5	58.5	102	110	63.5	30.6	15.3	58.0	110
Iron	mg/kg dw	193	943	1,310	1,610	1,920	1,750	3,130	4,570	1,928	1,359	193	1,680	4,570
Lead	mg/kg dw	0.0860	0.314	0.545	0.540	0.607	0.464	0.897	1.35	0.600	0.382	0.0860	0.542	1.35
Lithium	mg/kg dw	<0.5	<0.5	0.770	0.880	1.12	0.780	1.56	2.49	1.08	0.625	<0.5	0.830	2.49
Magnesium	mg/kg dw	979	1,220	1,270	1,280	1,370	1,160	1,440	1,880	1,325	264	979	1,275	1,880
Manganese	mg/kg dw	157	311	618	1,140	1,160	1,660	2,570	2,430	1,256	910	157	1,150	2,570
Mercury	mg/kg dw	0.0357	0.0318	0.0436	0.0517	0.0837	0.0694	0.0736	0.0861	0.0594	0.0215	0.0318	0.0606	0.0861
Molybdenum	mg/kg dw	7.84	6.70	5.75	5.17	7.10	4.71	4.10	4.14	5.69	1.40	4.10	5.46	7.84
Nickel	mg/kg dw	0.270	1.42	1.99	2.52	2.53	2.35	4.26	9.70	3.13	2.88	0.270	2.44	9.70
Phosphorus	mg/kg dw	6,650	8,430	8,750	7,980	7,490	6,630	7,880	7,480	7,661	763	6,630	7,685	8,750
Potassium	mg/kg dw	5,620	5,800	6,770	6,900	7,020	6,960	8,380	7,480	6,866	878	5,620	6,930	8,380
Rubidium	mg/kg dw	1.18	2.40	2.86	3.01	2.21	2.64	3.74	3.77	2.73	0.844	1.18	2.75	3.77
Selenium	mg/kg dw	13.3	7.57	10.9	8.37	10.0	11.8	5.56	5.49	9.12	2.86	5.49	9.18	13.3
Silver	mg/kg dw	<0.005	0.0165	0.0213	0.0289	0.0219	0.0237	0.0417	0.0513	0.0263	0.0126	<0.005	0.0228	0.0513
Sodium	mg/kg dw	2,180	2,650	3,150	2,880	3,010	3,090	3,620	3,400	2,998	445	2,180	3,050	3,620
Strontium	mg/kg dw	6.63	14.1	16.2	17.8	14.6	16.5	28.8	27.1	17.7	7.18	6.63	16.4	28.8
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	0.0104	0.0150	0.0153	0.0166	0.0152	0.0288	0.0384	0.0177	0.00988	<0.002	0.0152	0.0384
Tin	mg/kg dw	<0.1	<0.1	0.200	<0.1	<0.1	<0.1	<0.1	<0.1	0.112	-	<0.1	<0.15	0.200
Titanium	mg/kg dw	3.07	22.4	30.7	37.5	44.3	30.5	62.6	90.8	40.2	26.6	3.07	34.1	90.8
Uranium	mg/kg dw	0.00620	0.0496	0.0573	0.0777	0.0635	0.0558	0.122	0.160	0.0740	0.0472	0.00620	0.0604	0.160
Vanadium	mg/kg dw	0.280	2.20	3.21	3.95	4.44	4.47	7.91	10.2	4.58	3.14	0.280	4.20	10.2
Zinc	mg/kg dw	71.1	111	110	128	108	93.6	133	138	112	22.1	71.1	110	138
Zirconium	mg/kg dw	<0.2	0.400	0.530	0.660	0.710	0.260	1.16	1.66	0.698	0.489	<0.2	0.595	1.66

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.5: **Caddisfly Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]**

Analyte	Units	Exposed												
		Lower Edney Creek (E1 [EDC-EXP])												
		E1_INVTRI-1	E1_INVTRI-2	E1_INVTRI-3	E1_INVTRI-4	E1_INVTRI-5	E1_INVTRI-6	E1_INVTRI-7	E1_INVTRI-8	Mean	Standard Deviation	Minimum	Median	Maximum
		8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	7-Aug-24	7-Aug-24					
Moisture	mg/kg dw	73.2	78.5	78.4	75.2	77.3	79.8	76.5	74.8	76.7	2.21	73.2	76.9	79.8
Aluminum	mg/kg dw	35.6	6.70	2,040	58.4	1,070	1,180	740	105	654	740	6.70	422	2,040
Antimony	mg/kg dw	<0.01	<0.01	0.0430	0.0110	0.0360	0.0440	0.0280	0.0200	0.0253	0.0146	<0.01	0.0240	0.0440
Arsenic	mg/kg dw	1.26	0.945	8.48	0.766	4.29	4.22	3.09	0.885	2.99	2.67	0.766	2.17	8.48
Barium	mg/kg dw	10.7	6.37	97.3	5.94	59.9	85.9	53.5	7.37	40.9	38.1	5.94	32.1	97.3
Beryllium	mg/kg dw	<0.01	<0.01	0.0650	<0.01	0.0430	0.0540	0.0290	<0.01	0.0289	0.0154	<0.01	0.0195	0.0650
Bismuth	mg/kg dw	<0.01	<0.01	0.0160	<0.01	0.0130	0.0110	<0.01	<0.01	0.0112	0.00207	<0.01	<0.0105	0.0160
Boron	mg/kg dw	<1	<1	41.9	<1	6.40	5.30	3.40	<1	7.62	14.5	<1	2.20	41.9
Cadmium	mg/kg dw	0.0610	0.0220	0.480	0.0950	0.297	0.402	0.284	0.178	0.227	0.166	0.0220	0.231	0.480
Calcium	mg/kg dw	608	778	2,850	521	1,660	2,200	2,520	847	1,498	932	521	1,254	2,850
Cesium	mg/kg dw	0.00950	0.00580	0.268	0.0112	0.130	0.140	0.0964	0.0179	0.0848	0.0930	0.00580	0.0572	0.268
Chromium	mg/kg dw	<0.2	<0.2	5.55	<0.2	5.64	3.11	3.34	0.370	2.33	2.45	<0.2	1.74	5.64
Cobalt	mg/kg dw	0.316	0.0660	3.06	0.120	1.95	2.44	1.39	0.208	1.19	1.18	0.0660	0.853	3.06
Copper	mg/kg dw	14.1	16.8	38.9	16.1	56.3	70.0	44.4	21.3	34.7	21.0	14.1	30.1	70.0
Iron	mg/kg dw	150	116	3,730	174	2,160	2,790	1,730	291	1,393	1,414	116	1,010	3,730
Lead	mg/kg dw	0.0590	<0.05	0.937	0.0790	0.617	0.708	0.422	0.0940	0.371	0.353	<0.05	0.258	0.937
Lithium	mg/kg dw	<0.5	<0.5	2.08	<0.5	1.16	1.23	0.810	<0.5	0.910	0.482	<0.5	0.655	2.08
Magnesium	mg/kg dw	1,150	1,260	1,920	1,050	1,600	1,990	1,560	1,240	1,471	353	1,050	1,410	1,990
Manganese	mg/kg dw	149	132	754	114	445	757	829	232	426	311	114	338	829
Mercury	mg/kg dw	0.0371	0.0420	0.0599	0.0358	0.0870	0.101	0.0604	0.0772	0.0626	0.0242	0.0358	0.0602	0.101
Molybdenum	mg/kg dw	3.86	3.54	2.72	3.47	2.14	2.54	4.05	5.32	3.46	1.01	2.14	3.50	5.32
Nickel	mg/kg dw	0.400	<0.2	6.46	<0.2	5.84	3.38	2.98	0.300	2.47	2.65	<0.2	1.69	6.46
Phosphorus	mg/kg dw	7,250	8,210	6,680	7,060	7,060	7,700	8,330	6,880	7,396	616	6,680	7,155	8,330
Potassium	mg/kg dw	6,440	6,900	11,700	6,170	10,000	9,860	8,680	5,890	8,205	2,162	5,890	7,790	11,700
Rubidium	mg/kg dw	1.30	1.51	5.67	1.48	4.03	3.56	3.56	1.32	2.80	1.64	1.30	2.54	5.67
Selenium	mg/kg dw	0.780	1.08	1.48	1.26	1.69	2.20	1.54	1.50	1.44	0.423	0.780	1.49	2.20
Silver	mg/kg dw	0.00970	0.0114	0.0546	0.00730	0.0363	0.0451	0.0320	0.00970	0.0258	0.0186	0.00730	0.0217	0.0546
Sodium	mg/kg dw	2,450	2,650	2,360	2,400	2,760	3,230	2,880	2,810	2,692	293	2,360	2,705	3,230
Strontium	mg/kg dw	4.07	4.44	18.4	3.84	11.4	14.7	16.2	5.79	9.86	6.03	3.84	8.60	18.4
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	<0.002	<0.002	0.0206	0.00450	0.0133	0.0165	0.0101	0.00300	0.00900	0.00712	<0.002	0.00730	0.0206
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.88	<0.5	81.5	2.92	55.6	60.9	39.3	5.52	31.0	32.5	<0.5	22.4	81.5
Uranium	mg/kg dw	0.00840	<0.002	0.179	0.00380	0.104	0.136	0.0758	0.00730	0.0645	0.0701	<0.002	0.0421	0.179
Vanadium	mg/kg dw	0.190	<0.1	8.08	0.230	4.84	5.62	3.42	0.470	2.87	3.10	<0.1	1.94	8.08
Zinc	mg/kg dw	116	140	136	94.4	107	178	115	137	128	25.8	94.4	126	178
Zirconium	mg/kg dw	<0.2	<0.2	1.70	<0.2	0.920	1.20	0.790	<0.2	0.676	0.354	<0.2	0.495	1.70

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.6: Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference												
		Lower Edney Creek (EDC-D [EDC-REF])												
		EDC-D_INV-1	EDC-D_INV-2	EDC-D_INV-3	EDC-D_INV-4	EDC-D_INV-5	EDC-D_INV-6	EDC-D_INV-7	EDC-D_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24					
Moisture	mg/kg dw	81.9	71.1	80.6	82.9	73.8	76.7	72.6	73.1	76.6	4.63	71.1	75.2	82.9
Aluminum	mg/kg dw	718	94.7	902	1,670	104	231	114	126	495	568	94.7	178	1,670
Antimony	mg/kg dw	0.0260	<0.01	0.0300	0.0290	<0.01	0.0180	<0.01	0.0120	0.0181	0.00854	<0.01	0.0150	0.0300
Arsenic	mg/kg dw	4.75	6.04	8.09	7.50	1.29	2.46	0.938	2.18	4.16	2.83	0.938	3.60	8.09
Barium	mg/kg dw	35.9	7.02	39.8	48.2	8.17	11.1	5.35	7.73	20.4	17.7	5.35	9.64	48.2
Beryllium	mg/kg dw	0.0290	<0.01	0.0350	0.0560	<0.01	<0.01	<0.01	<0.01	0.0213	0.0109	<0.01	<0.0195	0.0560
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	0.0120	<0.01	<0.01	<0.01	<0.01	0.0102	-	<0.01	<0.011	0.0120
Boron	mg/kg dw	3.60	3.20	8.90	13.3	<1	3.50	<1	<1	4.44	3.97	<1	3.35	13.3
Cadmium	mg/kg dw	0.427	0.118	0.899	0.934	0.298	0.367	0.392	0.447	0.485	0.285	0.118	0.410	0.934
Calcium	mg/kg dw	2,470	2,420	3,090	2,530	1,650	1,770	3,030	2,620	2,448	519	1,650	2,500	3,090
Cesium	mg/kg dw	0.125	0.0230	0.147	0.263	0.0306	0.0434	0.0356	0.0330	0.0876	0.0851	0.0230	0.0395	0.263
Chromium	mg/kg dw	2.16	0.470	2.54	4.05	0.430	0.770	0.480	0.540	1.43	1.35	0.430	0.655	4.05
Cobalt	mg/kg dw	1.34	0.501	1.70	1.99	0.377	0.553	0.360	0.524	0.918	0.655	0.360	0.538	1.99
Copper	mg/kg dw	38.5	31.1	29.6	27.1	55.1	37.4	43.2	33.3	36.9	9.02	27.1	35.4	55.1
Iron	mg/kg dw	1,760	283	1,930	2,940	297	539	293	344	1,048	1,024	283	442	2,940
Lead	mg/kg dw	0.376	<0.05	0.407	0.598	<0.05	0.105	<0.05	0.0660	0.213	0.220	<0.05	0.0855	0.598
Lithium	mg/kg dw	0.750	<0.5	0.840	1.65	<0.5	<0.5	<0.5	<0.5	0.718	0.361	<0.5	<0.625	1.65
Magnesium	mg/kg dw	1,360	3,380	1,940	2,220	1,690	1,420	1,750	1,840	1,950	640	1,360	1,795	3,380
Manganese	mg/kg dw	643	200	661	564	228	285	230	236	381	203	200	260	661
Mercury	mg/kg dw	0.0738	0.0116	0.0492	0.0446	0.0510	0.0801	0.110	0.0552	0.0594	0.0290	0.0116	0.0531	0.110
Molybdenum	mg/kg dw	0.910	0.452	1.25	1.23	0.434	0.630	0.413	0.457	0.722	0.359	0.413	0.544	1.25
Nickel	mg/kg dw	5.86	3.23	5.33	4.35	1.57	1.84	0.990	1.53	3.09	1.89	0.990	2.54	5.86
Phosphorus	mg/kg dw	7,460	10,600	9,060	10,900	8,670	9,530	9,340	9,660	9,402	1,082	7,460	9,435	10,900
Potassium	mg/kg dw	8,150	7,480	9,450	11,200	6,380	8,160	6,490	6,750	8,008	1,653	6,380	7,815	11,200
Rubidium	mg/kg dw	3.28	2.62	5.53	6.84	2.54	2.57	2.11	3.05	3.57	1.69	2.11	2.84	6.84
Selenium	mg/kg dw	1.48	0.690	2.35	1.76	1.61	1.45	2.02	1.40	1.60	0.488	0.690	1.54	2.35
Silver	mg/kg dw	0.136	0.0793	0.0908	0.0978	0.222	0.133	0.201	0.154	0.139	0.0515	0.0793	0.134	0.222
Sodium	mg/kg dw	4,040	2,610	3,250	3,540	2,930	3,990	2,620	2,830	3,226	578	2,610	3,090	4,040
Strontium	mg/kg dw	20.2	18.7	26.2	17.8	9.53	13.0	13.1	12.4	16.4	5.39	9.53	15.4	26.2
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0148	0.00610	0.0201	0.0222	0.00390	0.00750	0.00390	0.00470	0.0104	0.00753	0.00390	0.00680	0.0222
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	29.1	3.68	32.3	63.3	4.60	9.71	4.52	5.56	19.1	21.2	3.68	7.64	63.3
Uranium	mg/kg dw	0.0787	0.0189	0.103	0.102	0.0121	0.0452	0.0124	0.0142	0.0483	0.0404	0.0121	0.0320	0.103
Vanadium	mg/kg dw	2.86	0.360	3.29	5.41	0.410	1.12	0.430	0.510	1.80	1.87	0.360	0.815	5.41
Zinc	mg/kg dw	162	164	181	165	173	182	154	181	170	10.5	154	169	182
Zirconium	mg/kg dw	0.740	<0.2	0.810	1.24	<0.2	0.270	<0.2	<0.2	0.482	0.401	<0.2	0.235	1.24

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.6: Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed												
		Lower Hazeltine Creek Reach 5 (HAC-D [HAC-R5])												
		HAC-D_INV-1	HAC-D_INV-2	HAC-D_INV-3	HAC-D_INV-4	HAC-D_INV-5	HAC-D_INV-6	HAC-D_INV-7	HAC-D_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24					
Moisture	mg/kg dw	79.9	72.0	73.8	84.5	79.6	81.5	70.2	76.3	77.2	4.97	70.2	78	84.5
Aluminum	mg/kg dw	513	954	411	2,080	2,760	2,230	2,430	4,890	2,034	1,464	411	2,155	4,890
Antimony	mg/kg dw	0.0570	0.0400	0.0280	0.0580	0.0820	0.0640	0.0870	0.0560	0.0590	0.0195	0.0280	0.0575	0.0870
Arsenic	mg/kg dw	4.43	4.09	3.53	8.06	6.54	5.73	4.38	3.50	5.03	1.61	3.50	4.40	8.06
Barium	mg/kg dw	54.2	29.0	9.38	51.5	88.2	73.5	60.8	90.3	57.1	27.9	9.38	57.5	90.3
Beryllium	mg/kg dw	0.0220	0.0400	0.0170	0.0750	0.0980	0.0750	0.0850	0.204	0.0770	0.0593	0.0170	0.0750	0.204
Bismuth	mg/kg dw	<0.01	0.0100	<0.01	0.0230	0.0260	0.0180	0.0160	0.0170	0.0162	0.00626	<0.01	0.0165	0.0260
Boron	mg/kg dw	4.80	3.00	2.00	11.3	6.60	3.20	4.10	7.90	5.36	3.09	2.00	4.45	11.3
Cadmium	mg/kg dw	1.54	1.25	2.19	11.3	5.66	4.20	1.64	1.66	3.68	3.45	1.25	1.92	11.3
Calcium	mg/kg dw	49,800	4,080	2,660	14,700	9,480	5,550	5,630	10,200	12,762	15,461	2,660	7,555	49,800
Cesium	mg/kg dw	0.0803	0.170	0.110	0.467	0.493	0.319	0.351	0.302	0.287	0.155	0.0803	0.310	0.493
Chromium	mg/kg dw	1.04	2.04	1.20	4.23	5.78	3.71	4.25	6.94	3.65	2.12	1.04	3.97	6.94
Cobalt	mg/kg dw	1.10	2.36	1.94	4.79	4.52	3.40	3.77	4.26	3.27	1.33	1.10	3.58	4.79
Copper	mg/kg dw	310	99.8	156	443	252	262	173	129	228	113	99.8	212	443
Iron	mg/kg dw	1,010	1,990	940	4,350	5,160	4,320	4,560	7,020	3,669	2,154	940	4,335	7,020
Lead	mg/kg dw	0.244	0.638	0.267	1.19	1.55	1.11	1.11	1.26	0.921	0.481	0.244	1.11	1.55
Lithium	mg/kg dw	<0.5	0.930	0.510	2.77	3.12	2.02	2.77	4.35	2.12	1.40	<0.5	2.40	4.35
Magnesium	mg/kg dw	2,520	1,170	1,160	2,890	2,700	2,290	2,640	3,390	2,345	795	1,160	2,580	3,390
Manganese	mg/kg dw	2,960	378	410	1,660	3,770	2,280	2,660	2,780	2,112	1,216	378	2,470	3,770
Mercury	mg/kg dw	0.0647	0.0447	0.109	0.175	0.122	0.130	0.0721	0.0779	0.0994	0.0425	0.0447	0.0934	0.175
Molybdenum	mg/kg dw	1.45	1.34	0.875	2.47	2.97	2.88	3.26	2.82	2.26	0.900	0.875	2.64	3.26
Nickel	mg/kg dw	2.20	2.98	1.63	5.89	7.03	4.84	6.61	8.63	4.98	2.51	1.63	5.36	8.63
Phosphorus	mg/kg dw	11,600	5,390	7,010	11,700	10,800	9,560	6,820	5,930	8,601	2,605	5,390	8,285	11,700
Potassium	mg/kg dw	6,640	5,070	6,010	10,000	10,100	8,570	6,700	5,960	7,381	1,924	5,070	6,670	10,100
Rubidium	mg/kg dw	5.03	3.54	4.99	10.6	8.54	5.89	4.84	3.68	5.89	2.46	3.54	5.01	10.6
Selenium	mg/kg dw	6.62	3.70	6.46	9.44	6.33	6.95	7.49	4.65	6.46	1.74	3.70	6.54	9.44
Silver	mg/kg dw	0.0824	0.0259	0.0259	0.117	0.0965	0.0686	0.0661	0.0761	0.0698	0.0316	0.0259	0.0724	0.117
Sodium	mg/kg dw	3,990	1,850	3,160	3,750	4,570	4,290	3,790	2,650	3,506	904	1,850	3,770	4,570
Strontium	mg/kg dw	125	25.7	11.5	54.8	43.0	40.4	29.2	48.9	47.3	34.3	11.5	41.7	125
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.035	<0.02	<0.023	<0.029	<0.02	-	.	<0.02	<0.035
Thallium	mg/kg dw	0.0251	0.0255	0.0138	0.0498	0.0515	0.0468	0.0261	0.0370	0.0344	0.0139	0.0138	0.0316	0.0515
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	0.210	<0.1	<0.12	<0.14	0.114	-	<0.1	<0.155	0.210
Titanium	mg/kg dw	17.5	38.6	20.5	87.1	112	96.6	117	212	87.7	64.2	17.5	91.8	212
Uranium	mg/kg dw	0.121	0.144	0.0406	0.173	0.174	0.130	0.119	0.178	0.135	0.0452	0.0406	0.137	0.178
Vanadium	mg/kg dw	3.92	5.19	2.32	11.1	13.1	12.4	13.4	27.7	11.1	8.02	2.32	11.8	27.7
Zinc	mg/kg dw	94.5	84.8	116	164	121	123	121	106	116	23.7	84.8	118	164
Zirconium	mg/kg dw	<0.2	0.690	0.350	0.580	1.91	1.63	1.49	1.54	1.05	0.643	<0.2	1.09	1.91

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.5.6: Composite-Taxa Benthic Invertebrate Tissue Quality Data from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed												
		Lower Edney Creek (E1 [EDC-EXP])												
		E1_INV-1	E1_INV-2	E1_INV-3	E1_INV-4	E1_INV-5	E1_INV-6	E1_INV-7	E1_INV-8	Mean	Standard Deviation	Minimum	Median	Maximum
		8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	8-Aug-24	7-Aug-24	7-Aug-24					
Moisture	mg/kg dw	74.9	83.9	77.4	79.4	77.3	79.6	79.5	79.9	79	2.61	74.9	79.5	83.9
Aluminum	mg/kg dw	304	1,190	712	1,010	1,320	673	424	1,560	899	444	304	861	1,560
Antimony	mg/kg dw	0.0190	0.0370	0.0250	0.0340	0.0470	0.0260	0.0110	0.0760	0.0344	0.0201	0.0110	0.0300	0.0760
Arsenic	mg/kg dw	1.94	5.65	3.63	2.70	3.04	3.74	1.32	3.65	3.21	1.31	1.32	3.34	5.65
Barium	mg/kg dw	8.26	19.6	19.8	16.3	37.6	36.3	21.2	36.9	24.5	11.0	8.26	20.5	37.6
Beryllium	mg/kg dw	0.0120	0.0360	0.0230	0.0370	0.0450	0.0250	0.0150	0.0450	0.0298	0.0129	0.0120	0.0305	0.0450
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0110	0.0101	-	<0.01	<0.0105	0.0110
Boron	mg/kg dw	2.00	6.00	3.70	2.40	3.30	2.50	1.50	2.40	2.98	1.40	1.50	2.45	6.00
Cadmium	mg/kg dw	0.980	2.71	1.90	1.84	1.84	1.73	0.638	2.74	1.80	0.732	0.638	1.84	2.74
Calcium	mg/kg dw	3,320	4,110	3,970	3,880	3,490	1,980	2,410	3,340	3,312	757	1,980	3,415	4,110
Cesium	mg/kg dw	0.0589	0.187	0.122	0.126	0.170	0.0936	0.0565	0.167	0.123	0.0502	0.0565	0.124	0.187
Chromium	mg/kg dw	1.04	3.33	2.00	2.56	3.35	2.74	1.10	4.96	2.64	1.29	1.04	2.65	4.96
Cobalt	mg/kg dw	0.865	2.76	1.63	1.90	2.15	2.05	0.650	2.54	1.82	0.745	0.650	1.98	2.76
Copper	mg/kg dw	48.3	42.1	38.4	53.1	49.1	79.5	47.1	74.9	54.1	15.0	38.4	48.7	79.5
Iron	mg/kg dw	772	2,340	1,440	1,900	2,490	1,440	881	3,210	1,809	839	772	1,670	3,210
Lead	mg/kg dw	0.216	0.537	0.304	0.482	0.526	0.336	0.185	0.695	0.410	0.178	0.185	0.409	0.695
Lithium	mg/kg dw	<0.5	1.32	0.790	1.07	1.38	0.690	<0.5	1.99	1.03	0.477	<0.5	0.930	1.99
Magnesium	mg/kg dw	2,650	2,030	2,380	2,960	1,880	1,850	1,000	2,740	2,186	632	1,000	2,205	2,960
Manganese	mg/kg dw	212	223	249	243	424	526	360	670	363	167	212	304	670
Mercury	mg/kg dw	0.0682	0.0452	0.0543	0.0560	0.0824	0.0877	0.0364	0.114	0.0680	0.0255	0.0364	0.0621	0.114
Molybdenum	mg/kg dw	0.602	0.877	0.565	0.765	1.30	0.968	0.283	1.33	0.836	0.362	0.283	0.821	1.33
Nickel	mg/kg dw	1.70	3.93	2.53	2.62	3.51	2.54	1.16	6.10	3.01	1.53	1.16	2.58	6.10
Phosphorus	mg/kg dw	10,500	10,200	8,940	10,300	8,130	8,650	3,790	9,990	8,812	2,207	3,790	9,465	10,500
Potassium	mg/kg dw	6,720	9,360	7,180	7,100	7,500	8,800	3,070	7,870	7,200	1,892	3,070	7,340	9,360
Rubidium	mg/kg dw	2.41	8.79	5.54	4.62	4.32	4.75	1.85	5.40	4.71	2.12	1.85	4.68	8.79
Selenium	mg/kg dw	1.62	3.27	2.26	1.76	1.92	2.28	0.810	2.45	2.05	0.714	0.810	2.09	3.27
Silver	mg/kg dw	0.231	0.0891	0.140	0.115	0.0474	0.0965	0.0655	0.0906	0.109	0.0566	0.0474	0.0935	0.231
Sodium	mg/kg dw	5,540	4,340	3,250	6,430	5,260	4,780	1,830	5,460	4,611	1,464	1,830	5,020	6,430
Strontium	mg/kg dw	13.8	21.0	19.9	18.2	17.5	10.8	10.8	20.0	16.5	4.14	10.8	17.8	21.0
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0103	0.0229	0.0132	0.0150	0.0183	0.0119	0.00850	0.0239	0.0155	0.00570	0.00850	0.0141	0.0239
Tin	mg/kg dw	<0.1	0.260	<0.1	0.180	<0.1	0.260	<0.1	<0.1	0.150	0.0424	<0.1	<0.14	0.260
Titanium	mg/kg dw	13.6	47.0	29.8	50.8	54.6	31.4	15.9	57.4	37.6	17.3	13.6	39.2	57.4
Uranium	mg/kg dw	0.0295	0.0855	0.0872	0.0682	0.0902	0.0716	0.0628	0.0926	0.0734	0.0209	0.0295	0.0786	0.0926
Vanadium	mg/kg dw	1.73	4.46	2.81	4.73	5.27	3.07	1.54	6.53	3.77	1.77	1.54	3.76	6.53
Zinc	mg/kg dw	154	168	143	121	145	140	66.4	178	139	34.3	66.4	144	178
Zirconium	mg/kg dw	0.220	0.790	0.570	0.820	0.990	0.630	0.270	0.980	0.659	0.295	0.220	0.710	0.990

Value exceeds the British Columbia interim guideline for selenium in invertebrate tissue (4 mg/kg dw; BCMOE 2014).

Notes: "-" = no data or summary statistic could not be calculated. mg/kg dw = milligrams per kilogram dry weight. All summary statistics are reported to three significant digits for display purposes and were calculated using the Kaplan-Meier method. Sample identifiers presented in this table are an abbreviated version of the full sample identifiers and exclude a pre-fix (MP_) and a suffix (YYYY-MM; where YYYY represents the year [i.e., 2024] and MM represents the month [e.g., 08]) used in the full sample identifiers.

[a] EDC-REF, EDC-EXP, and HAC-R5 are alternate names used the for the EDC-D, E1, and HAC-D sampling areas, respectively, for HRWG reporting.

APPENDIX D.6
FISH CATCH AND
PHYSICAL MEASURES

Table D.6.1: Spot Backpack Electrofishing Catch Data Associated with Fish Tissue Collections from the Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, September 2018

Area	Station ID	Minnow (2019d)					
		UTM Coordinates NAD83 Zone 10U		Date	Effort (sec)	Rainbow Trout	
		Easting	Northing			Caught	Sacrificed
Frypan Creek (FPC-R2; Reference)	FPC-01	592765	5826524	23-Sep-18	46	3	2
	FPC-02	592753	5826537	23-Sep-18	42	3	2
	FPC-03	592726	5826524	23-Sep-18	45	4	2
	FPC-04	592727	5826532	23-Sep-18	60	5	2
Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed)	HAC-01	595753	5820344	23-Sep-18	6	2	2
	HAC-02	595741	5820230	23-Sep-18	28	4	2
	HAC-03	596142	5819731	23-Sep-18	24	3	2
	HAC-04	595973	5819814	23-Sep-18	62	3	2
				Total	**313**	**27**	**16**

Notes: UTM = Universal Transverse Mercator. NAD = North American Datum. Data were originally reported in Minnow (2019d) and are presented to show fish collection locations and details. HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.6.2: Closed-Station Backpack Electrofishing Catch Data Associated with Fish Tissue Collections from the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, August 2024

Station		UTM Coordinates NAD83 Zone 10U				Date	Length of Run (m)	Mean Wetted Width (m)	Pass	Effort (seconds)	Rainbow Trout		
		Upstream		Downstream									
		Easting	Northing	Easting	Northing						Catch	Sacrificed [a]	Mortalities
Frypan Creek (FPC-R2; Reference)	R2S1	592650	5826493	592676	5826503	12-Aug-24	34.0	1.2	Pass 1	800	20	8	0
									Pass 2	800	7	0	3
									Pass 3	800	2	0	1
									Total	**2,400**	**29**	**8**	**4**
Hazeltine Creek (HAC-U [HAC-R2]; Exposed)	R2S2	596474	5819411	596481	5819402	11-Aug-24	7.9	4.9	Pass 1	802	4	2	0
									Pass 2	800	3	0	0
									Pass 3	800	5	0	1
									Pass 4	800	4	0	1
									Total	**3,202**	**16**	**2**	**2**
	R2S4	596233	5819623	596242	5819681	7-Aug-24	9.3	5.3	Pass 1	802	10	2	0
									Pass 2	802	10	3	0
									Pass 3	800	7	1	0
									Total	**2,404**	**27**	**6**	**0**

Notes: UTM = Universal Transverse Mercator. NAD = North American Datum. m = meters. Closed-station backpack electrofishing was completed in Hazeltine Creek and Frypan Creek in 2024 for the purpose of Habitat Remediation Working Group (HRWG) reporting (Minnow 2025); only stations associated with fish tissue quality sample collection are presented here. See Minnow (2025) for fishing effort and catch records for all stations sampled in August 2024. HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

[a] A subset of fish were sacrificed in order to assess fish tissue selenium concentrations. Aging structures and whole-body tissue samples were collected.

Table D.6.3: Minnow Trapping Catch Data Associated with Fish Tissue Collections from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Exposed) Monitoring Areas, August and October 2024

Area	Station ID	UTM (NAD83, Zone 10U)		Set depth (m)		Date Range		Time Range		Trap Hours (hrs)	# of traps	Effort (trap*d)	Coho Salmon				Longnose Sucker				Northern Pikeminnow				Rainbow Trout				Redside Shiner			
		Easting	Northing	Minimum	Maximum	Set Date	Lift Date	Set Time	Lift Time				Catch	Sacrificed	Mortalities	CPUE[a]	Catch	Sacrificed	Mortalities	CPUE[a]	Catch	Sacrificed	Mortalities	CPUE[a]	Catch	Sacrificed	Mortalities	CPUE[a]	Catch	Sacrificed	Mortalities	CPUE[a]
Edney Creek (EDC-D [EDC-REF]; Reference)	MP_EDC-REF_MT-1_2024-08	601185	5816850	0.4	0.6	7-Aug-24	9-Aug-24	13:05	13:18	96	2	4	4	0	0	0.996	0	0	0	0	0	0	0	0	4	4	0	0.996	0	0	0	0
	MP_EDC-REF_MT-2_2024-08	601164	5816825	0.4	0.4	7-Aug-24	9-Aug-24	13:10	13:52	97	2	4	5	0	0	1.23	0	0	0	0	0	0	0	0	2	2	0	0.493	0	0	0	0
	MP_EDC-REF_MT-3_2024-08	601149	5816784	0.2	0.2	7-Aug-24	9-Aug-24	13:18	14:08	98	2	4	1	0	0	0.246	0	0	0	0	0	0	0	0	5	2	0	1.23	0	0	0	0
	MP_EDC-REF_MT-4_2024-08	601185	5816850	0.4	0.6	9-Aug-24	11-Aug-24	13:22	14:45	99	2	4	7	0	1	1.70	0	0	0	0	0	0	0	0	2	0	0	0.486	0	0	0	0
	MP_EDC-REF_MT-5_2024-08	601164	5816825	0.4	0.4	9-Aug-24	11-Aug-24	13:54	14:40	98	2	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.984	0	0	0	0
	MP_EDC-REF_MT-6_2024-08	601149	5816784	0.2	0.2	9-Aug-24	11-Aug-24	14:15	14:30	96	2	4	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	2.24	0	0	0	0
	MP_EDC-REF_MT-1_2024-10	601185	5816850	0.4	0.7	17-Oct-24	19-Oct-24	13:52	15:58	100	2	4	2	2	0	0.479	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_EDC-REF_MT-2_2024-10	601164	5816825	0.4	0.5	17-Oct-24	19-Oct-24	13:56	16:13	101	2	4	1	1	0	0.239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_EDC-REF_MT-3_2024-10	601149	5816784	0.2	0.4	17-Oct-24	19-Oct-24	14:30	16:24	100	2	4	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	1.68	0	0	0	0
	MP_EDC-REF_MT-4_2024-10	601185	5816850	0.4	0.7	19-Oct-24	21-Oct-24	16:30	9:00	81	2	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.296	0	0	0	0
	MP_EDC-REF_MT-5_2024-10	601164	5816825	0.4	0.5	19-Oct-24	21-Oct-24	16:15	8:48	81	2	3	1	1	0	0.296	0	0	0	0	0	0	0	0	1	0	0	0.296	0	0	0	0
	MP_EDC-REF_MT-6_2024-10	601149	5816784	0.2	0.4	19-Oct-24	21-Oct-24	16:25	9:22	82	2	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.586	0	0	0	0
	MP_EDC-REF_MT-7_2024-10	601185	5816850	0.5	0.7	21-Oct-24	23-Oct-24	10:05	8:42	140	3	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.172	0	0	0	0
	MP_EDC-REF_MT-8_2024-10	601164	5816825	0.3	0.5	21-Oct-24	23-Oct-24	10:20	9:00	140	3	6	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	1.89	0	0	0	0
	MP_EDC-REF_MT-9_2024-10	601185	5816850	0.4	0.6	22-Oct-24	24-Oct-24	9:40	11:05	148	3	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.162	0	0	0	0
	MP_EDC-REF_MT-10_2024-10	601164	5816825	0.3	0.5	22-Oct-24	24-Oct-24	9:35	11:20	149	3	6	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0.322	0	0	0	0
	MP_EDC-REF_MT-11_2024-10	601185	5816850	0.4	0.6	24-Oct-24	25-Oct-24	12:15	13:30	101	4	4	1	1	0	0.238	0	0	0	0	0	0	0	0	1	0	0	0.238	0	0	0	0
	MP_EDC-REF_MT-12_2024-10	601164	5816825	0.4	0.5	24-Oct-24	25-Oct-24	12:15	13:45	102	4	4	3	0	0	0.706	0	0	0	0	0	0	0	0	2	0	0	0.471	0	0	0	0
	MP_EDC-REF_MT-13_2024-10	601167	5816805	0.3	0.5	24-Oct-24	25-Oct-24	12:35	14:15	103	4	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.935	0	0	0	0
	MP_EDC-REF_MT-14_2024-10	601140	5816761	0.3	0.5	24-Oct-24	25-Oct-24	12:50	14:30	103	4	4	2	0	0	0.468	0	0	0	0	0	0	0	0	1	0	0	0.234	0	0	0	0
	MP_EDC-REF_MT-15_2024-10	601183	5816899	0.3	1.0	24-Oct-24	25-Oct-24	13:11	12:49	213	9	9	3	3	0	0.339	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
									Total	**2,327**	**61**	**97**	**30**	**8**	**1**	**0.309**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**8**	**0**	**0.619**	**0**	**0**	**0**	**0**
Hazeltine Creek (HAC-D [HAC-R5]; Exposed)	MP_HAC-R5_MT-1_2024-08	601573	5817253	0.35	0.35	13-Aug-24	14-Aug-24	11:23	8:55	43	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.557	0	0	0	0
	MP_HAC-R5_MT-2_2024-08	601509	5817182	0.45	0.6	13-Aug-24	14-Aug-24	11:17	9:20	44	2	2	0	0	0	0	0	0	0	0	2	0	0	1.09	0	0	0	0	1	0	0	0.544
	MP_HAC-R5_MT-3_2024-08	601414	5817136	0.40	0.45	13-Aug-24	14-Aug-24	10:54	9:40	46	2	2	0	0	0	0	0	0	0	0	6	0	0	3.16	0	0	0	0	4	0	0	2.11
	MP_HAC-R5_MT-4_2024-08	601307	5817125	0.35	0.45	13-Aug-24	14-Aug-24	10:48	10:05	47	2	2	0	0	0	0	0	0	0	0	2	0	0	1.03	0	0	0	0	4	0	0	2.06
	MP_HAC-R5_MT-5_2024-08	601229	5817150	0.55	0.65	13-Aug-24	14-Aug-24	10:40	10:20	47	2	2	0	0	0	0	0	0	0	0	1	0	0	0.507	0	0	0	0	3	0	0	1.52
	MP_HAC-R5_MT-6_2024-08	601131	5817176	0.30	0.35	13-Aug-24	14-Aug-24	10:31	10:57	49	2	2	2	2	0	0.982	1	0	0	0.491	6	0	0	2.95	0	0	0	0	1	0	0	0.491
	MP_HAC-R5_MT-7_2024-08	601071	5817225	0.45	0.60	13-Aug-24	14-Aug-24	10:23	11:11	50	2	2	0	0	0	0	0	0	0	0	1	0	0	0.484	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-8_2024-08	600895	5817292	0.45	0.60	13-Aug-24	14-Aug-24	10:12	11:25	50	2	2	0	0	0	0	0	0	0	0	1	0	0	0.476	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-1_2024-10	601573	5817253	0.3	0.3	18-Oct-24	20-Oct-24	9:51	9:12	95	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-2_2024-10	601509	5817182	0.4	0.6	18-Oct-24	20-Oct-24	10:09	9:19	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-3_2024-10	601414	5817136	0.6	0.6	18-Oct-24	20-Oct-24	10:36	9:25	94	2	4	1	1	0	0.256	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-4_2024-10	601307	5817125	0.4	0.5	18-Oct-24	20-Oct-24	10:54	9:35	93	2	4	1	1	0	0.257	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-5_2024-10	601229	5817150	0.6	0.9	18-Oct-24	20-Oct-24	11:05	9:55	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-6_2024-10	601131	5817176	0.4	0.5	18-Oct-24	20-Oct-24	11:24	10:20	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-7_2024-10	601071	5817225	0.7	0.9	18-Oct-24	20-Oct-24	11:36	10:30	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-8_2024-10	600895	5817292	0.5	0.8	18-Oct-24	20-Oct-24	12:00	10:50	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-9_2024-10	601573	5817253	0.3	0.3	20-Oct-24	22-Oct-24	9:12	8:34	95	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-10_2024-10	601509	5817182	0.4	0.6	20-Oct-24	22-Oct-24	9:19	8:43	95	2	4	1	1	0	0.253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-11_2024-10	601414	5817136	0.6	0.6	20-Oct-24	22-Oct-24	9:25	9:09	95	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-12_2024-10	601307	5817125	0.4	0.5	20-Oct-24	22-Oct-24	9:35	9:28	96	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-13_2024-10	601229	5817150	0.6	0.9	20-Oct-24	22-Oct-24	9:55	9:30	95	2	4	3	3	0	0.757	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-14_2024-10	601131	5817176	0.4	0.5	20-Oct-24	22-Oct-24	10:20	9:38	95	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-15_2024-10	601071	5817225	0.7	0.9	20-Oct-24	22-Oct-24	10:30	9:42	94	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MP_HAC-R5_MT-16_2024-10	600895	5817292	0.5	0.8	20-Oct-24	22-Oct-24	10:50	10:02	94	2	4	2	0	0	0.508	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
									Total	**1,886**	**64**	**79**	**10**	**8**	**0**	**0.127**	**1**	**0**	**0**	**0.0127**	**19**	**0**	**0**	**0.242**	**1**	**1**	**0**	**0.0127**	**13**	**0**	**0**	**0.165**

Notes: ID = identifier. UTM = Universal Transverse Mercator. NAD = North American Datum. m = metres. ft = feet. CPUE = catch-per-unit-effort. EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas for HRWG reporting. Due to water temperatures above 20°C in August 2024, minnow traps were not reset in HAC-R5.

[a] CPUE = total # of fish / trap*days.

Table D.6.4: Physical Measurements of Rainbow Trout Retained for Tissue Sampling from the Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, September 2018

Area	Processing Date	Minnow (2019d)					
		Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Tissue Collected	Abnormalities
Frypan Creek (FPC-R2; Reference)	23-Sep-18	FPC-R2_RB-1	4.6	4.4	0.894	WB	None
		FPC-R2_RB-2	5.2	5.0	1.290	WB	None
		FPC-R2_RB-3	5.6	5.4	1.970	WB	None
		FPC-R2_RB-4	6.1	5.7	2.237	WB	None
		FPC-R2_RB-5	5.1	4.9	1.659	WB	None
		FPC-R2_RB-6	4.9	4.7	0.970	WB	None
		FPC-R2_RB-7	5.0	4.8	1.382	WB	None
		FPC-R2_RB-8	4.7	4.5	1.000	WB	None
	Sample Size (n)		**8**	**8**	**8**		
	Average		**5.2**	**4.9**	**1.4**		
	Median		**5.1**	**4.9**	**1.3**		
	Standard Deviation		**0.49**	**0.44**	**0.49**		
	Minimum		**4.6**	**4.4**	**0.9**		
	Maximum		**6.1**	**5.7**	**2.2**		
Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed)	23-Sep-18	HAC-R1_RB-1	5.0	4.8	1.334	WB	None
		HAC-R1_RB-2	5.4	5.1	1.474	WB	None
		HAC-R1_RB-3	5.1	4.9	1.236	WB	None
		HAC-R1_RB-4	5.7	5.4	2.060	WB	None
		HAC-R2_RB-5	4.5	4.3	0.796	WB	None
		HAC-R2_RB-6	5.1	4.9	1.177	WB	None
		HAC-R2_RB-7	4.9	4.7	1.117	WB	None
		HAC-R2_RB-8	5.9	5.6	1.876	WB	None
	Sample Size (n)		**8**	**8**	**8**		
	Average		**5.2**	**5.0**	**1.4**		
	Median		**5.1**	**4.9**	**1.3**		
	Standard Deviation		**0.45**	**0.41**	**0.41**		
	Minimum		**4.5**	**4.3**	**0.8**		
	Maximum		**5.9**	**5.6**	**2.1**		

Notes: WB = whole-body. Data were originally reported in Minnow (2019d) and are presented here to show fish physical measures details. HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.6.5: Physical Measurements of Rainbow Trout Retained for Tissue Sampling from the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, August 2024

Area	Processing Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected	Age (Years)	Tissue Collected	Abnormalities
Frypan Creek (FPC-R2; Reference)	12-Aug-24	MP_FPC-R2S1_RB-1_2024-08	6.7	6.5	2.765	SC	0	WB	None
		MP_FPC-R2S1_RB-2_2024-08	4.7	4.5	0.835	SC	0	WB	None
		MP_FPC-R2S1_RB-3_2024-08	6.6	6.4	2.718	SC	0	WB	None
		MP_FPC-R2S1_RB-4_2024-08	6.0	5.9	2.022	SC	0	WB	None
		MP_FPC-R2S1_RB-5_2024-08	5.0	4.9	1.267	SC	0	WB	None
		MP_FPC-R2S1_RB-6_2024-08	5.6	5.4	1.545	SC	0	WB	None
		MP_FPC-R2S1_RB-7_2024-08	4.6	4.4	1.068	SC	0	WB	None
		MP_FPC-R2S1_RB-8_2024-08	5.8	5.5	2.030	SC	0	WB	None
		Total Sample Size	**8**	**8**	**8**		**8**		
		Mean	**5.6**	**5.4**	**1.781**		**0**		
		Median	**5.7**	**5.5**	**1.784**		**0**		
		Standard Deviation	**0.8**	**0.8**	**0.73**		**0**		
		Minimum	**4.6**	**4.4**	**0.835**		**0**		
		Maximum	**6.7**	**6.5**	**2.765**		**0**		
Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed)	7-Aug-24	MP_HAC-R2S4_RB-1_2024-08	5.3	5.1	1.386	SC	0	WB	None
		MP_HAC-R2S4_RB-2_2024-08	6.1	5.9	2.740	SC	0	WB	None
		MP_HAC-R2S4_RB-11_2024-08	5.0	4.8	1.051	SC	0	WB	None
		MP_HAC-R2S4_RB-12_2024-08	5.1	4.8	1.372	SC	0	WB	None
		MP_HAC-R2S4_RB-19_2024-08	5.1	4.8	1.012	SC	0	WB	None
		MP_HAC-R2S4_RB-20_2024-08	5.2	4.9	1.178	SC	0	WB	None
	11-Aug-24	MP_HAC-R2S2_RB-1_2024-08	7.4	7.1	3.632	SC	0	WB	None
		MP_HAC-R2S2_RB-3_2024-08	5.6	5.4	1.923	SC	0	WB	None
		Total Sample Size	**8**	**8**	**8**		**8**		
		Mean	**5.6**	**5.4**	**1.787**		**0**		
		Median	**5.3**	**5.0**	**1.379**		**0**		
		Standard Deviation	**0.8**	**0.8**	**0.94**		**0**		
		Minimum	**5.0**	**4.8**	**1.012**		**0**		
		Maximum	**7.4**	**7.1**	**3.632**		**0**		

Notes: SC = scales, WB = whole-body. HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

Table D.6.6: Physical Measurements of Rainbow Trout Retained for Tissue Sampling from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]]; Exposed) Monitoring Areas, August 2024

Area	Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected	Age (Years)	Tissue Collected	Abnormalities
Lower Edney Creek (EDC-D [EDC-REF]; Reference)	9-Aug-24	MP_EDC-REF_RB-1_2024-08	5.3	5.0	1.339	SC	0	WB	None
		MP_EDC-REF_RB-2_2024-08	4.5	4.3	0.707	SC	0	WB	None
		MP_EDC-REF_RB-3_2024-08	4.7	4.5	0.808	SC	0	WB	None
		MP_EDC-REF_RB-4_2024-08	5.6	5.3	1.450	SC	0	WB	None
		MP_EDC-REF_RB-5_2024-08	11.4	10.3	11.382	SC	1	WB	None
		MP_EDC-REF_RB-6_2024-08	5.6	5.4	1.391	SC	0	WB	None
		MP_EDC-REF_RB-7_2024-08	6.9	6.5	2.442	SC	0	WB	None
		MP_EDC-REF_RB-8_2024-08	6.0	5.7	1.630	SC	0	WB	None
		total sample size	**8**	**8**	**8**		**8**		
		average	**6.3**	**5.9**	**2.644**		**0.1**		
		median	**5.6**	**5.4**	**1.421**		**0**		
		standard deviation	**2.2**	**1.9**	**3.57**		**0.35**		
		minimum	**4.5**	**4.3**	**0.707**		**0**		
		maximum	**11.4**	**10.3**	**11.382**		**1**		
Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed)	14-Aug-24	MP_HAC-R5_RB-1_2024-08	5.9	5.4	1.646	SC	0	WB	None
		total sample size	**1**	**1**	**1**		**1**		
		average	-	-	-		-		
		median	-	-	-		-		
		standard deviation	-	-	-		-		
		minimum	-	-	-		-		
		maximum	-	-	-		-		

Notes: "-" = summary statistics not calculated as sample size was n=1. SC = scales, WB = whole-body. EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.6.7: Physical Measurements of Coho Salmon Retained for Tissue Sampling from the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]) Monitoring Areas, August and October 2024

Area	Date	Fish ID	Total Length (cm)	Fork Length (cm)	Body Weight (g)	Age Structure Collected	Age (Years)	Tissue Collected	Abnormalities
Lower Edney Creek (EDC-D [EDC-REF]; Reference)	19-Oct-24	MP_EDC-REF_CO-1_2024-10	5.9	5.4	1.425	SC	0	WB	None
		MP_EDC-REF_CO-2_2024-10	6.0	5.5	1.448	SC	0	WB	None
		MP_EDC-REF_CO-3_2024-10	7.5	6.9	3.021	SC	0	WB	None
	21-Oct-24	MP_EDC-REF_CO-4_2024-10	7.2	6.5	3.545	SC	0	WB	None
		MP_EDC-REF_CO-5_2024-10	6.9	6.4	2.416	SC	0	WB	None
		MP_EDC-REF_CO-6_2024-10	8.3	7.6	4.407	SC	1	WB	None
		MP_EDC-REF_CO-7_2024-10	7.4	6.8	2.965	SC	0	WB	None
		MP_EDC-REF_CO-8_2024-10	6.6	6.2	2.348	SC	0	WB	None
		total sample size	**8**	**8**	**8**		**8**		
		average	**7.0**	**6.4**	**2.697**		**0.1**		
		median	**7.1**	**6.5**	**2.691**		**0**		
		standard deviation	**0.8**	**0.7**	**1.01**		**0.35**		
		minimum	**5.9**	**5.4**	**1.425**		**0**		
		maximum	**8.3**	**7.6**	**4.407**		**1**		
Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed)	14-Aug-24	MP_HAC-R5_CO-1_2024-08	6.3	6.0	2.355	SC	0	WB	None
		MP_HAC-R5_CO-2_2024-08	6.9	6.4	3.022	SC	0	WB	None
	20-Oct-24	MP_HAC-R5_CO-1_2024-10	7.8	7.3	3.610	SC	0	WB	None
		MP_HAC-R5_CO-2_2024-10	8.2	7.5	4.237	SC	0	WB	None
	22-Oct-24	MP_HAC-R5_CO-3_2024-10	7.8	7.1	2.981	SC	0	WB	None
		MP_HAC-R5_CO-4_2024-10	6.5	5.9	1.096	SC	0	WB	None
		MP_HAC-R5_CO-5_2024-10	8.2	7.7	3.271	SC	1	WB	None
		MP_HAC-R5_CO-6_2024-10	8.6	7.9	4.151	SC	0	WB	None
		total sample size	**8**	**8**	**8**		**8**		
		average	**7.5**	**7.0**	**3.090**		**0.1**		
		median	**7.8**	**7.2**	**3.147**		**0**		
		standard deviation	**0.9**	**0.8**	**1.02**		**0.35**		
		minimum	**6.3**	**5.9**	**1.096**		**0**		
		maximum	**8.6**	**7.9**	**4.237**		**1**		

Notes: SC = scales, WB = whole-body. EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas, respectively, for HRWG reporting.

APPENDIX D.7
FISH TISSUE QUALITY

Table D.7.1: Rainbow Trout Tissue Quality Data for the Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2018

Analyte	Units	Reference														
		Frypan Creek (FPC-R2)														
		FPC-R2_RB-WB-1	FPC-R2_RB-WB-2	FPC-R2_RB-WB-3	FPC-R2_RB-WB-4	FPC-R2_RB-WB-5	FPC-R2_RB-WB-6	FPC-R2_RB-WB-7	FPC-R2_RB-WB-8	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	74.9	71.7	71.4	74.7	74.1	76.9	73.4	74.7	8	0	74.0	1.80	71.4	74.4	76.9
Aluminum	mg/kg dw	439	38.2	316	30.7	69.4	48.6	291	35.1	8	0	159	163	30.7	59.0	439
Antimony	mg/kg dw	0.0120	<0.010	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	8	75	0.0106	0.00119	<0.010	<0.010	0.0130
Arsenic	mg/kg dw	0.313	0.177	0.403	0.321	0.221	0.0940	0.333	0.0940	8	0	0.245	0.116	0.0940	0.267	0.403
Barium	mg/kg dw	4.64	3.24	5.59	1.51	1.84	2.26	3.01	2.23	8	0	3.04	1.42	1.51	2.64	5.59
Beryllium	mg/kg dw	0.0120	<0.010	0.0130	<0.010	<0.010	<0.010	<0.010	<0.010	8	75	0.0106	0.00119	<0.010	<0.010	0.0130
Bismuth	mg/kg dw	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	8	100	<0.010	-	<0.010	<0.010	<0.010
Boron	mg/kg dw	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8	100	<1.0	-	<1.0	<1.0	<1.0
Cadmium	mg/kg dw	0.0380	0.0230	0.117	0.0500	0.392	0.0330	0.148	0.0440	8	0	0.106	0.124	0.0230	0.0470	0.392
Calcium	mg/kg dw	20,900	26,200	23,700	20,400	18,000	21,600	19,400	19,900	8	0	21,263	2,599	18,000	20,650	26,200
Cesium	mg/kg dw	0.0332	0.0156	0.134	0.0513	0.0118	0.0132	0.0183	0.0125	8	0	0.0362	0.0418	0.0118	0.0170	0.134
Chromium	mg/kg dw	2.08	<0.20	1.22	<0.20	0.280	0.280	1.65	<0.20	8	37.5	0.764	0.770	<0.20	0.280	2.08
Cobalt	mg/kg dw	0.421	0.0930	0.440	0.116	0.261	0.0850	0.497	0.114	8	0	0.253	0.175	0.0850	0.189	0.497
Copper	mg/kg dw	3.34	3.46	9.25	2.99	2.88	2.00	2.73	3.58	8	0	3.78	2.27	2.00	3.17	9.25
Iron	mg/kg dw	1,220	101	688	128	162	112	611	113	8	0	392	411	101	145	1,220
Lead	mg/kg dw	0.202	0.235	0.449	0.0860	0.0990	0.0590	0.190	0.0860	8	0	0.176	0.128	0.0590	0.145	0.449
Lithium	mg/kg dw	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8	100	<0.50	-	<0.50	<0.50	<0.50
Magnesium	mg/kg dw	1,220	1,210	1,210	1,180	1,040	1,050	1,090	1,150	8	0	1,144	74.1	1,040	1,165	1,220
Manganese	mg/kg dw	44.1	23.1	50.5	12.5	54.2	19.6	24.2	27.6	8	0	32.0	15.5	12.5	25.9	54.2
Mercury	mg/kg dw	0.209	0.153	0.0911	0.101	0.167	0.227	0.191	0.164	8	0	0.163	0.0480	0.0911	0.166	0.227
	mg/kg ww	0.0523	0.0433	0.0261	0.0256	0.0434	0.0523	0.0508	0.0416	8	0	0.0419	0.0108	0.0256	0.0434	0.0523
Molybdenum	mg/kg dw	0.0970	0.0760	0.0890	0.0620	0.0880	0.0420	0.146	0.0860	8	0	0.0858	0.0301	0.0420	0.0870	0.146
Nickel	mg/kg dw	0.960	0.500	0.530	<0.20	0.220	<0.20	0.840	<0.20	8	37.5	0.493	0.313	<0.20	0.500	0.960
Phosphorus	mg/kg dw	17,100	21,000	19,000	17,600	15,600	17,200	17,100	17,900	8	0	17,813	1,599	15,600	17,400	21,000
Potassium	mg/kg dw	7,240	9,660	9,690	12,800	8,920	9,590	7,090	9,200	8	0	9,274	1,768	7,090	9,395	12,800
Rubidium	mg/kg dw	7.13	9.10	9.82	10.2	5.53	5.08	3.26	5.37	8	0	6.94	2.54	3.26	6.33	10.2
Selenium	mg/kg dw	1.64	1.26	1.33	1.44	1.64	1.21	1.69	1.42	8	0	1.45	0.185	1.21	1.43	1.69
Sodium	mg/kg dw	2,290	3,290	2,740	3,350	3,010	3,350	2,300	3,110	8	0	2,930	441	2,290	3,060	3,350
Strontium	mg/kg dw	24.4	23.3	23.1	15.1	17.2	17.2	19.5	17.4	8	0	19.7	3.50	15.1	18.5	24.4
Tellurium	mg/kg dw	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	8	100	<0.020	-	<0.020	<0.020	<0.020
Thallium	mg/kg dw	0.0151	0.0166	0.0159	0.0171	0.00850	0.00990	0.0104	0.00950	8	0	0.0129	0.00361	0.00850	0.0128	0.0171
Tin	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	8	100	<0.10	-	<0.10	<0.10	<0.10
Uranium	mg/kg dw	0.0303	0.00410	0.0280	0.00440	0.0104	0.00570	0.0227	0.00310	8	0	0.0136	0.0115	0.00310	0.00805	0.0303
Vanadium	mg/kg dw	2.94	0.450	2.20	0.310	0.600	0.340	2.13	0.360	8	0	1.17	1.07	0.310	0.525	2.94
Zinc	mg/kg dw	121	108	97.1	124	123	113	99.2	147	8	0	117	16.1	97.1	117	147
Zirconium	mg/kg dw	0.440	<0.20	0.410	<0.20	<0.20	<0.20	0.290	<0.20	8	62	0.268	0.102	<0.20	<0.20	0.440

Value exceeds Selenium Guideline for Aquatic life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, WB = whole-body, LRL = laboratory reporting limit. Data were originally reported in Minnow (2019d). HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

[a] All summary statistics were reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method.

Table D.7.1: Rainbow Trout Tissue Quality Data for the Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2018

Analyte	Units	Exposed														
		Upper Hazeltine Creek (HAC-R1 and HAC-U [HAC-R2])														
		HAC-R1_RB-WB-1	HAC-R1_RB-WB-2	HAC-R1_RB-WB-3	HAC-R1_RB-WB-4	HAC-U_RB-WB-5	HAC-U_RB-WB-6	HAC-U_RB-WB-7	HAC-U_RB-WB-8	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	74.5	75.5	74.7	74.0	74.6	72.3	75.7	75.0	8	0	74.5	1.06	72.3	74.7	75.7
Aluminum	mg/kg dw	60.5	159	135	62.2	171	66.5	113	31.9	8	0	99.9	51.6	31.9	89.8	171
Antimony	mg/kg dw	<0.010	<0.010	0.0150	<0.010	0.0150	0.0140	0.0130	<0.010	8	50		0.00096	0.0130	0.0145	0.0150
Arsenic	mg/kg dw	0.134	0.237	0.239	0.146	0.262	0.206	0.252	0.112	8	0	0.199	0.0591	0.112	0.222	0.262
Barium	mg/kg dw	3.72	5.33	7.51	3.05	9.81	4.91	8.46	4.73	8	0	5.94	2.39	3.05	5.12	9.81
Beryllium	mg/kg dw	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	8	100	<0.010	-	<0.010	<0.010	<0.010
Bismuth	mg/kg dw	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	8	100	<0.010	-	<0.010	<0.010	<0.010
Boron	mg/kg dw	<1.0	1.30	<1.0	<1.0	1.20	<1.0	1.20	<1.0	8	63	1.23	0.0577	<1.0	<1.0	1.30
Cadmium	mg/kg dw	0.0380	0.0440	0.0920	0.0230	0.154	0.103	0.0920	0.0580	8	0	0.0755	0.0430	0.0230	0.0750	0.154
Calcium	mg/kg dw	19,100	32,300	22,400	16,100	19,200	19,000	29,500	29,500	8	0	23,388	6,134	16,100	20,800	32,300
Cesium	mg/kg dw	0.0340	0.0606	0.0697	0.0490	0.0567	0.0578	0.0730	0.0372	8	0	0.0548	0.0140	0.0340	0.0573	0.0730
Chromium	mg/kg dw	0.260	0.350	0.590	0.280	0.390	<0.20	0.290	<0.20	8	25	0.360	0.123	0.260	0.320	0.590
Cobalt	mg/kg dw	0.157	0.301	0.255	0.142	0.275	0.164	0.253	0.101	8	0	0.206	0.0734	0.101	0.209	0.301
Copper	mg/kg dw	9.08	12.5	28.9	6.98	12.7	9.94	11.2	7.23	8	0	12.3	7.04	6.98	10.6	28.9
Iron	mg/kg dw	157	407	332	161	452	182	309	122	8	0	265	126	122	246	452
Lead	mg/kg dw	0.166	0.175	0.310	0.100	0.300	0.119	0.193	0.0690	8	0	0.179	0.0879	0.0690	0.171	0.310
Lithium	mg/kg dw	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	8	100	<0.50	-	<0.50	<0.50	<0.50
Magnesium	mg/kg dw	1,180	1,990	1,180	1,000	1,100	1,260	1,410	1,130	8	0	1,281	310	1,000	1,180	1,990
Manganese	mg/kg dw	44.6	52.9	37.5	35.2	79.8	181	47.2	31.4	8	0	63.7	49.7	31.4	45.9	181
Mercury	mg/kg dw	0.145	0.149	0.132	0.126	0.153	0.123	0.135	0.133	8	0	0.137	0.0109	0.123	0.134	0.153
	mg/kg ww	0.0369	0.0364	0.0335	0.0327	0.0388	0.0341	0.0327	0.0333	8	0	0.0348	0.0023	0.0327	0.0338	0.0388
Molybdenum	mg/kg dw	0.918	0.241	0.281	1.34	0.201	0.247	0.813	0.0620	8	0	0.513	0.453	0.0620	0.264	1.34
Nickel	mg/kg dw	<0.20	0.330	0.310	<0.20	0.360	<0.20	0.300	<0.20	8	50	0.325	0.0265	0.300	0.320	0.360
Phosphorus	mg/kg dw	17,200	26,800	17,900	14,400	14,600	17,400	20,300	22,000	8	0	18,825	4,120	14,400	17,650	26,800
Potassium	mg/kg dw	10,600	12,100	10,700	8,220	8,570	9,100	9,230	9,330	8	0	9,731	1,295	8,220	9,280	12,100
Rubidium	mg/kg dw	3.47	5.02	5.55	4.24	5.66	6.29	6.26	4.23	8	0	5.09	1.03	3.47	5.29	6.29
Selenium	mg/kg dw	4.14	4.16	5.35	4.31	4.74	3.40	4.82	4.20	8	0	4.39	0.582	3.40	4.26	5.35
Sodium	mg/kg dw	3,050	4,220	3,660	2,890	3,060	3,020	3,450	2,960	8	0	3,289	460	2,890	3,055	4,220
Strontium	mg/kg dw	31.3	50.5	38.2	27.6	32.4	29.6	46.4	39.3	8	0	36.9	8.23	27.6	35.3	50.5
Tellurium	mg/kg dw	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	8	100	<0.020	-	<0.020	<0.020	<0.020
Thallium	mg/kg dw	0.00230	0.00230	0.00450	0.00220	0.00380	0.00420	0.00350	0.00230	8	0	0.00314	0.00097	0.00220	0.00290	0.00450
Tin	mg/kg dw	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	8	100	<0.10	-	<0.10	<0.10	<0.10
Uranium	mg/kg dw	0.00620	0.0111	0.0369	0.00770	0.0313	0.00870	0.0119	0.00470	8	0	0.0148	0.0122	0.00470	0.00990	0.0369
Vanadium	mg/kg dw	0.350	1.15	1.06	0.390	1.34	0.550	0.920	0.230	8	0	0.749	0.420	0.230	0.735	1.34
Zinc	mg/kg dw	169	190	133	131	145	143	150	154	8	0	152	19.5	131	148	190
Zirconium	mg/kg dw	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	8	100	<0.20	-	<0.20	<0.20	<0.20

Value exceeds Selenium Guideline for Aquatic life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, WB = whole-body, LRL = laboratory reporting limit. Data were originally reported in Minnow (2019d). HAC-R2 is the alternate name used the for the HAC-U sampling area for HRWG reporting.

[a] All summary statistics were reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method.

Table D.7.2: Rainbow Trout Tissue Quality Data for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference														
		Frypan Creek (FPC-R2)														
		MP_FPC-R2S1_RB-WB-1_2024-08	MP_FPC-R2S1_RB-WB-2_2024-08	MP_FPC-R2S1_RB-WB-3_2024-08	MP_FPC-R2S1_RB-WB-4_2024-08	MP_FPC-R2S1_RB-WB-5_2024-08	MP_FPC-R2S1_RB-WB-6_2024-08	MP_FPC-R2S1_RB-WB-7_2024-08	MP_FPC-R2S1_RB-WB-8_2024-08	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	74.7	74.5	75.4	75.2	74.5	74.0	75.4	73.0	8	0	74.6	0.810	73.0	74.6	75.4
Aluminum	mg/kg dw	112	59.2	48	27.9	154.0	195.0	173	60.4	8	0	104	63.7	27.9	86.2	195
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.167	0.135	0.547	0.214	0.085	0.1410	0.231	0.2200	8	0	0.218	0.142	0.0850	0.190	0.547
Barium	mg/kg dw	1.93	1.14	1.24	2.00	1.57	1.42	1.80	1.30	8	0	1.55	0.328	1.14	1.50	2.00
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.139	0.105	0.679	0.182	0.0870	0.0900	0.145	0.101	8	0	0.191	0.200	0.0870	0.122	0.679
Calcium	mg/kg dw	20,200	26,600	33,700	35,300	28,400	16,300	33,400	26,200	8	0	27,513	6,720	16,300	27,500	35,300
Cesium	mg/kg dw	0.0223	0.0170	0.029	0.0811	0.0859	0.0284	0.0220	0.0199	8	0	0.0381	0.0283	0.0170	0.0254	0.0859
Chromium	mg/kg dw	0.37	0.21	<0.2	<0.2	0.580	0.610	0.61	0.25	8	25	0.379	0.193	<0.2	0.310	0.610
Cobalt	mg/kg dw	0.149	0.1110	0.178	0.154	0.142	0.2190	0.229	0.190	8	0	0.172	0.0402	0.111	0.166	0.229
Copper	mg/kg dw	3.19	2.78	3.38	3.78	5.81	3.50	4.62	2.71	8	0	3.72	1.04	2.71	3.44	5.81
Iron	mg/kg dw	197	127	133	105	261	308	339	146	8	0	202	89.8	105	172	339
Lead	mg/kg dw	<0.05	<0.05	<0.05	<0.05	0.0580	0.0600	0.083	<0.05	8	62	0.0564	0.0100	<0.05	<0.054	0.0830
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,650	1,360	1,360	1,640	2,100	1,240	1,810	1,240	8	0	1,550	305	1,240	1,500	2,100
Manganese	mg/kg dw	23.1	23.2	25.5	16.1	16.7	22.4	43.6	24.8	8	0	24.4	8.50	16.1	23.2	43.6
Mercury	mg/kg dw	0.109	0.107	0.1450	0.103	0.081	0.107	0.124	0.146	8	0	0.115	0.0221	0.0809	0.108	0.146
	mg/kg ww	0.0277	0.0273	0.0358	0.0255	0.0206	0.0279	0.0306	0.0395	8	0	0.0294	0.00594	0.0206	0.0278	0.0395
Molybdenum	mg/kg dw	0.1200	0.0760	0.1460	0.0890	0.0970	0.1020	0.125	0.0810	8	0	0.104	0.0241	0.0760	0.0995	0.146
Nickel	mg/kg dw	0.230	<0.2	<0.2	<0.2	0.280	0.36	0.410	<0.2	8	50	0.260	0.0770	<0.2	0.215	0.410
Phosphorus	mg/kg dw	22,500	25,000	29,000	31,400	27,500	18,800	28,300	24,600	8	0	25,888	4,012	18,800	26,250	31,400
Potassium	mg/kg dw	14,900	13,400	13,000	13,400	13,400	13,000	13,400	12,300	8	0	13,350	733	12,300	13,400	14,900
Rubidium	mg/kg dw	15.2	13.3	14.5	18.6	16.1	12.3	14.1	12.2	8	0	14.5	2.12	12.2	14.3	18.6
Selenium	mg/kg dw	1.49	1.30	1.95	1.82	1.14	1.27	1.28	1.76	8	0	1.50	0.303	1.14	1.40	1.95
Silver	mg/kg dw	0	<0.005	0	0	0	0	0	0	8	12	0.0267	0.0457	<0.005	0.00905	0.137
Sodium	mg/kg dw	3,870	3,540	3,660	3,970	3,720	3,650	4,060	3,390	8	0	3,732	223	3,390	3,690	4,060
Strontium	mg/kg dw	17.8	20.1	25.9	25.0	23.0	12.8	23.5	20.2	8	0	21.0	4.30	12.8	21.6	25.9
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0214	0.0191	0.0234	0.0168	0.0161	0.0131	0.0176	0.0140	8	0	0.0177	0.00351	0.0131	0.0172	0.0234
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Uranium	mg/kg dw	0.00760	0.00550	0.0171	0.00380	0.00790	0.00820	0.0131	0.00530	8	0	0.00856	0.00443	0.00380	0.00775	0.0171
Vanadium	mg/kg dw	0.610	0.450	0.450	0.320	0.860	0.900	0.980	0.380	8	0	0.619	0.259	0.320	0.530	0.980
Zinc	mg/kg dw	150	141	216.0	187	170	104	173.0	166	8	0	163	33.1	104	168	216
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and were reported to three significant digits for display purposes.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling areas for HRWG reporting.

Table D.7.2: Rainbow Trout Tissue Quality Data for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed														
		Upper Hazeltine Creek (HAC-U [HAC-R2])														
		MP_HAC-R2S4_RB-WB-1_2024-08	MP_HAC-R2S4_RB-WB-2_2024-08	MP_HAC-R2S4_RB-WB-11_2024-08	MP_HAC-R2S4_RB-WB-12_2024-08	MP_HAC-R2S4_RB-WB-19_2024-08	MP_HAC-R2S4_RB-WB-20_2024-08	MP_HAC-R2S2_RB-WB-1_2024-08	MP_HAC-R2S2_RB-WB-3_2024-08	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	73.5	72.2	72.2	71.5	73.1	76.0	75.1	78.3	8	0	74	2.31	71.5	73.3	78.3
Aluminum	mg/kg dw	47	61.4	164	19.7	34.5	59.2	17	33.8	8	0	54.5	47.2	16.6	40.8	164
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.136	0.135	0.192	0.128	0.110	0.1420	0.247	0.1350	8	0	0.153	0.0445	0.110	0.136	0.247
Barium	mg/kg dw	3.58	7.18	10.90	1.97	2.92	5.80	1.90	1.84	8	0	4.51	3.24	1.84	3.25	10.9
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.159	0.108	0.182	0.0830	0.140	0.164	0.0780	0.0700	8	0	0.123	0.0438	0.0700	0.124	0.182
Calcium	mg/kg dw	34,300	21,200	26,800	21,200	15,600	32,700	25,700	10,400	8	0	23,488	8,121	10,400	23,450	34,300
Cesium	mg/kg dw	0.0456	0.0387	0.056	0.0423	0.0371	0.0414	0.0620	0.0452	8	0	0.0460	0.00859	0.0371	0.0438	0.0620
Chromium	mg/kg dw	0.21	<0.2	0.28	<0.2	<0.2	<0.2	<0.2	<0.2	8	75	0.211	0.0327	<0.2	<0.205	0.280
Cobalt	mg/kg dw	0.157	0.1380	0.246	0.100	0.095	0.1060	0.063	0.084	8	0	0.124	0.0576	0.0630	0.103	0.246
Copper	mg/kg dw	4.95	7.23	17.30	8.45	9.49	7.45	9.24	9.35	8	0	9.18	3.61	4.95	8.85	17.3
Iron	mg/kg dw	119	134	346	75	98	149	77	81	8	0	135	89.7	74.9	108	346
Lead	mg/kg dw	<0.05	<0.05	0.101	<0.05	<0.05	<0.05	<0.05	<0.05	8	88	0.0564	-	<0.05	<0.0755	0.101
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,560	1,310	1,930	1,520	1,400	1,350	1,200	844	8	0	1,389	312	844	1,375	1,930
Manganese	mg/kg dw	114.0	129.0	248.0	76.7	121.0	142.0	29.2	68.5	8	0	116	65.1	29.2	118	248
Mercury	mg/kg dw	0.113	0.100	0.0766	0.230	0.107	0.091	0.089	0.175	8	0	0.123	0.0526	0.0766	0.103	0.230
	mg/kg ww	0.0300	0.0277	0.0213	0.0655	0.0288	0.0220	0.0221	0.0380	8	0	0.0319	0.0147	0.0213	0.0282	0.0655
Molybdenum	mg/kg dw	0.0930	0.1870	0.2870	0.8360	0.1090	0.1510	0.068	0.1550	8	0	0.236	0.252	0.0680	0.153	0.836
Nickel	mg/kg dw	0.310	<0.2	0.340	<0.2	<0.2	<0.2	<0.2	<0.2	8	75	0.231	0.0140	<0.2	<0.255	0.340
Phosphorus	mg/kg dw	28,600	20,700	23,900	21,800	16,600	26,800	22,600	12,400	8	0	21,675	5,248	12,400	22,200	28,600
Potassium	mg/kg dw	9,230	10,800	10,800	12,600	11,400	11,000	13,200	9,240	8	0	11,034	1,407	9,230	10,900	13,200
Rubidium	mg/kg dw	8.41	5.56	7.96	3.9	4.18	6.29	8.67	5.65	8	0	6.33	1.85	3.93	5.97	8.67
Selenium	mg/kg dw	6.01	5.12	9.02	7.99	6.34	8.09	3.33	5.43	8	0	6.42	1.87	3.33	6.18	9.02
Silver	mg/kg dw	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	8	75	0.00588	0.00178	<0.005	<0.0058	0.0104
Sodium	mg/kg dw	2,870	2,620	3,620	3,650	3,280	3,470	3,670	2,760	8	0	3,242	432	2,620	3,375	3,670
Strontium	mg/kg dw	44.7	28.8	39.3	25.5	19.2	48.0	33.6	14.2	8	0	31.7	12.0	14.2	31.2	48.0
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0107	0.00300	0.00580	0.00340	0.00270	0.00480	0.00740	0.00280	8	0	0.00507	0.00282	0.00270	0.00410	0.0107
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Uranium	mg/kg dw	0.0140	0.00540	0.0123	0.00440	0.00410	0.00630	0.00620	0.00280	8	0	0.00694	0.00403	0.00280	0.00580	0.0140
Vanadium	mg/kg dw	0.380	0.370	1.06	0.140	0.280	0.420	0.140	0.200	8	0	0.374	0.298	0.140	0.325	1.06
Zinc	mg/kg dw	164	102	157.0	139	83	172	110.0	76	8	0	125	37.6	76.0	124	172
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Se Guideline for Aquatic Life, fish muscle or whole body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and were reported to three significant digits for display purposes.

[a] HAC-R2 is the alternate name used the for the HAC-U sampling areas for HRWG reporting.

Table D.7.3: Rainbow Trout Tissue Quality Data for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference															Exposed
		Edney Creek (EDC-D [EDC-REF])															Lower Hazeltine Creek (HAC-D [HAC-R5])
		MP_EDC-REF_RB-WB-1_2024-08	MP_EDC-REF_RB-WB-2_2024-08	MP_EDC-REF_RB-WB-3_2024-08	MP_EDC-REF_RB-WB-4_2024-08	MP_EDC-REF_RB-WB-5_2024-08	MP_EDC-REF_RB-WB-6_2024-08	MP_EDC-REF_RB-WB-7_2024-08	MP_EDC-REF_RB-WB-8_2024-08	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum	MP_HAC-R5_RB-WB-1_2024-08
Moisture	%	74.9	75.2	76.6	78.0	76.6	76.6	74.1	76.4	8	0	76.0	1.24	74.1	76.5	78.0	75.6
Aluminum	mg/kg dw	56	9.4	7	12.7	8.1	450.0	12	39.4	8	0	74.2	153	6.60	12.4	450	<5
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.012	0.038	8	75	0.0138	0.0122	<0.01	<0.011	0.0380	<0.01
Arsenic	mg/kg dw	0.249	0.195	0.225	0.266	0.159	0.6190	0.200	0.5190	8	0	0.304	0.169	0.159	0.237	0.619	0.071
Barium	mg/kg dw	1.70	0.98	3.24	0.62	2.24	4.58	2.01	4.24	8	0	2.45	1.45	0.617	2.12	4.58	0.59
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1	<1
Cadmium	mg/kg dw	0.0810	0.0340	0.089	0.0420	0.031	0.0570	0.143	0.1120	8	0	0.0737	0.0400	0.0313	0.0690	0.143	0.0710
Calcium	mg/kg dw	13,700	11,000	23,000	8,580	36,200	37,800	36,600	45,600	8	0	26,560	14,273	8,580	29,600	45,600	5,760
Cesium	mg/kg dw	0.0394	0.0470	0.063	0.0638	0.0528	0.0931	0.0959	0.1400	8	0	0.0744	0.0334	0.0394	0.0636	0.140	0.0263
Chromium	mg/kg dw	0.30	<0.2	<0.2	<0.2	0.058	0.520	0.21	0.43	8	38	0.212	0.196	0.0580	0.134	0.520	<0.2
Cobalt	mg/kg dw	0.149	0.1190	0.177	0.149	0.105	0.7160	0.096	0.224	8	0	0.217	0.206	0.0960	0.149	0.716	0.029
Copper	mg/kg dw	1.91	3.10	2.72	2.79	2.52	3.59	4.20	4.00	8	0	3.10	0.779	1.91	2.94	4.20	2.16
Iron	mg/kg dw	166	42	53	61	75	827	105	196	8	0	190	263	41.6	89.8	827	30
Lead	mg/kg dw	<0.05	<0.05	<0.05	<0.05	<0.02	0.1090	<0.05	0.0500	8	75	0.0349	0.0276	<0.02	<0.035	0.109	<0.05
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	0.55	<0.5	<0.5	8	88	0.506	-	<0.5	<0.525	0.550	<0.5
Magnesium	mg/kg dw	785	1,140	1,680	1,230	1,370	2,070	1,530	1,840	8	0	1,456	412	785	1,450	2,070	438
Manganese	mg/kg dw	12.2	6.8	10.1	5.5	17.0	48.6	20.0	30.4	8	0	18.8	14.5	5.49	14.6	48.6	23.1
Mercury	mg/kg dw	0.150	0.136	0.1360	0.163	0.215	0.058	0.075	0.071	8	0	0.125	0.0540	0.0580	0.136	0.215	0.085
	mg/kg ww	0.0377	0.0336	0.0318	0.0358	0.0504	0.0136	0.0193	0.0166	8	0	0.0298	0.0125	0.0136	0.0327	0.0504	0.0207
Molybdenum	mg/kg dw	0.0580	0.0460	0.0490	0.0580	0.0400	0.0670	0.096	0.1280	8	0	0.0678	0.0298	0.0400	0.0580	0.128	<0.04
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	0.8	0.220	0.3	8	62	0.290	0.233	<0.2	<0.21	0.800	<0.2
Phosphorus	mg/kg dw	12,600	13,700	22,800	15,000	29,000	30,800	29,800	36,800	8	0	23,813	9,157	12,600	25,900	36,800	6,420
Potassium	mg/kg dw	7,340	10,400	15,600	16,500	15,400	15,500	13,600	14,700	8	0	13,630	3,160	7,340	15,050	16,500	4,500
Rubidium	mg/kg dw	6.59	9.44	13.6	14.6	15.7	16.7	18.1	14.8	8	0	13.7	3.84	6.59	14.7	18.1	3.84
Selenium	mg/kg dw	1.26	1.78	2.91	2.94	1.77	2.11	3.49	2.21	8	0	2.31	0.744	1.26	2.16	3.49	2.30
Silver	mg/kg dw	0	0	0	0	0	0	0	0	8	0	0.0380	0.0581	0.00500	0.0194	0.181	<0.005
Sodium	mg/kg dw	1,890	2,710	4,640	4,260	3,340	4,200	3,740	4,580	8	0	3,670	971	1,890	3,970	4,640	1,060
Strontium	mg/kg dw	17.1	14.4	30.4	10.0	42.4	56.7	43.9	59.7	8	0	34.3	19.3	10.0	36.4	59.7	7.8
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0176	0.0176	0.0280	0.0270	0.01930	0.02900	0.0151	0.02650	8	0	0.0225	0.00563	0.0151	0.0229	0.0290	0.00460
Tin	mg/kg dw	<0.1	<0.1	0.13	0.13	<0.1	<0.1	<0.1	<0.1	8	75	0.108	0	<0.1	<0.115	0.130	<0.1
Uranium	mg/kg dw	0.0046	<0.002	0.0026	<0.002	0.0062	0.00810	<0.002	0.00540	8	38	0.00411	0.00220	<0.002	0.00360	0.00810	<0.002
Vanadium	mg/kg dw	0.35	<0.1	<0.1	<0.1	<0.1	1.300	<0.1	0.470	8	62	0.328	0.381	<0.1	<0.225	1.30	<0.1
Zinc	mg/kg dw	71	92	125.0	80	122	149	159.0	158	8	0	120	35.0	70.8	124	159	39
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2	<0.2

Value exceeds Selenium Guideline for Aquatic life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. All summary statistics were calculated using the Kaplan-Meier method and were reported to three significant digits for display purposes.

[a] EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas, respectively, for HRWG reporting.

Table D.7.4: Coho Tissue Quality Data for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Reference														
		Edney Creek (EDC-D [EDC-REF])														
		MP_EDC-REF_CO-WB-1_2024-10	MP_EDC-REF_CO-WB-2_2024-10	MP_EDC-REF_CO-WB-3_2024-10	MP_EDC-REF_CO-WB-4_2024-10	MP_EDC-REF_CO-WB-5_2024-10	MP_EDC-REF_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-7_2024-10	MP_EDC-REF_CO-WB-8_2024-10	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	76.7	75.7	75.1	78.8	74.7	76.6	78.1	75.2	8	0	76.4	1.48	74.7	76.2	78.8
Aluminum	mg/kg dw	6	82.0	7	48.5	11.7	7.2	22	25.9	8	0	26.3	26.7	5.80	17.0	82.0
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Arsenic	mg/kg dw	0.251	0.380	0.254	0.352	0.185	0.3040	0.229	0.1700	8	0	0.266	0.0750	0.170	0.252	0.380
Barium	mg/kg dw	4.31	4.92	3.87	5.15	2.45	5.94	4.10	2.61	8	0	4.17	1.20	2.45	4.20	5.94
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.0960	0.1460	0.068	0.0729	0.107	0.1050	0.083	0.1240	8	0	0.100	0.0262	0.0682	0.100	0.146
Calcium	mg/kg dw	40,300	37,700	42,400	47,800	47,200	66,000	35,600	25,000	8	0	42,750	11,854	25,000	41,350	66,000
Cesium	mg/kg dw	0.0620	0.0742	0.054	0.0778	0.0436	0.0423	0.0583	0.0400	8	0	0.0565	0.0144	0.0400	0.0560	0.0778
Chromium	mg/kg dw	<0.2	0.4	0.13	0.179	<0.2	0.112	0.21	<0.2	8	38	0.182	0.103	0.112	0.156	0.400
Cobalt	mg/kg dw	0.168	0.1630	0.109	0.127	0.062	0.1300	0.057	0.131	8	0	0.118	0.0412	0.0570	0.128	0.168
Copper	mg/kg dw	3.26	2.68	2.73	2.68	2.36	3.14	2.89	2.41	8	0	2.77	0.318	2.36	2.70	3.26
Iron	mg/kg dw	95	188	94	187	94	132	109	137	8	0	129	39.6	93.8	120	188
Lead	mg/kg dw	0.067	0.090	0.034	0.0420	0.0630	0.0890	0.045	0.0770	8	0	0.0634	0.0215	0.0340	0.0650	0.0900
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,880	2,280	1,760	1,930	1,890	2,250	1,660	1,220	8	0	1,859	337	1,220	1,885	2,280
Manganese	mg/kg dw	9.2	21.8	17.5	25.6	9.5	20.8	12.9	13.2	8	0	16.3	6.05	9.16	15.4	25.6
Mercury	mg/kg dw	0.183	0.196	0.1090	0.088	0.057	0.103	0.140	0.100	8	0	0.122	0.0477	0.0569	0.106	0.196
	mg/kg ww	0.0427	0.0476	0.0272	0.0186	0.0144	0.0242	0.0308	0.0247	8	0	0.0288	0.0114	0.0144	0.0260	0.0476
Molybdenum	mg/kg dw	0.0880	0.1150	0.1080	0.1200	0.0800	0.1660	0.112	0.1760	8	0	0.121	0.0340	0.0800	0.114	0.176
Nickel	mg/kg dw	<0.2	0.220	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	88	0.202	-	<0.2	<0.21	0.220
Phosphorus	mg/kg dw	30,300	29,300	32,600	37,700	33,400	50,600	30,400	20,900	8	0	33,150	8,503	20,900	31,500	50,600
Potassium	mg/kg dw	11,600	13,000	13,600	14,600	12,300	14,400	15,800	12,500	8	0	13,475	1,395	11,600	13,300	15,800
Rubidium	mg/kg dw	11.40	14.20	13.70	12.8	10.60	11.40	12.60	9.71	8	0	12.1	1.54	9.71	12.0	14.2
Selenium	mg/kg dw	1.87	1.94	2.70	3.04	1.70	2.80	2.88	1.77	8	0	2.34	0.565	1.70	2.32	3.04
Silver	mg/kg dw	0.0118	0.0375	0.0106	0.0103	0.0110	0.0148	0.0078	0.0096	8	0	0.0142	0.00963	0.00780	0.0108	0.0375
Sodium	mg/kg dw	4,450	4,750	4,310	4,440	4,410	4,710	4,630	4,200	8	0	4,488	194	4,200	4,445	4,750
Strontium	mg/kg dw	69.6	87.3	69.3	82.8	65.7	107.0	67.7	42.2	8	0	74	18.9	42.2	69.5	107
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0155	0.0259	0.0180	0.0195	0.01770	0.02480	0.0183	0.01780	8	0	0.0197	0.00368	0.0155	0.0182	0.0259
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	<0.5	6.43	0.92	3.31	0.79	0.72	1.50	1.19	8	12	1.92	2.03	<0.5	1.06	6.43
Uranium	mg/kg dw	0.0020	0.020	0.01	0.007	<0.002	0.003	<0.002	0.004	8	25	0.00585	0.00632	0.00200	0.00385	0.0204
Vanadium	mg/kg dw	0.100	0.440	<0.1	0.270	<0.1	<0.1	0.1	0.150	8	38	0.171	0.129	0.100	0.105	0.440
Zinc	mg/kg dw	280.000	223	316.000	245	229	371	219.000	140	8	0	253	69.8	140	237	371
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Selenium Guideline for Aquatic life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas, respectively, for HRWG reporting.

[a] All summary statistics were reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method.

Table D.7.4: Coho Tissue Quality Data for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024[a]

Analyte	Units	Exposed														
		Lower Hazeltine Creek (HAC-D [HAC-R5])														
		MP_HAC-R5_CO-WB-1_2024-08	MP_HAC-R5_CO-WB-2_2024-08	MP_HAC-R5_CO-WB-1_2024-10	MP_HAC-R5_CO-WB-2_2024-10	MP_HAC-R5_CO-WB-3_2024-10	MP_HAC-R5_CO-WB-4_2024-10	MP_HAC-R5_CO-WB-5_2024-10	MP_HAC-R5_CO-WB-6_2024-10	n	% <LRL	Mean	Standard Deviation	Minimum	Median	Maximum
Moisture	%	79.3	73.1	77.2	79.5	77.9	75.7	77.4	78.3	8	0	77.3	2.08	73.1	77.7	79.5
Aluminum	mg/kg dw	34	18.9	25	7.5	11.2	16.5	165	128.0	8	0	50.6	60.5	7.50	21.8	165
Antimony	mg/kg dw	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	<0.01	<0.01	8	88	0.0111	-	<0.01	<0.0145	0.0190
Arsenic	mg/kg dw	0.163	0.156	0.181	0.408	0.167	0.3880	0.270	0.3920	8	0	0.266	0.114	0.156	0.226	0.408
Barium	mg/kg dw	2.29	2.55	2.21	3.10	5.14	4.77	3.30	5.24	8	0	3.58	1.28	2.21	3.20	5.24
Beryllium	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Bismuth	mg/kg dw	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	8	100	<0.01	-	<0.01	<0.01	<0.01
Boron	mg/kg dw	<1	<1	<1	<1	<1	<1	<1	<1	8	100	<1	-	<1	<1	<1
Cadmium	mg/kg dw	0.1940	0.2440	0.100	0.0681	0.216	0.0680	0.324	0.1670	8	0	0.173	0.0907	0.0680	0.180	0.324
Calcium	mg/kg dw	30,800	33,000	19,700	39,400	61,300	47,600	17,400	43,000	8	0	36,525	14,544	17,400	36,200	61,300
Cesium	mg/kg dw	0.1720	0.0475	0.043	0.0830	0.0459	0.0443	0.0660	0.0624	8	0	0.0706	0.0433	0.0433	0.0550	0.172
Chromium	mg/kg dw	<0.2	<0.2	0.12	0.164	<0.2	<0.2	0.42	0.414	8	50	0.213	0.142	0.124	0.164	0.423
Cobalt	mg/kg dw	0.175	0.1730	0.083	0.231	0.168	0.1710	0.415	0.196	8	0	0.202	0.0957	0.0830	0.174	0.415
Copper	mg/kg dw	5.90	4.43	3.92	6.98	4.39	4.13	6.24	7.32	8	0	5.41	1.36	3.92	5.16	7.32
Iron	mg/kg dw	121	105	89	66	210	94	327	282	8	0	162	98.6	66.2	113	327
Lead	mg/kg dw	<0.05	<0.05	0.064	0.0540	0.1200	0.1040	0.058	0.0770	8	25	0.0721	0.0262	<0.05	0.0610	0.120
Lithium	mg/kg dw	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8	100	<0.5	-	<0.5	<0.5	<0.5
Magnesium	mg/kg dw	1,390	1,240	1,480	1,970	2,080	1,820	1,410	1,850	8	0	1,655	311	1,240	1,650	2,080
Manganese	mg/kg dw	19.0	21.6	13.9	29.5	56.7	27.3	17.6	19.7	8	0	25.7	13.5	13.9	20.6	56.7
Mercury	mg/kg dw	0.089	0.055	0.0829	0.081	0.118	0.101	0.094	0.078	8	0	0.0873	0.0184	0.0548	0.0861	0.118
	mg/kg ww	0.0185	0.0148	0.0189	0.0165	0.0261	0.0245	0.0212	0.0170	8	0	0.0197	0.00396	0.0148	0.0187	0.0261
Molybdenum	mg/kg dw	0.1230	0.0970	0.1000	0.1100	0.0980	0.0820	0.138	0.1870	8	0	0.117	0.0332	0.0820	0.105	0.187
Nickel	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.310	0.27	8	75	0.222	0.0187	<0.2	<0.235	0.310
Phosphorus	mg/kg dw	26,400	26,300	21,500	35,000	44,100	35,300	21,100	35,700	8	0	30,675	8,096	21,100	30,700	44,100
Potassium	mg/kg dw	13,800	9,730	15,100	16,900	15,200	13,200	16,400	15,200	8	0	14,441	2,256	9,730	15,150	16,900
Rubidium	mg/kg dw	14.30	9.76	12.70	13.0	8.24	9.50	11.70	9.98	8	0	11.1	2.09	8.24	10.8	14.3
Selenium	mg/kg dw	3.81	3.65	2.45	7.75	4.22	3.58	5.81	4.12	8	0	4.42	1.63	2.45	3.96	7.75
Silver	mg/kg dw	<0.005	<0.005	<0.005	<0.005	0	0	<0.005	<0.005	8	75	0.00506	0.000234	<0.005	<0.005	0.00550
Sodium	mg/kg dw	3,380	2,690	2,890	4,420	4,510	4,270	3,900	3,230	8	0	3,661	710	2,690	3,640	4,510
Strontium	mg/kg dw	53.8	47.4	34.5	68.8	95.1	85.8	27.6	78.0	8	0	61.4	24.4	27.6	61.3	95.1
Tellurium	mg/kg dw	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	8	100	<0.02	-	<0.02	<0.02	<0.02
Thallium	mg/kg dw	0.0216	0.0141	0.0185	0.0267	0.0284	0.0182	0.0209	0.0175	8	0	0.0207	0.00480	0.0141	0.0197	0.0284
Tin	mg/kg dw	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	100	<0.1	-	<0.1	<0.1	<0.1
Titanium	mg/kg dw	1.92	1.08	1.54	0.70	0.87	1.44	9.37	7.53	8	0	3.06	3.39	0.700	1.49	9.37
Uranium	mg/kg dw	0.00	0.003	0.00	0.003	0.010	0.004	0.01	0.009	8	0	0.00534	0.00299	0.00250	0.00380	0.0100
Vanadium	mg/kg dw	0	0	0.2	<0.1	0	0	0.7	1	8	12	0.280	0.217	<0.1	0.190	0.680
Zinc	mg/kg dw	142	155	136	200	289	250	158	176	8	0	188	55	136	167	289
Zirconium	mg/kg dw	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8	100	<0.2	-	<0.2	<0.2	<0.2

Value exceeds Selenium Guideline for Aquatic life, fish muscle or whole-body tissue (4 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, high consumption (7.3 mg/kg dw; BCMOE 2014).

Value exceeds Se Guideline for Human Health, general population, moderate consumption (14.5 mg/kg dw; BCMOE 2014).

Value exceeds Hg Guideline for Human Health (0.5 mg/kg ww; CFIA 2015).

Notes: "-" = no data available or standard deviation not calculated. mg/kg = milligrams per kilogram. dw = dry weight. ww = wet weight. LRL = laboratory reporting limit. EDC-REF and HAC-R5 are the alternate names used the for the EDC-D and HAC-D sampling areas, respectively, for HRWG reporting.

[a] All summary statistics were reported to three significant digits for display purposes. All summary statistics were calculated using the Kaplan-Meier method.

APPENDIX E
STATISTICAL ANALYSES - LAKE HABITAT

APPENDIX E.1
SEDIMENT QUALITY

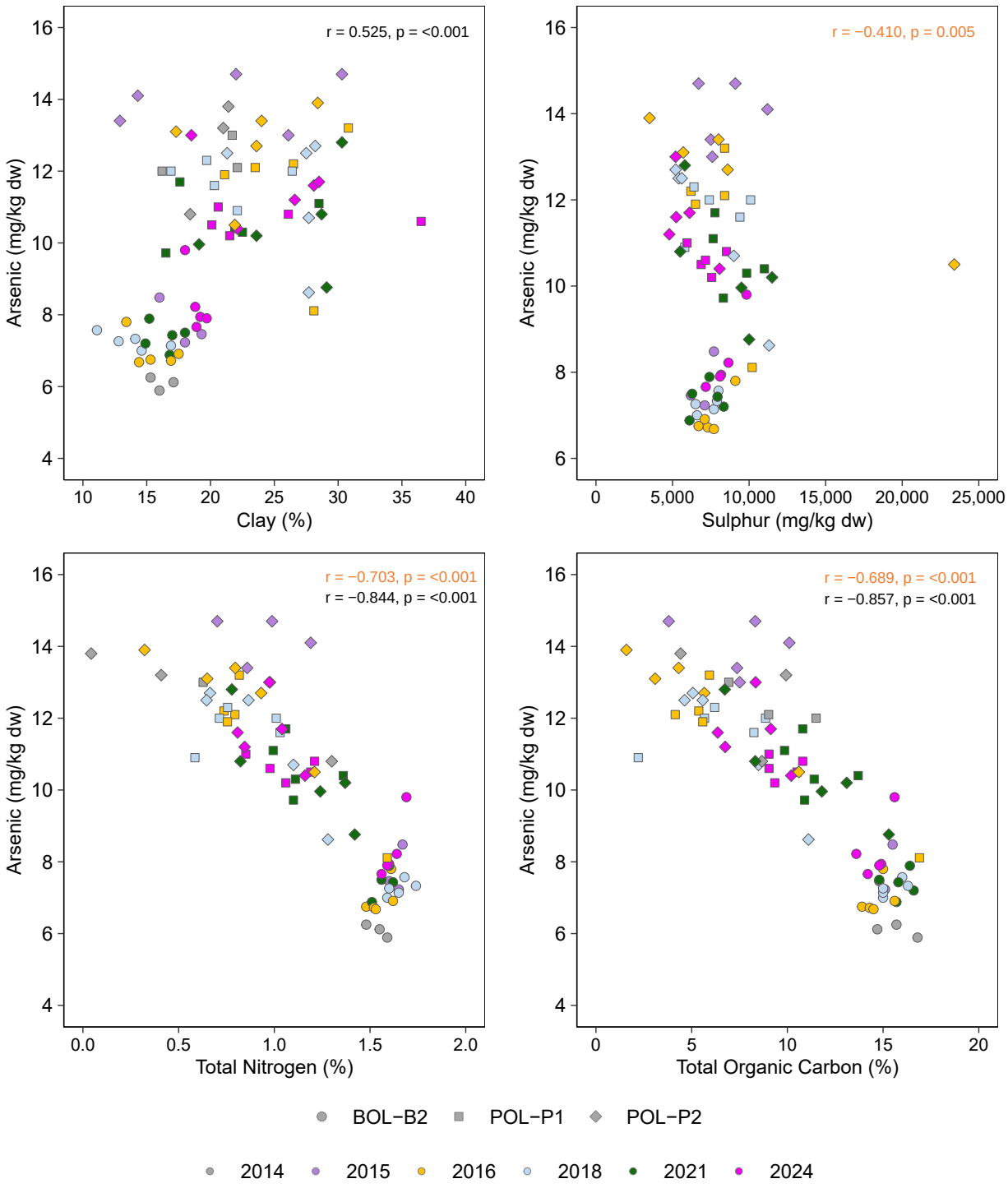
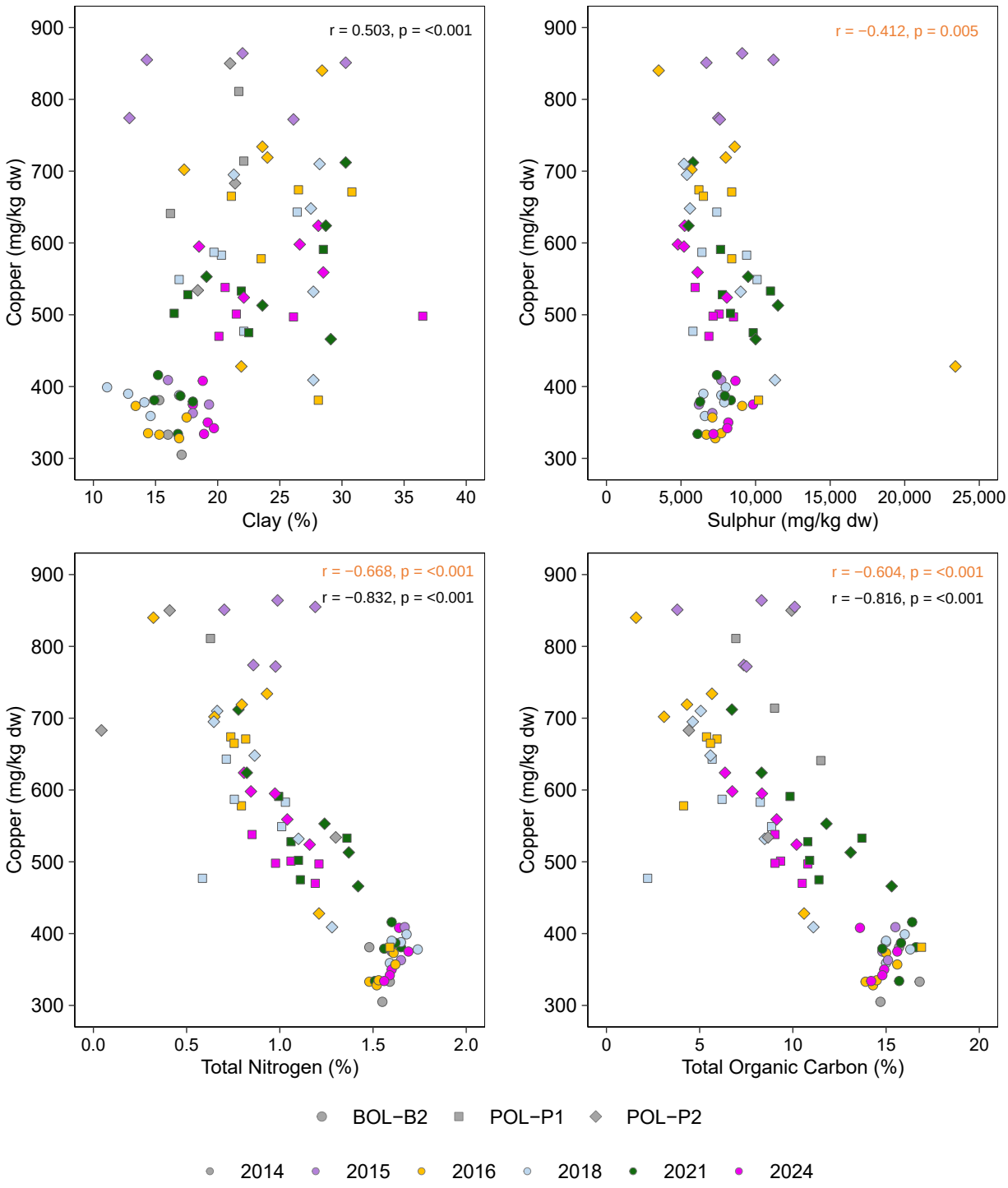


Figure E.1.1: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from the deep areas of Polley Lake (POL−P1, POL−P2) and Bootjack Lake (BOL−B2) are shown in black font on each plot. Results of correlations that only evaluated data from the deep areas of Polley Lake (POL−P1, POL−P2) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = POL−P1, POL−P2 and BOL−B2; red font = POL−P1 and POL−P2 only). Open data points indicate at least one of the two variables plotted were <LRL.



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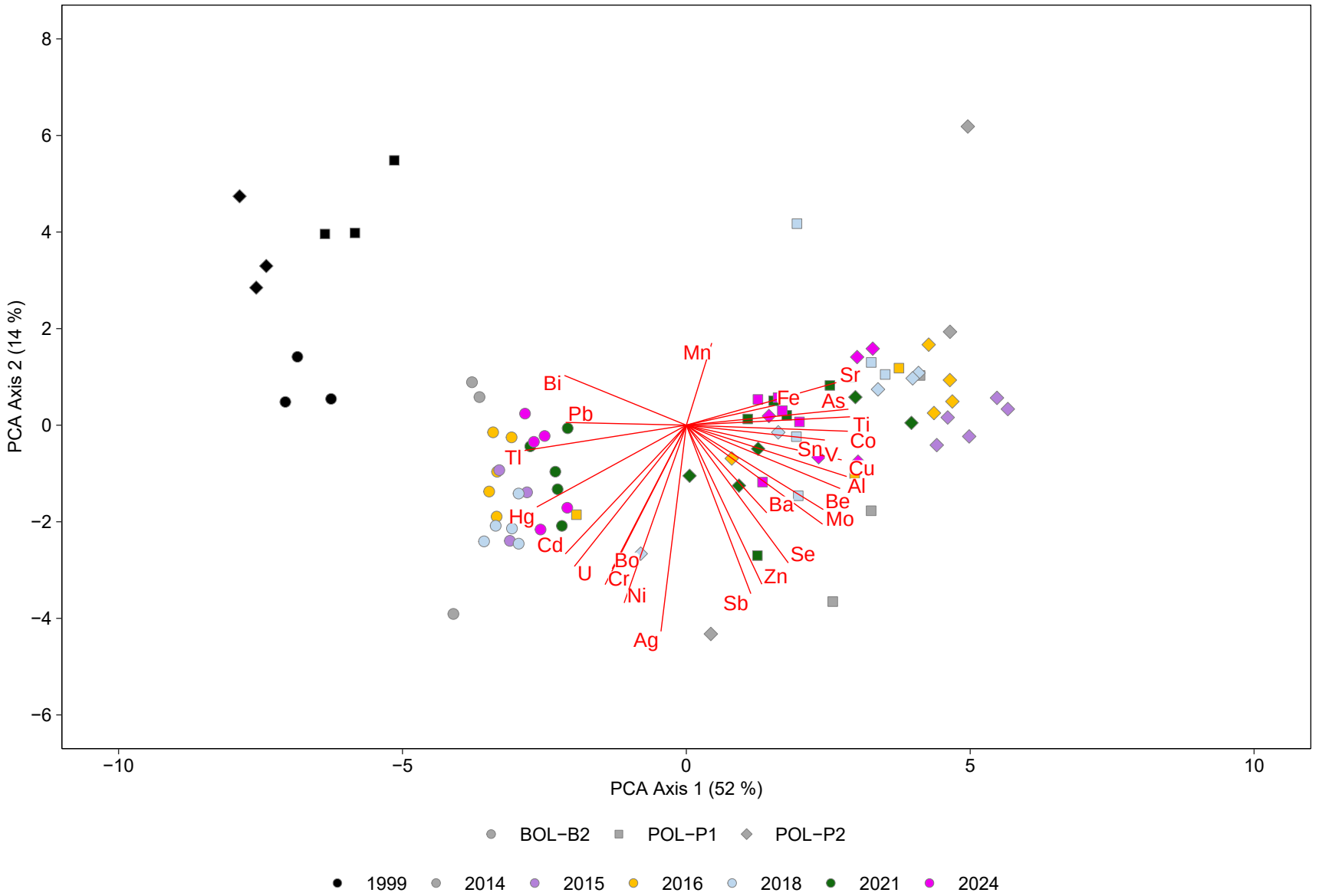

Figure E.1.2: Biplot of Principal Components Analysis (PCA) Axis Scores (PC1, PC2) for Metal Concentrations inSediment (<63 µm Fraction) for Polley Lake (POL−P1, POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: PCA conducted on correlation matrix with $\log_{10}$ transformed concentrations. Vectors represent the PC loadings for each parameter (scaled). Parameters that had more than 25% censored data were excluded from the analyses.

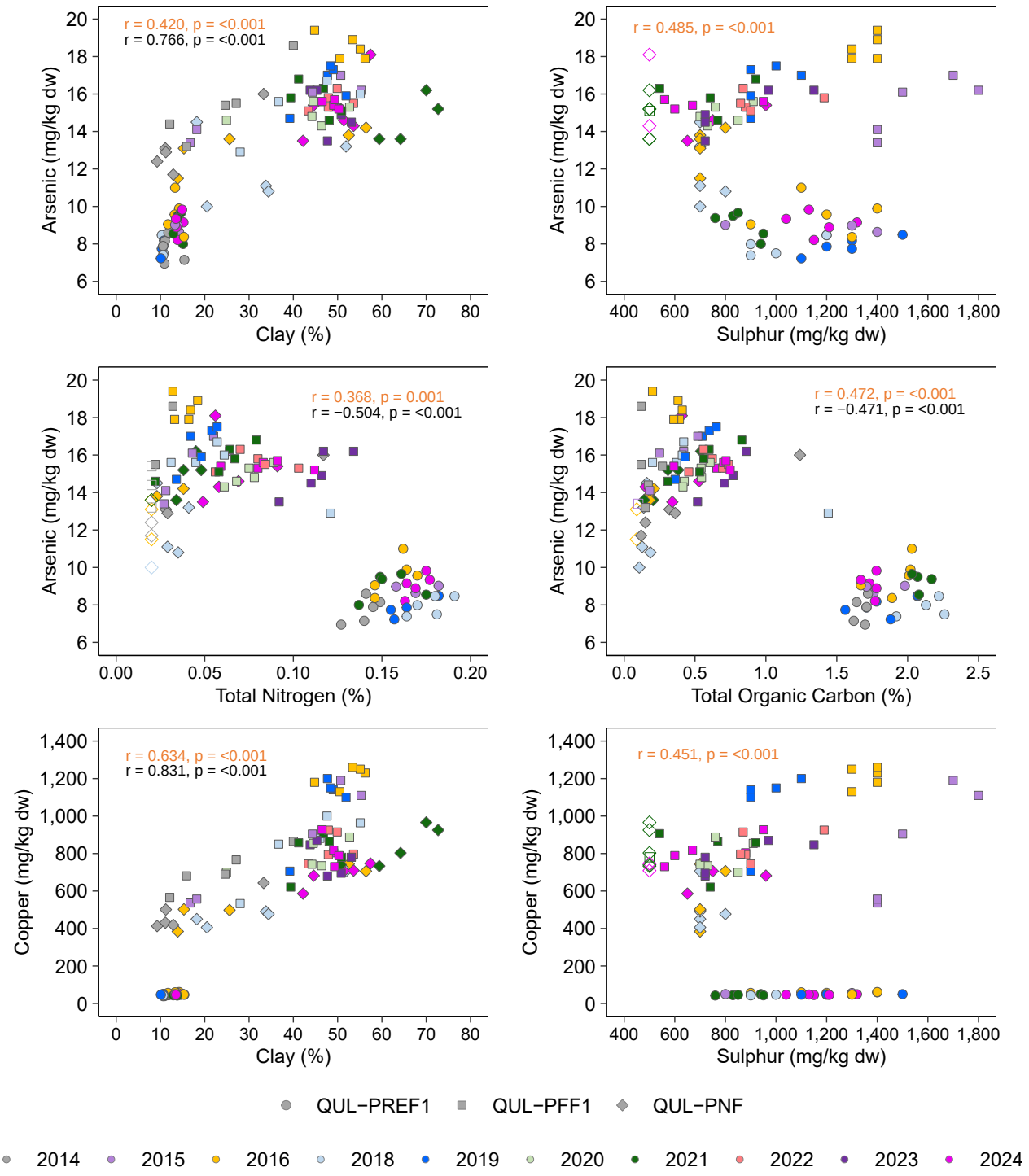

Figure E.1.3: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from deep exposed and reference sampling areas of Quesnel Lake (QUL−PNF, QUL−PFF1, QUL−PREF1) are shown in black font on each plot. Results of correlations that only evaluated data from the deep exposed area of Quesnel Lake (QUL−PNF) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−PNF, QUL−PFF1 and QUL−PREF1; red font = QUL−PNF and QUL-PFF1 only). Open data points indicate at least one of the two variables plotted were <LRL. QUL−PREF1 was not sampled in 2020, 2022, or 2023.

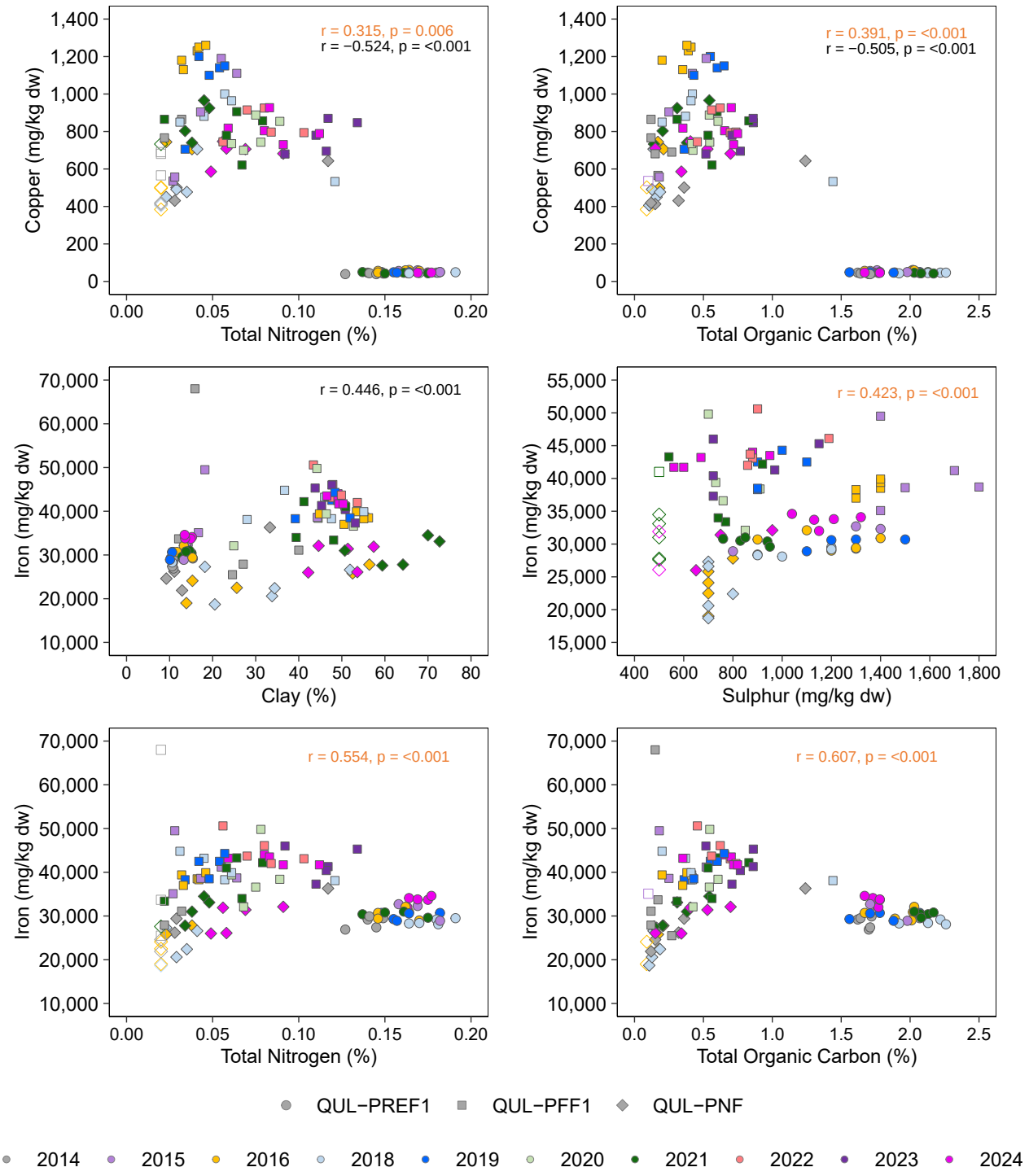

Figure E.1.3: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from deep exposed and reference sampling areas of Quesnel Lake (QUL−PNF, QUL−PFF1, QUL−PREF1) are shown in black font on each plot. Results of correlations that only evaluated data from the deep exposed area of Quesnel Lake (QUL−PNF) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−PNF, QUL−PFF1 and QUL−PREF1; red font = QUL−PNF and QUL-PFF1 only). Open data points indicate at least one of the two variables plotted were <LRL. QUL−PREF1 was not sampled in 2020, 2022, or 2023.

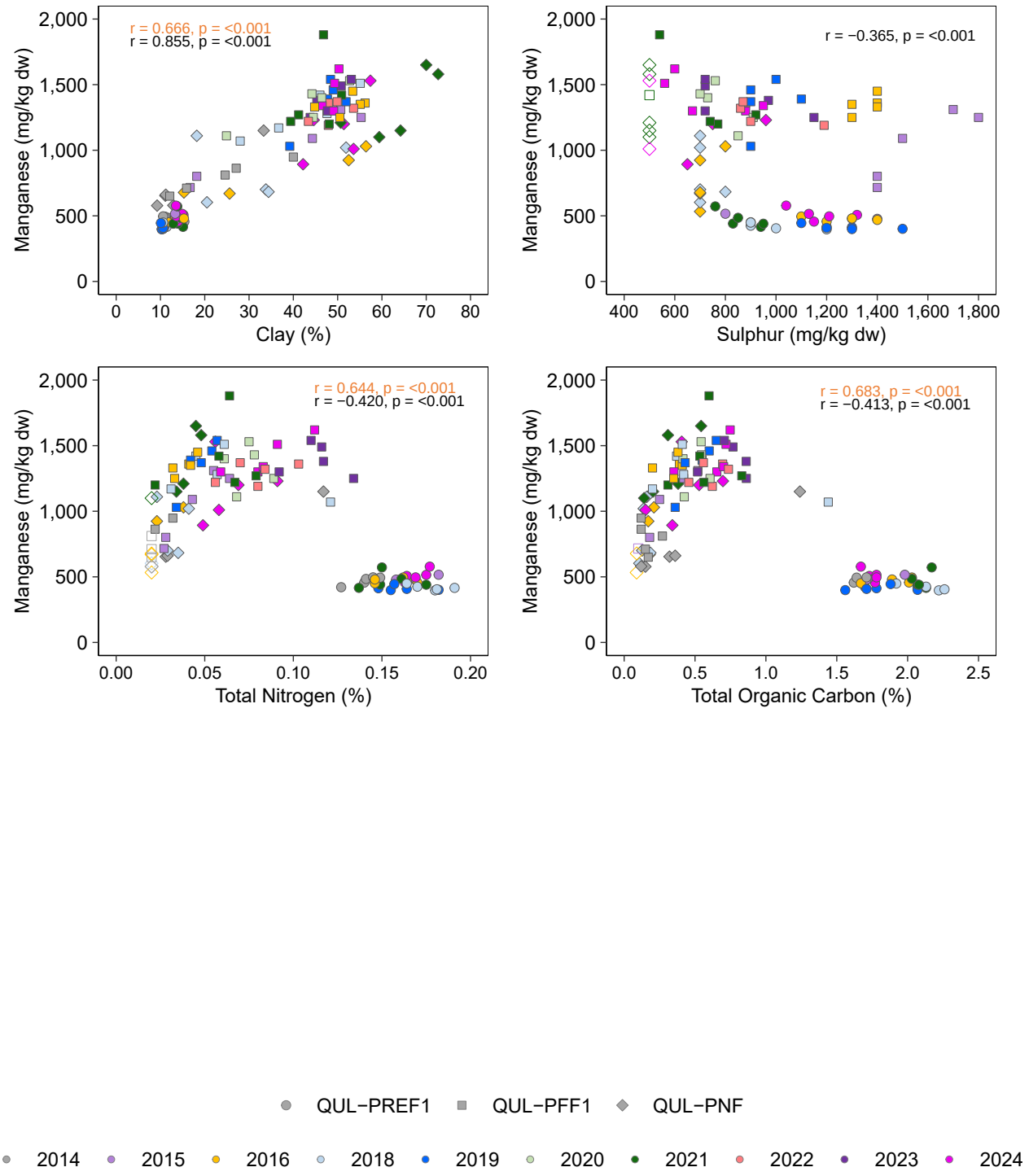

Figure E.1.3: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel Lake (QUL−PNF and QUL−PFF1; Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from deep exposed and reference sampling areas of Quesnel Lake (QUL−PNF, QUL−PFF1, QUL−PREF1) are shown in black font on each plot. Results of correlations that only evaluated data from the deep exposed area of Quesnel Lake (QUL−PNF) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−PNF, QUL−PFF1 and QUL−PREF1; red font = QUL−PNF and QUL-PFF1 only). Open data points indicate at least one of the two variables plotted were <LRL. QUL−PREF1 was not sampled in 2020, 2022, or 2023.

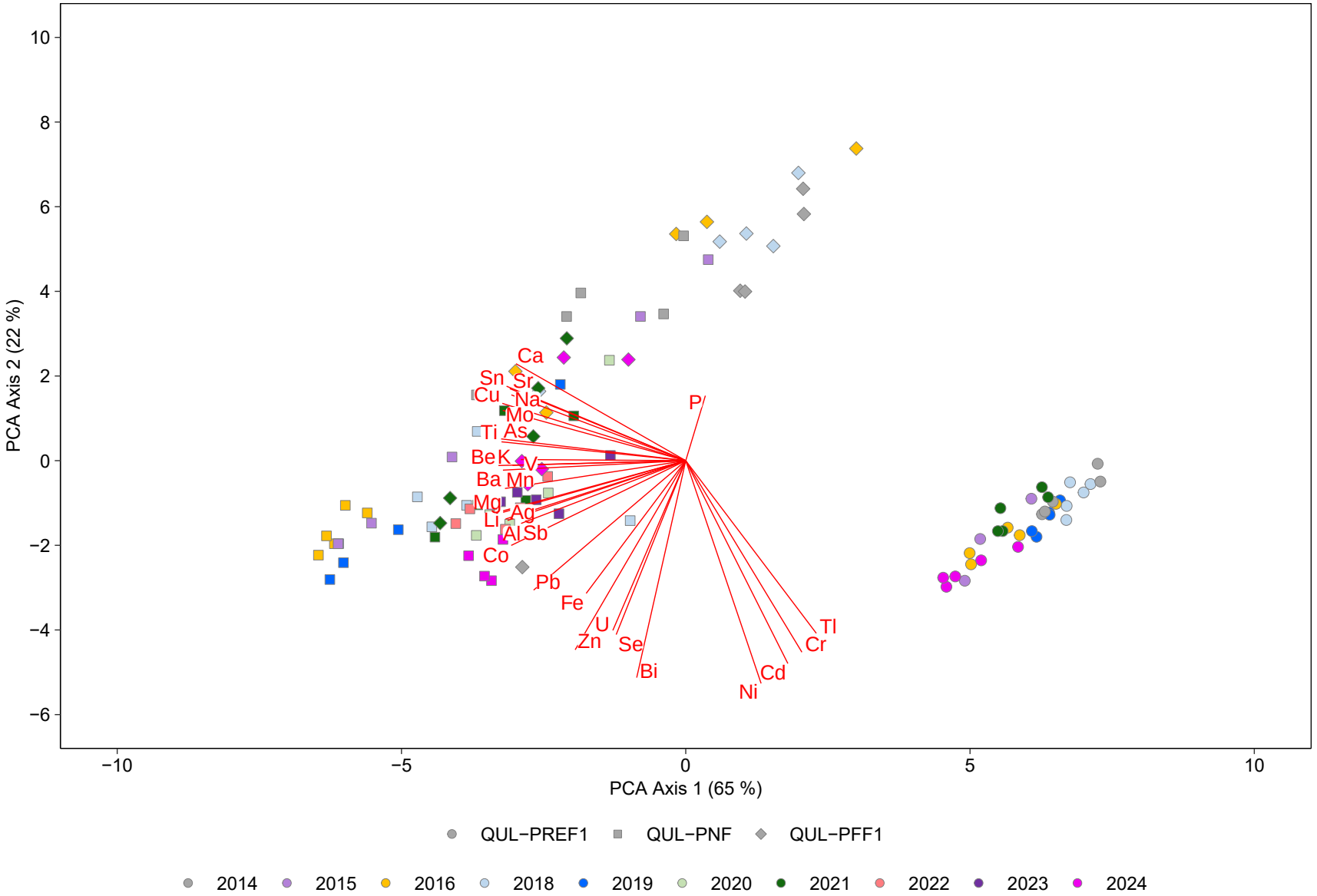

Figure E.1.4: Biplot of Principal Components Analysis (PCA) Axis Scores (PC1, PC2) for Metal Concentrations in Sediment (<63 µm Fraction) for the Quesnel Lake (QUL−PNF and QUL−PFF1;Exposed and QUL−PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: PCA conducted on correlation matrix with $\log_{10}$ transformed concentrations. Vectors represent the PC loadings for each parameter (scaled). Parameters that had more than 25% censored data were excluded from the analyses. QUL−PREF1 was not sampled in 2020, 2022, or 2023.

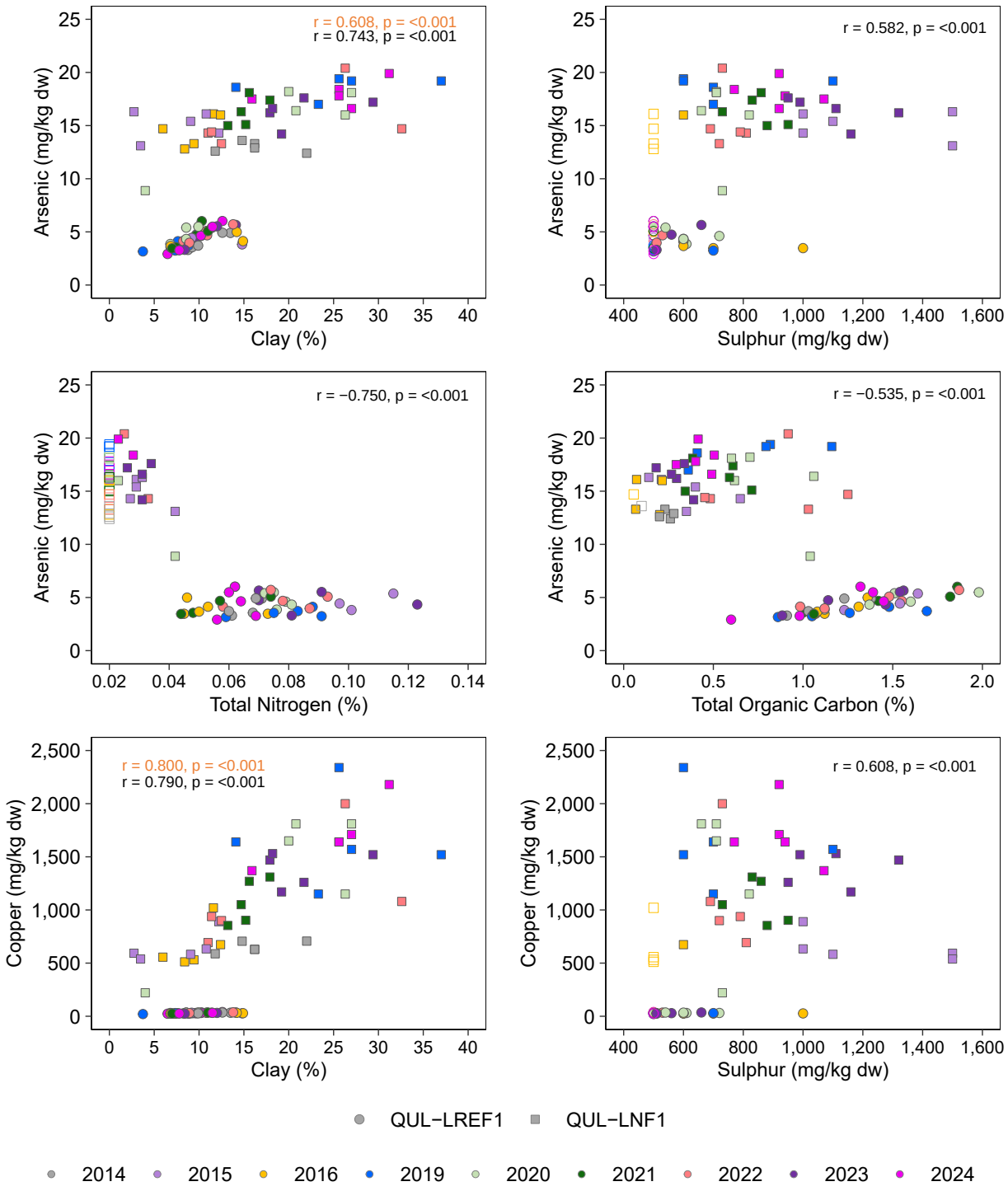

Figure E.1.5: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from shallow exposed and reference sampling areas of Quesnel Lake (QUL−LREF1, QUL−LNF1) are shown in black font on each plot. Results of correlations that only evaluated data from the shallow exposed area of Quesnel Lake (QUL−LNF1) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−LNF1 and QUL−LREF1; red font = QUL− LNF1 only). Open data points indicate at least one of the two variables plotted were <LRL.

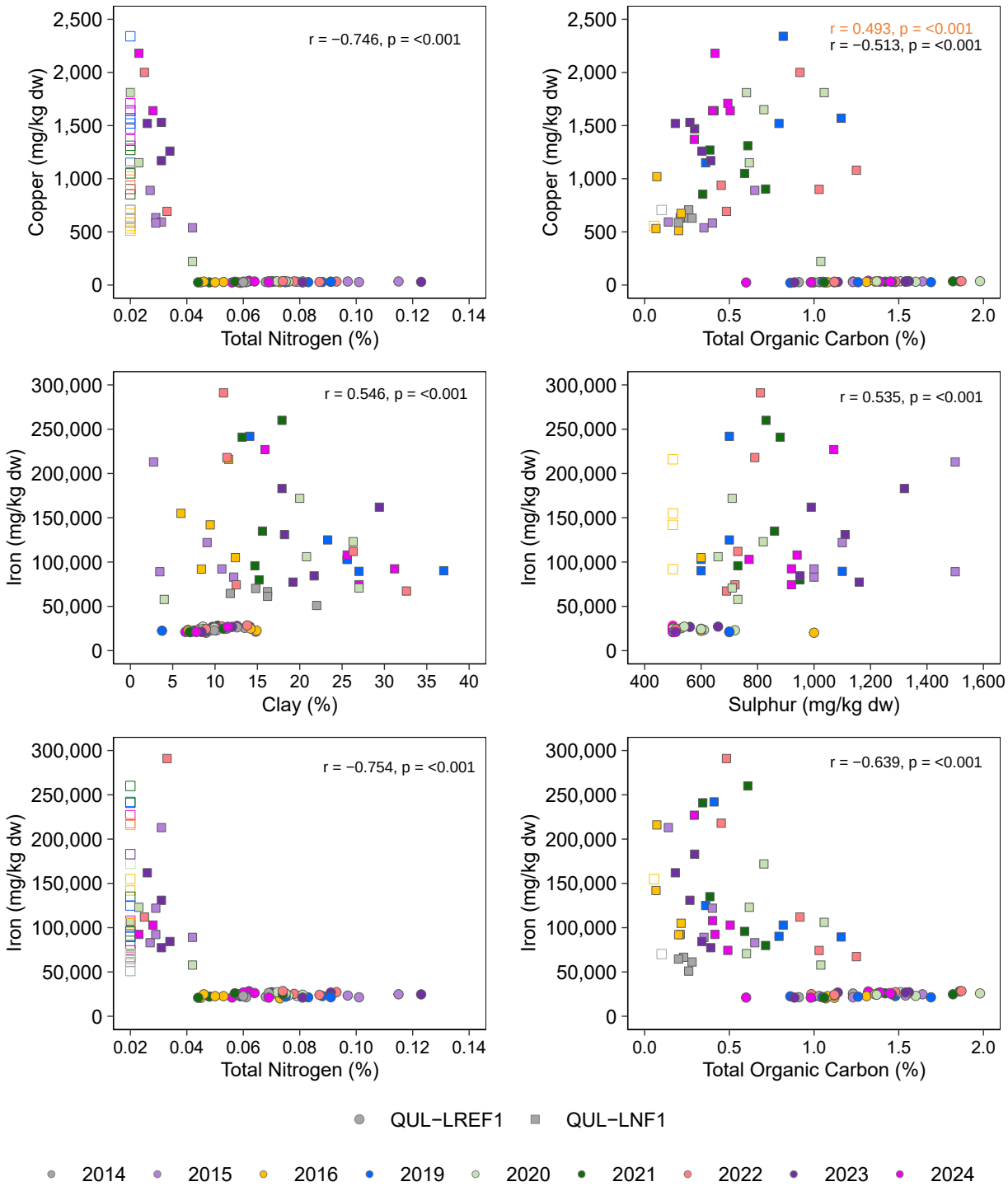

Figure E.1.5: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from shallow exposed and reference sampling areas of Quesnel Lake (QUL−LREF1, QUL−LNF1) are shown in black font on each plot. Results of correlations that only evaluated data from the shallow exposed area of Quesnel Lake (QUL−LNF1) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−LNF1 and QUL−LREF1; red font = QUL− LNF1 only). Open data points indicate at least one of the two variables plotted were <LRL.

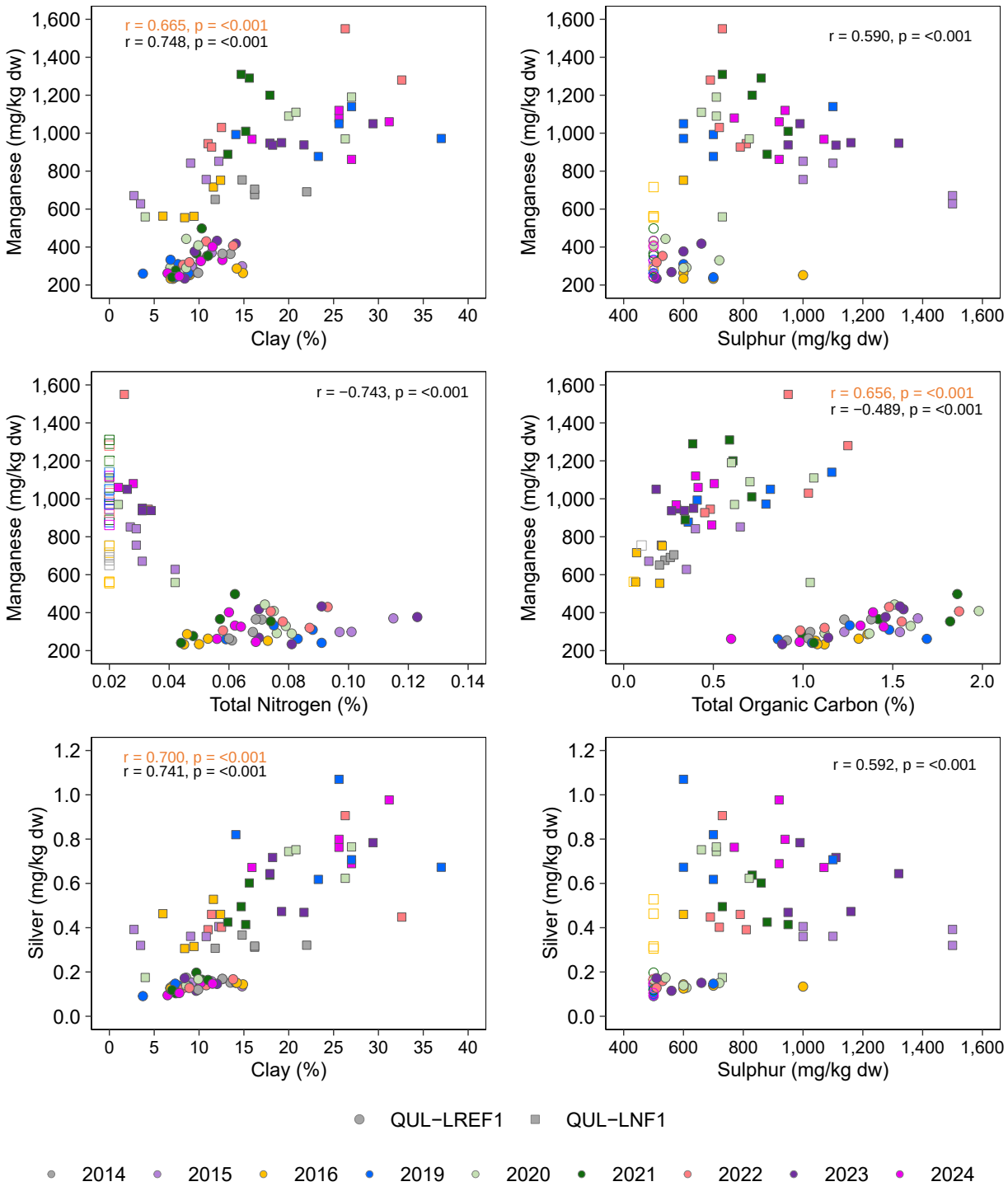

Figure E.1.5: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from shallow exposed and reference sampling areas of Quesnel Lake (QUL−LREF1, QUL−LNF1) are shown in black font on each plot. Results of correlations that only evaluated data from the shallow exposed area of Quesnel Lake (QUL−LNF1) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−LNF1 and QUL−LREF1; red font = QUL− LNF1 only). Open data points indicate at least one of the two variables plotted were <LRL.

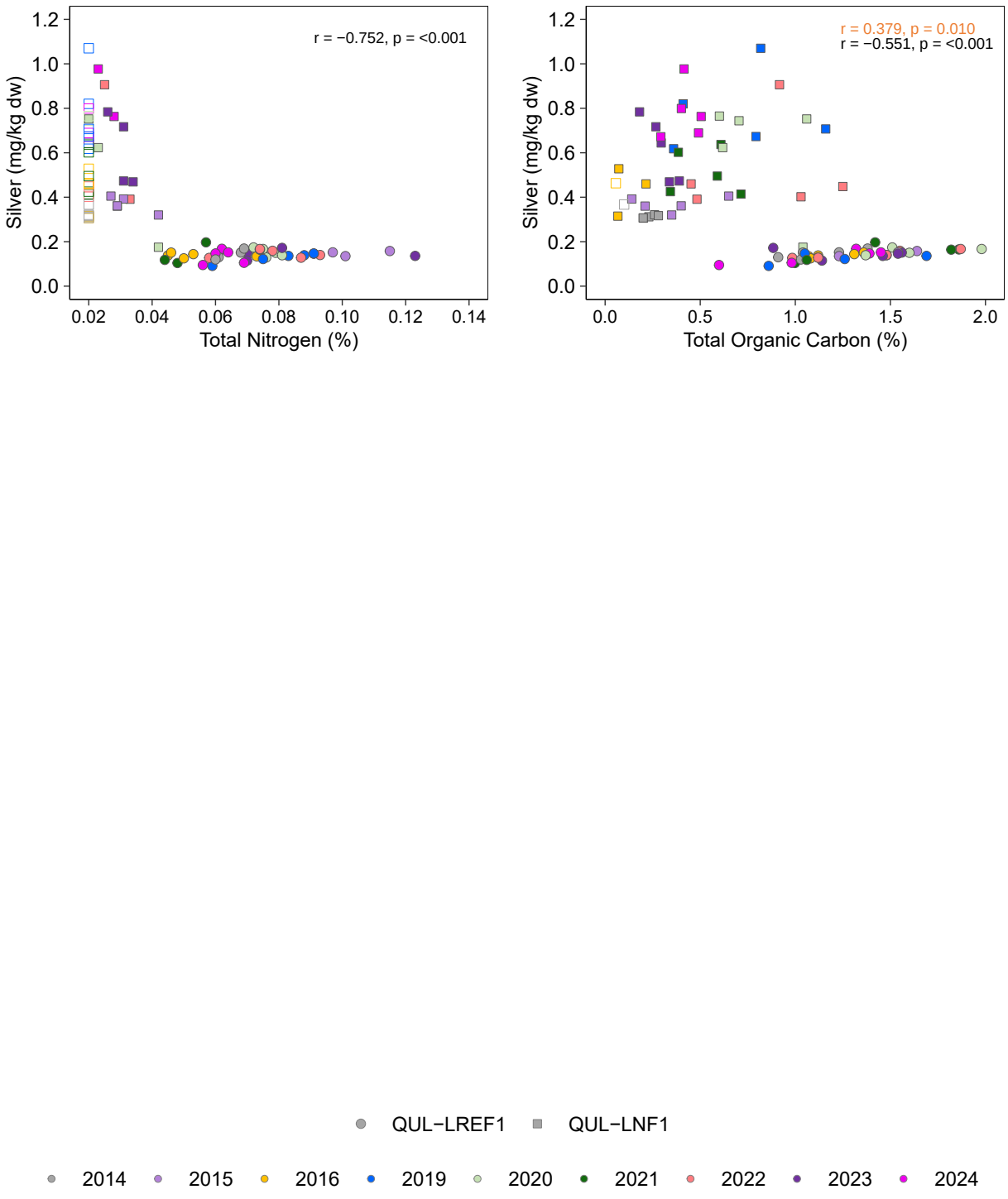

Figure E.1.5: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Results of correlations that evaluated data from shallow exposed and reference sampling areas of Quesnel Lake (QUL−LREF1, QUL−LNF1) are shown in black font on each plot. Results of correlations that only evaluated data from the shallow exposed area of Quesnel Lake (QUL−LNF1) are shown in red font. An absence of either the red or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = QUL−LNF1 and QUL−LREF1; red font = QUL− LNF1 only). Open data points indicate at least one of the two variables plotted were <LRL.

Table E.1.1: Statistical Comparisons of Exposed - Reference Relative Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

ANOVA Model						Group	Exposed - Reference Relative Differences Among Years[a]						Relative MOD for Exposed - Reference Over Time (%)[b]				
Parameter	Unit	Transformation	Area	Year	Area x Year		2014	2015	2016	2018	2021	2024	2015	2016	2018	2021	2024
Total Organic Carbon	%	none	<0.001	0.002	0.366	POL-P1 vs BOL-B2	A						ns				
						POL-P2 vs BOL-B2	A						ns				
Arsenic	mg/kg dw	log10	<0.001	0.006	<0.001	POL-P1 vs BOL-B2	A	-	B	B	BC	C	-	-20	-20	-30	-40
						POL-P2 vs BOL-B2	A	AB	AB	BC	C	C	ns	ns	-20	-30	-30
Copper	mg/kg dw	log10	<0.001	0.002	0.032	POL-P1 vs BOL-B2	A	-	AB	B	B	B	-	ns	-30	-30	-30
						POL-P2 vs BOL-B2	AB	A	AB	B	B	B	ns	ns	ns	ns	ns

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Notes: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that share a letter are not significantly different among years.

[b] MOD calculated as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})x100\%$, where $Exp_{predicted} = Ref_{observed} + (Exp_{observed\ 2014} - Ref_{observed\ 2014})$. Exp = Exposed (POL-P1 and POL-P2); Ref = Reference (BOL-B2).

Table E.1.2: Statistical Comparisons of Spatial and Temporal Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024

ANOVA Model						Area	Pairwise Differences Among Years for Each Area[a]						Do Concentrations Differ from 2014? Magnitude of Difference (MOD)[b]					Do Concentrations Differ Between the Areas? Group		Magnitude of Difference (MOD)[c]					
Parameter	Unit	Transformation	Area	Year	Area x Year		2014	2015	2016	2018	2021	2024	2015	2016	2018	2021	2024	A	B	2014	2015	2016	2018	2021	2024
Total Organic Carbon	%	none	<0.001	0.002	0.366	BOL-B2	AB	AB	B	B	A	AB	ns	ns	ns	ns	ns	POL-P1	BOL-B2	-42.5					
						POL-P1	AB	-	B	B	A	AB	ns	ns	ns	ns	ns	POL-P2	BOL-B2	-49.1					
						POL-P2	AB	AB	B	B	A	AB	ns	ns	ns	ns	ns	POL-P1	POL-P2	ns					
Arsenic	mg/kg dw	log10	<0.001	0.006	<0.001	BOL-B2	B	A	AB	AB	AB	A	26.6	ns	ns	ns	35.9	POL-P1	BOL-B2	103	-	63.0	61.9	44.1	28.4
						POL-P1	A	-	A	A	A	A	-	ns	ns	ns	ns	POL-P2	BOL-B2	106	81.2	81.9	55.5	41.4	39.6
						POL-P2	ABC	A	AB	BC	C	BC	ns	ns	ns	ns	ns	POL-P1	POL-P2	ns	-	ns	ns	ns	ns
Copper	mg/kg dw	log10	<0.001	0.002	0.032	BOL-B2	A	A	A	A	A	A	ns	ns	ns	ns	ns	POL-P1	BOL-B2	112	-	68.5	47.7	38.6	38.7
						POL-P1	A	-	AB	AB	B	B	-	ns	ns	-27.0	-30.4	POL-P2	BOL-B2	100	115	93.8	53.4	49.9	60.4
						POL-P2	AB	A	AB	B	B	B	ns	ns	ns	ns	ns	POL-P1	POL-P2	ns	-	ns	ns	ns	ns

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Note: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that do not share a letter are significantly different for that area.

[b] MOD is calculated as $((year_{recent} - year_{2014})/year_{2014})*100$.

[c] MOD calculated as $((Group_{A} - Group_{B})/Group_{B})*100$.

Table E.1.3: Spearman's Correlation Relationships Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 2014 to 2024[a]

Analyte of Interest	Correlation Parameter	Data used in Correlation: BOL-B2, POL-P1, POL-P2[b]				Data used in Correlation: POL-P1, POL-P2[c]			
		Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)	Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)
Arsenic (mg/kg dw)	Correlation Coefficient	-0.857	0.525	-0.844	-0.150	-0.689	-0.0687	-0.703	-0.410
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.222	<0.001	0.632	<0.001	0.005
Copper (mg/kg dw)	Correlation Coefficient	-0.816	0.503	-0.832	-0.179	-0.604	-0.0210	-0.668	-0.412
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.144	<0.001	0.884	<0.001	0.005

Significant correlation; p-value < 0.0125 (p<0.05, Bonferroni corrected for 4 independent variables).

Notes: mg/kg dw = milligrams per kilogram dry weight; % = percent. Analyte of Interest was defined as an analyte at the exposed areas with a mean concentration that exceeded guidelines as well as pre-breach and reference 95th percentile values.

[a] Results below the Laboratory Reporting Limit (LRL) were used at the LRL for calculations.

[b] Clay and Total Organic Carbon: n = 77; Sulphur: n = 68; Total Nitrogen: n =75.

[c] Clay and Total Organic Carbon: n = 51; Sulphur: n = 45; Total Nitrogen: n = 49.

[d] % clay represents the clay proportion of the < 63 µm (silt and clay) sediment fraction that was used for metals analysis. % clay was calculated as: [% clay] / [% silt and clay].

Table E.1.4: Principal Components (PC) and Percentage of Variance Explained for the Principal Component Analysis (PCA) of Sediment Metal Concentrations (<63 µm Fraction) for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Year	Replicate Number	Reference		Exposed			
		BOL-B2		POL-P1		POL-P2	
		PC1 (52%)	PC2 (14%)	PC1 (52%)	PC2 (14%)	PC1 (52%)	PC2 (14%)
1999	1	-6.85	1.42	-5.84	3.98	-7.87	4.74
	2	-6.26	0.544	-5.14	5.48	-7.58	2.85
	3	-7.06	0.481	-6.37	3.96	-7.40	3.30
2014	1	-3.64	0.582	2.58	-3.65	4.64	1.93
	2	-4.10	-3.91	3.25	-1.77	0.432	-4.32
	3	-3.78	0.889	4.12	1.03	4.96	6.18
2015	1	-2.81	-1.39	nd	nd	5.66	0.334
	2	-3.11	-2.40	nd	nd	5.47	0.565
	3	-3.29	-0.931	nd	nd	4.41	-0.413
2016	1	-3.08	-0.252	2.91	1.00	4.27	1.67
	2	-3.34	-1.89	-1.94	-1.85	4.64	0.934
	3	-3.40	-0.148	3.11	-0.842	4.36	0.252
	4	-3.33	-0.964	3.74	1.18	0.800	-0.690
	5	-3.47	-1.37	2.96	-1.00	4.69	0.491
2018	1	-2.95	-1.42	1.97	-1.46	1.62	-0.148
	2	-2.95	-2.45	1.95	4.17	4.09	1.08
	3	-3.36	-2.08	1.94	-0.238	-0.804	-2.66
	4	-3.56	-2.41	3.50	1.05	3.99	0.971
	5	-3.07	-2.14	3.26	1.30	3.38	0.742
2018	1	-2.09	-0.0637	1.25	-2.70	3.96	0.0473
	2	-2.27	-1.33	1.77	0.205	0.0574	-1.05
	3	-2.19	-2.09	1.08	0.129	1.26	-0.489
	4	-2.75	-0.439	1.54	0.505	0.928	-1.25
	5	-2.31	-0.963	2.53	0.823	2.98	0.581
2024	1	-2.57	-2.16	1.34	-1.18	3.28	1.58
	2	-2.10	-1.71	1.26	0.533	1.45	0.190
	3	-2.50	-0.224	1.62	0.571	3.01	1.41
	4	-2.69	-0.345	1.99	0.0680	2.33	-0.664
	5	-2.84	0.239	1.69	0.302	3.02	-0.757

Notes: "nd" indicates no data. Variables with >25% non-detects were excluded from analysis.

Table E.1.5: Pearson Correlation of Principal Components (PC) of Sediment Metal Concentrations (<63 µm Fraction) for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Variable	PC1 (52%)		PC2 (14%)	
	P-value	r_s	P-value	r_s
Aluminum	<0.001	0.910	0.033	-0.231
Antimony	<0.001	0.382	<0.001	-0.614
Arsenic	<0.001	0.959	0.594	0.0583
Barium	<0.001	0.476	0.003	-0.319
Beryllium	<0.001	0.810	0.004	-0.307
Bismuth	<0.001	-0.721	0.095	0.181
Boron	<0.001	-0.439	<0.001	-0.523
Cadmium	<0.001	-0.716	<0.001	-0.469
Chromium	<0.001	-0.481	<0.001	-0.581
Cobalt	<0.001	0.955	0.840	-0.0220
Copper	<0.001	0.949	0.085	-0.187
Iron	<0.001	0.523	0.511	0.0718
Lead	<0.001	-0.714	0.927	0.0100
Manganese	0.167	0.151	0.005	0.299
Mercury	<0.001	-0.885	0.005	-0.298
Molybdenum	<0.001	0.806	<0.001	-0.360
Nickel	<0.001	-0.368	<0.001	-0.647
Selenium	<0.001	0.603	<0.001	-0.502
Silver	0.168	-0.150	<0.001	-0.751
Strontium	<0.001	0.888	0.154	0.155
Thallium	<0.001	-0.957	0.398	-0.0923
Tin	<0.001	0.820	0.621	-0.0541
Titanium	<0.001	0.969	0.781	0.0305
Uranium	<0.001	-0.662	<0.001	-0.514
Vanadium	<0.001	0.919	0.246	-0.126
Zinc	<0.001	0.447	<0.001	-0.579

$r_s \geq 0.6$ or ≤ -0.6.

significant correlation (p-value < 0.05).

Notes: Principal Components Analysis (PCA) conducted on correlation matrix with $\log_{10}$−transformed concentrations. Parameters that had more than 25% censored data were excluded from the analyses. Sediment metal concentrations are in units of mg/kg dw (milligram per kilogram dry weight).

Table E.1.6: **Statistical Comparisons of Exposed - Reference Relative Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024**

ANOVA Model						Area	(Exposed - Reference) Relative Differences Among Years[a]										Relative MOD for Exposed - Reference Over Time (%)[b]								
Parameter	Units	Transformation	Area	Year	Area x Year		2014	2015[c]	2016	2018	2019[c]	2020[c]	2021	2022[c]	2023[c]	2024	2015[c]	2016	2018	2019[c]	2020[c]	2021	2022[c]	2023[c]	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	QUL-PNF	B	B	B	B	AB	-	B	-	-	A	ns	ns	ns	ns	-	ns	-	-	171
						QUL-PFF1	A	-	B	B	-	-	B	-	-	A	-	-80	-80	-	-	-60	-	-	ns
Arsenic	mg/kg dw	log10	<0.001	<0.001	0.001	QUL-PNF	AB	B	AB	AB	A	-	B	-	-	B	ns	ns	ns	ns	-	ns	-	-	ns
						QUL-PFF1	A	-	B	AB	-	-	A	-	-	A	-	-20	ns	-	-	ns	-	-	ns
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	QUL-PNF	AB	B	A	AB	A	-	AB	-	-	AB	ns	ns	ns	ns	-	ns	-	-	ns
						QUL-PFF1	BC	-	C	C	-	-	A	-	-	AB	-	ns	ns	-	-	62	-	-	ns
Iron	mg/kg dw	log10	<0.001	0.010	0.104	QUL-PNF	A										ns								
						QUL-PFF1																			
Manganese	mg/kg dw	log10	<0.001	<0.001	<0.001	QUL-PNF	C	BC	A	A	A	-	A	-	-	AB	ns	70	82	94	-	75	-	-	65
						QUL-PFF1	C	-	C	BC	-	-	A	-	-	AB	-	ns	ns	-	-	89	-	-	52

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Notes: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that share a letter are not significantly different among years.

[b] MOD calculated as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})x100\%$, where $Exp_{predicted} = Ref_{observed} + (Exp_{observed\ 2014} - Ref_{observed\ 2014})$. Exp = Exposed (QUL-PNF, QUL-PFF1); Ref = Reference (QUL-PREF1).

[c] No data available for QUL-PREF1 or QUL-PFF1 in 2015, 2019, 2020, 2022 and 2023. Statistical comparisons and MOD values calculated based on available data only.

Table E.1.7: Statistical Comparisons of Spatial and Temporal Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

ANOVA Model						Area	Pairwise Differences Among Years for Each Area[a]										Do Concentrations Differ from 2014?									Do Concentrations Differ Between the Areas?										
																	MOD[b]									Group		Magnitude of Difference (MOD)[c]									
Parameter	Units	Transformation	Area	Year	Area x Year		2014	2015[d]	2016	2018	2019[d]	2020[d]	2021	2022[d]	2023[d]	2024	2015[d]	2016	2018	2019[d]	2020[d]	2021	2022[d]	2023[d]	2024	A	B	2014	2015[d]	2016	2018	2019[d]	2020[d]	2021	2022[d]	2023[d]	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	QUL-PREF1	C	ABC	ABC	A	ABC	-	AB	-	-	BC	ns	ns	26.3	ns	-	24.9	-	-	ns	QUL-PNF	QUL-PREF1	-90.1	-83.8	-82.0	-73.2	-71.2	-	-73.0	-	-	-63.6
						QUL-PNF	C	BC	BC	AB	ABC	ABC	AB	AB	A	AB	ns	ns	242	ns	ns	241	270	348	282	QUL-PFF1	QUL-PREF1	-73.9	-	-92.3	-93.2	-	-	-84.9	-	-	-75.7
						QUL-PFF1	A	-	A	A	-	-	A	-	-	A	-	ns	ns	-	-	ns	-	-	ns	QUL-PNF	QUL-PFF1	ns	-	ns	-74.8	-	-	ns	-	-	ns
Arsenic	mg/kg dw	log10	<0.001	<0.001	0.001	QUL-PREF1	B	AB	A	B	B	-	AB	-	-	AB	ns	23.5	ns	ns	-	ns	-	-	ns	QUL-PNF	QUL-PREF1	98.4	72.3	93.9	92.5	108	-	74.5	-	-	70.3
						QUL-PNF	B	B	A	B	AB	B	AB	AB	B	B	ns	20.7	ns	ns	ns	ns	ns	ns	ns	QUL-PFF1	QUL-PREF1	70.2	-	38.5	48.5	-	-	63.7	-	-	66.5
						QUL-PFF1	AB	-	AB	B	-	-	A	-	-	A	-	ns	ns	-	-	ns	-	-	ns	QUL-PNF	QUL-PFF1	-14.2	-	-28.6	-22.8	-	-	ns	-	-	ns
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	QUL-PREF1	A	A	A	A	A	-	A	-	-	A	ns	ns	ns	ns	-	ns	-	-	ns	QUL-PNF	QUL-PREF1	1,580	1,381	2,062	1,690	2,025	-	1,666	-	-	1,624
						QUL-PNF	C	BC	A	BC	AB	BC	BC	BC	BC	BC	ns	71.1	ns	47.3	ns	ns	ns	ns	ns	QUL-PFF1	QUL-PREF1	1,028	-	884	976	-	-	1,730	-	-	1,353
						QUL-PFF1	C	-	BC	C	-	-	A	-	-	AB	-	ns	ns	-	-	74.5	-	-	44.1	QUL-PNF	QUL-PFF1	-32.9	-	-54.5	-39.9	-	-	ns	-	-	ns
Iron	mg/kg dw	log10	<0.001	0.010	0.104	QUL-PREF1	A										ns									QUL-PNF	QUL-PREF1	30.0									
						QUL-PNF																				QUL-PFF1	QUL-PREF1	-11.8									
						QUL-PFF1																				QUL-PNF	QUL-PFF1	-32.2									
Manganese	mg/kg dw	log10	<0.001	<0.001	<0.001	QUL-PREF1	A	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	-	ns	-	-	ns	QUL-PNF	QUL-PREF1	68.2	105	186	206	226	-	195	-	-	177
						QUL-PNF	C	BC	AB	AB	AB	AB	AB	AB	AB	A	ns	70.6	62.1	70.4	69.2	74.5	63.4	75.8	78.4	QUL-PFF1	QUL-PREF1	48.9	-	58.6	91.3	-	-	182	-	-	127
						QUL-PFF1	B	-	B	B	-	-	A	-	-	A	-	ns	ns	-	-	88.7	-	-	65.0	QUL-PNF	QUL-PFF1	ns	-	-44.6	-37.5	-	-	ns	-	-	ns

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Notes: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that do not share a letter are significantly different for that area.

[b] MOD is calculated as $((year_{recent} - year_{2014})/year_{2014})*100$.

[c] MOD calculated as $((Group_{A} - Group_{B})/Group_{B})*100$.

[d] No data available for QUL-PREF1 or QUL-PFF1 in 2015, 2019, 2020, 2022 and 2023. Statistical comparisons and MOD values calculated based on available data only.

Table E.1.8: Spearman's Correlation Relationships Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024[a]

Analyte of Interest	Correlation Parameter	Data used in Correlation: QUL-PREF1, QUL-PNF, QUL-PFF1[b]				Data used in Correlation: QUL-PNF, QUL-PFF1[c]			
		Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)	Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)
Arsenic (mg/kg dw)	Correlation Coefficient	-0.471	0.766	-0.504	-0.110	0.472	0.420	0.368	0.485
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.310	<0.001	<0.001	0.001	<0.001
Copper (mg/kg dw)	Correlation Coefficient	-0.505	0.831	-0.524	-0.0849	0.391	0.634	0.315	0.451
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.432	<0.001	<0.001	0.006	<0.001
Iron (mg/kg dw)	Correlation Coefficient	0.0649	0.446	0.0481	0.199	0.607	0.183	0.554	0.423
	Sig. (2-tailed)	0.505	<0.001	0.621	0.063	<0.001	0.117	<0.001	<0.001
Manganese (mg/kg dw)	Correlation Coefficient	-0.413	0.855	-0.420	-0.365	0.683	0.666	0.644	-0.0142
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.914

Significant correlation; p-value < 0.0125 (p<0.05, Bonferroni corrected for 4 independent variables).

Notes: mg/kg dw = milligrams per kilogram dry weight. % = percent. Analyte of Interest was defined as an analyte at the exposed areas with a mean concentration that exceeded guidelines as well as reference 95th percentile values.

[a] Results below the Laboratory Reporting Limit (LRL) were used at the LRL for calculations.

[b] n = 108 for comparisons except for comparisons to total sulphur, where n = 88.

[c] n = 75 for comparisons except for comparisons to sulphur, where n = 70.

[d] % clay represents the clay proportion of the < 63 µm (silt and clay) sediment fraction that was used for metals analysis. % clay was calculated as: [% clay] / [% silt and clay].

Table E.1.9: Principal Components (PC) and Percentage of Variance Explained for the Principal Component Analysis (PCA) of Sediment Metal Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Year	Replicate Number	Reference		Exposed			
		QUL-PREF1		QUL-PNF		QUL-PFF1	
		PC1 (65%)	PC2 (22%)	PC1 (65%)	PC2 (22%)	PC1 (65%)	PC2 (22%)
2014	1	6.27	-1.27	-2.10	3.41	-2.88	-2.51
	2	7.29	-0.494	-3.68	1.55	0.958	4.01
	3	6.32	-1.20	-1.85	3.96	1.04	4.00
	4	6.46	-0.967	-0.0382	5.31	2.08	5.83
	5	7.25	-0.0734	-0.389	3.47	2.06	6.42
2015	1	4.91	-2.84	-5.53	-1.48	nd	nd
	2	nd	nd	-6.11	-1.96	nd	nd
	3	5.18	-1.85	-4.11	0.0858	nd	nd
	4	nd	nd	0.395	4.75	nd	nd
	5	6.08	-0.900	-0.797	3.41	nd	nd
2016	1	4.99	-2.18	-6.18	-1.96	-2.45	1.14
	2	5.87	-1.76	-6.32	-1.78	3.00	7.37
	3	5.02	-2.45	-5.99	-1.06	-3.00	2.11
	4	5.66	-1.58	-6.46	-2.23	0.373	5.64
	5	6.51	-1.02	-5.60	-1.24	-0.168	5.36
2018	1	6.69	-1.40	-3.85	-1.05	0.597	5.18
	2	6.70	-1.07	-4.72	-0.857	1.98	6.80
	3	6.76	-0.512	-3.67	0.690	-2.58	1.64
	4	7.00	-0.752	-0.977	-1.42	1.07	5.37
	5	7.12	-0.553	-4.47	-1.56	1.54	5.07
2019	1	6.17	-1.80	-6.11	-1.96	nd	nd
	2	6.09	-1.66	-6.02	-2.41	nd	nd
	3	6.39	-1.23	-2.21	1.80	nd	nd
	4	6.40	-1.28	-6.26	-2.81	nd	nd
	5	6.58	-0.938	-5.06	-1.63	nd	nd
2020	1	nd	nd	-1.34	2.37	nd	nd
	2	nd	nd	-3.45	-1.28	nd	nd
	3	nd	nd	-2.42	-0.764	nd	nd
	4	nd	nd	-3.10	-1.50	nd	nd
	5	nd	nd	-3.68	-1.77	nd	nd
2021	1	5.57	-1.66	-4.41	-1.81	-4.32	-1.48
	2	6.27	-0.627	-3.66	-1.05	-2.59	1.71
	3	5.49	-1.66	-3.19	1.18	-4.14	-0.883
	4	6.37	-0.864	-1.97	1.06	-2.68	0.573
	5	5.53	-1.12	-2.81	-0.938	-2.09	2.89
2022	1	nd	nd	-3.80	-1.14	nd	nd
	2	nd	nd	-2.91	-1.11	nd	nd
	3	nd	nd	-2.43	-0.373	nd	nd
	4	nd	nd	-3.17	-1.62	nd	nd
	5	nd	nd	-4.04	-1.49	nd	nd
2023	1	nd	nd	-3.26	-0.971	nd	nd
	2	nd	nd	-2.96	-0.749	nd	nd
	3	nd	nd	-1.33	0.123	nd	nd
	4	nd	nd	-2.23	-1.25	nd	nd
	5	nd	nd	-2.63	-0.925	nd	nd
2024	1	4.58	-2.98	-3.22	-1.86	-2.78	-0.558
	2	5.84	-2.04	-3.82	-2.25	-1.01	2.39
	3	4.74	-2.74	-3.41	-1.03	-2.53	-0.200
	4	5.20	-2.36	-3.42	-2.84	-2.88	-0.0120
	5	4.53	-2.77	-3.54	-2.73	-2.15	2.44

Notes: "nd" indicates no data. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, and 2023.

Table E.1.10: Pearson Correlation of Principal Components (PC) of Sediment Metal Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-PNF; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Variable	PC1 (65%)		PC2 (22%)	
	P-value	r_s	P-value	r_s
Aluminum	<0.001	-0.948	0.014	-0.237
Antimony	<0.001	-0.866	0.008	-0.255
Arsenic	<0.001	-0.970	0.431	0.0765
Barium	<0.001	-0.962	0.692	-0.0386
Beryllium	<0.001	-0.986	0.839	-0.0198
Bismuth	0.007	-0.258	<0.001	-0.881
Cadmium	<0.001	0.537	<0.001	-0.824
Calcium	<0.001	-0.893	<0.001	0.393
Chromium	<0.001	0.611	<0.001	-0.778
Cobalt	<0.001	-0.918	<0.001	-0.344
Copper	<0.001	-0.965	0.015	0.232
Iron	<0.001	-0.524	<0.001	-0.539
Lead	<0.001	-0.800	<0.001	-0.526
Lithium	<0.001	-0.961	0.029	-0.210
Magnesium	<0.001	-0.961	0.035	-0.204
Manganese	<0.001	-0.951	0.244	-0.113
Molybdenum	<0.001	-0.963	0.034	0.204
Nickel	<0.001	0.396	<0.001	-0.905
Phosphorus	0.288	0.103	0.006	0.264
Potassium	<0.001	-0.911	0.845	-0.0190
Selenium	<0.001	-0.366	<0.001	-0.706
Silver	<0.001	-0.937	0.011	-0.243
Sodium	<0.001	-0.918	0.005	0.267
Strontium	<0.001	-0.926	0.002	0.292
Thallium	<0.001	0.687	<0.001	-0.701
Tin	<0.001	-0.943	0.001	0.302
Titanium	<0.001	-0.971	0.363	0.0883
Uranium	<0.001	-0.384	<0.001	-0.689
Vanadium	<0.001	-0.868	0.963	0.00447
Zinc	<0.001	-0.582	<0.001	-0.768

$r_s \geq 0.6$ or ≤ -0.6.

Significant correlation (p-value < 0.05).

Notes: Principal Components Analysis (PCA) conducted on correlation matrix with $\log_{10}$–transformed concentrations. Vectors represent the PC loadings for each parameter (scaled). Parameters that had more than 25% censored data were excluded from the analyses. Sediment metal concentrations are in units of mg/kg dw (milligram per kilogram dry weight).

Table E.1.11: **Statistical Comparisons of Spatial and Temporal Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024**

ANOVA Model						Area	Pairwise Differences Among Years for Each Area[a]									Do Concentrations Differ from 2014? MOD[b]								Do Concentrations Differ Between the Areas? QUL-LNF1 vs QUL-LREF1[c]								
Parameter	Units	Transformation	Area	Year	Area x Year		2014	2015	2016	2019	2020	2021	2022	2023	2024	2015	2016	2019	2020	2021	2022	2023	2024	2014	2015	2016	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	0.155	QUL-LREF1	B	AB	B	AB	A	AB	A	AB	AB	ns	ns	ns	74.2	ns	67.2	ns	ns	-63.8								
						QUL-LNF1																									
Arsenic	mg/kg dw	log10	<0.001	0.156	0.031	QUL-LREF1	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	222	233	272	427	220	267	226	253	319
						QUL-LNF1	B	AB	AB	A	AB	AB	AB	AB	AB	ns	ns	44.0	ns	ns	ns	ns	ns									
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	QUL-LREF1	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	2,062	1,926	2,192	5,976	3,105	3,454	3,188	4,513	5,459
						QUL-LNF1	B	B	B	A	AB	AB	AB	A	A	ns	ns	146	ns	ns	ns	113	160									
Iron	mg/kg dw	log10	<0.001	0.128	0.137	QUL-LREF1	A									ns								369								
						QUL-LNF1																										
Manganese	mg/kg dw	log10	<0.001	<0.001	0.047	QUL-LREF1	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	127	132	147	259	174	235	212	187	228
						QUL-LNF1	CD	BCD	D	AB	ABC	A	A	ABC	AB	ns	ns	44.4	ns	62.3	61.8	ns	45.9									
Silver	mg/kg dw	log10	<0.001	0.003	<0.001	QUL-LREF1	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	126	148	193	509	259	248	245	323	494
						QUL-LNF1	D	CD	BCD	A	ABC	ABCD	ABCD	AB	A	ns	ns	135	67.1	ns	ns	86.3	138									

P-value < 0.05.

Indicates negative MOD.

Indicates positive MOD.

Note: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that do not share a letter are significantly different for that area.

[b] MOD is calculated as $((year_{recent} - year_{2014})/year_{2014})*100$.

[c] MOD calculated as ((QUL-LNF1 - QUL-LREF1)/QUL-LREF1)*100.

Table E.1.12: Statistical Comparisons of Exposed - Reference Relative Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024

ANOVA Model						(Exposed - Reference) Relative Differences Among Years[a]									Relative MOD for Exposed - Reference Over Time (%)[b]							
Parameter	Units	Transformation	Area	Year	Area x Year	2014	2015	2016	2019	2020	2021	2022	2023	2024	2015	2016	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	0.155	A									ns							
Arsenic	mg/kg dw	log10	<0.001	0.156	0.031	B	B	B	A	B	B	B	B	AB	ns	ns	64	ns	ns	ns	ns	ns
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	DE	E	DE	A	CDE	BCD	CDE	ABC	AB	ns	ns	181	ns	ns	ns	113	157
Iron	mg/kg dw	log10	<0.001	0.128	0.137	A									ns							
Manganese	mg/kg dw	log10	<0.001	<0.001	0.047	D	CD	BCD	A	ABCD	AB	ABCD	ABCD	ABC	ns	ns	58	ns	47	ns	ns	44
Silver	mg/kg dw	log10	<0.001	0.003	<0.001	D	CD	BCD	A	BC	BCD	BCD	AB	A	ns	ns	169	59	ns	ns	87	162

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Note: "-" = comparison not-relevant; mg/kg dw = milligram per kilogram dry weight; ns = not significant; MOD = Magnitude of Difference. ANOVA = Analysis of Variance.

[a] Years that share a letter are not significantly different among years.

[b] MOD calculated as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})x100\%$, where $Exp_{predicted} = Ref_{observed} + (Exp_{observed\ 2014} - Ref_{observed\ 2014})$. Exp = Exposed (QUL-LNF1); Ref = Reference (QUL-LREF1).

Table E.1.13: Spearman's Correlation Relationships Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Quesnel Lake (QUL-LNF1; Exposed and QUL-LREF1; Reference) Shallow Monitoring Areas, 2014 to 2024[a]

Analyte of Interest	Correlation Parameter	Data used in Correlation: QUL-LREF1, QUL-LNF1[b]				Data used in Correlation: QUL-LNF1[c]			
		Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)	Total Organic Carbon (%)	Clay (%)[d]	Total Nitrogen (%)	Total Sulphur (mg/kg dw)
Arsenic (mg/kg dw)	Correlation Coefficient	-0.535	0.743	-0.750	0.582	0.340	0.608	-0.0552	-0.00230
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	0.022	<0.001	0.719	0.989
Copper (mg/kg dw)	Correlation Coefficient	-0.513	0.790	-0.746	0.608	0.493	0.800	-0.149	0.000376
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.327	0.998
Iron (mg/kg dw)	Correlation Coefficient	-0.639	0.546	-0.754	0.535	-0.165	-0.178	-0.0124	-0.0195
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	0.279	0.242	0.935	0.905
Manganese (mg/kg dw)	Correlation Coefficient	-0.489	0.748	-0.743	0.590	0.656	0.665	-0.159	-0.00714
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.296	0.965
Silver (mg/kg dw)	Correlation Coefficient	-0.551	0.741	-0.752	0.592	0.379	0.700	-0.115	-0.0623
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	0.010	<0.001	0.451	0.703

Significant correlation; p-value < 0.0125 (p<0.05, Bonferroni corrected for 4 independent variables).

Notes: mg/kg dw = milligrams per kilogram dry weight. % = percent. Analyte of Interest was defined as an analyte at the exposed areas with a mean concentration that exceeded guidelines as well as reference 95th percentile values.

[a] Results below the Laboratory Reporting Limit (LRL) were used at the LRL for calculations.

[b] n = 88 for comparisons except for comparisons to total sulphur, where n = 78.

[c] n = 45 for comparisons except for comparisons to sulphur, where n = 40.

[d] % clay represents the clay proportion of the < 63 µm (silt and clay) sediment fraction that was used for metals analysis. % clay was calculated as: [% clay] / [% silt and clay].

APPENDIX E.2
PLANKTON COMMUNITY AND PRODUCTIVITY

APPENDIX E2 PLANKTON DATA COLLAPSING METHODS

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E2.1 Zooplankton 1
E2.2 Phytoplankton 1

E2 PLANKTON DATA COLLAPSING METHODS

E2.1 Zooplankton

Zooplankton community densities were calculated by the laboratory, Biologica Environmental Services (Biologica; Appendix G). Biologica used sampling information (haul depth, net diameter; provided by Minnow) and zooplankton abundances in each sample to calculate densities for taxa within each sample using the following formula:

$$Density(\frac{\#}{L}) = \frac{Abundance}{Haul\ Depth\ (m) \times \left(0.25\pi \times \left(Net\ mouth\ diameter\ (m)\right)^2\right) * 1000}$$

Zooplankton taxa identified in samples from the vicinity of the Mount Polley Mine typically are part of four major taxonomic groups: Cladocera, Rotifera, Calanoida, and Cyclopoida. Cladocera and Rotifera are easier to identify than Calanoida and Cyclopoida and have better developed taxonomic classifications. Therefore, decisions regarding taxonomic resolution of Cladocera and Rotifera taxa were made using a decision key, as described in Appendix E.4 (i.e., Resolving mixed-levels of taxonomic resolution for benthic invertebrates). Calanoida and Cyclopoida are less consistently identified to lower (i.e., higher resolution) taxonomic levels than Cladocera and Rotifera, making them unsuitable for the decision key described above for resolving inconsistent taxonomic resolution. Thus, inconsistent taxonomic resolution with within the Calanoida and Cyclopoida orders was resolved by pooling results within their respective major taxonomic group level (i.e., higher taxonomic resolution) for analysis, with the Copepod Nauplii stage remaining as a separate taxon group.

E2.2 Phytoplankton

Phytoplankton taxa are commonly identified to genus level but are occasionally identified to species level / species complex level (i.e., higher resolution) or phylum level (i.e., lower resolution). Due to the high proportion of ambiguously resolved taxa within phytoplankton data, phytoplankton taxonomy is not suited for the decision key described in Appendix E.4.

As such phytoplankton data were processed prior to analysis as follows. Phytoplankton taxa identified to species were rolled up to genus, and taxa identified to genus remained at genus. Two morphological groups, centric and pennate Diatoms, were considered as genera for the purpose of resolving taxonomic resolution. For each sample, taxa at a higher taxonomic level (e.g., phylum) were proportionally assigned to a lower taxonomic level (i.e., genera) if taxa at a lower taxonomic level were present in that sample. In cases where taxa at a lower taxonomic level were not observed in a sample, the taxon was assigned to the most common lower taxonomic level present in samples from that monitoring station (e.g., QUL-ZOO-1) in the present sampling year. If a lower taxonomic level was not observed at that station, the original taxonomic level was retained.

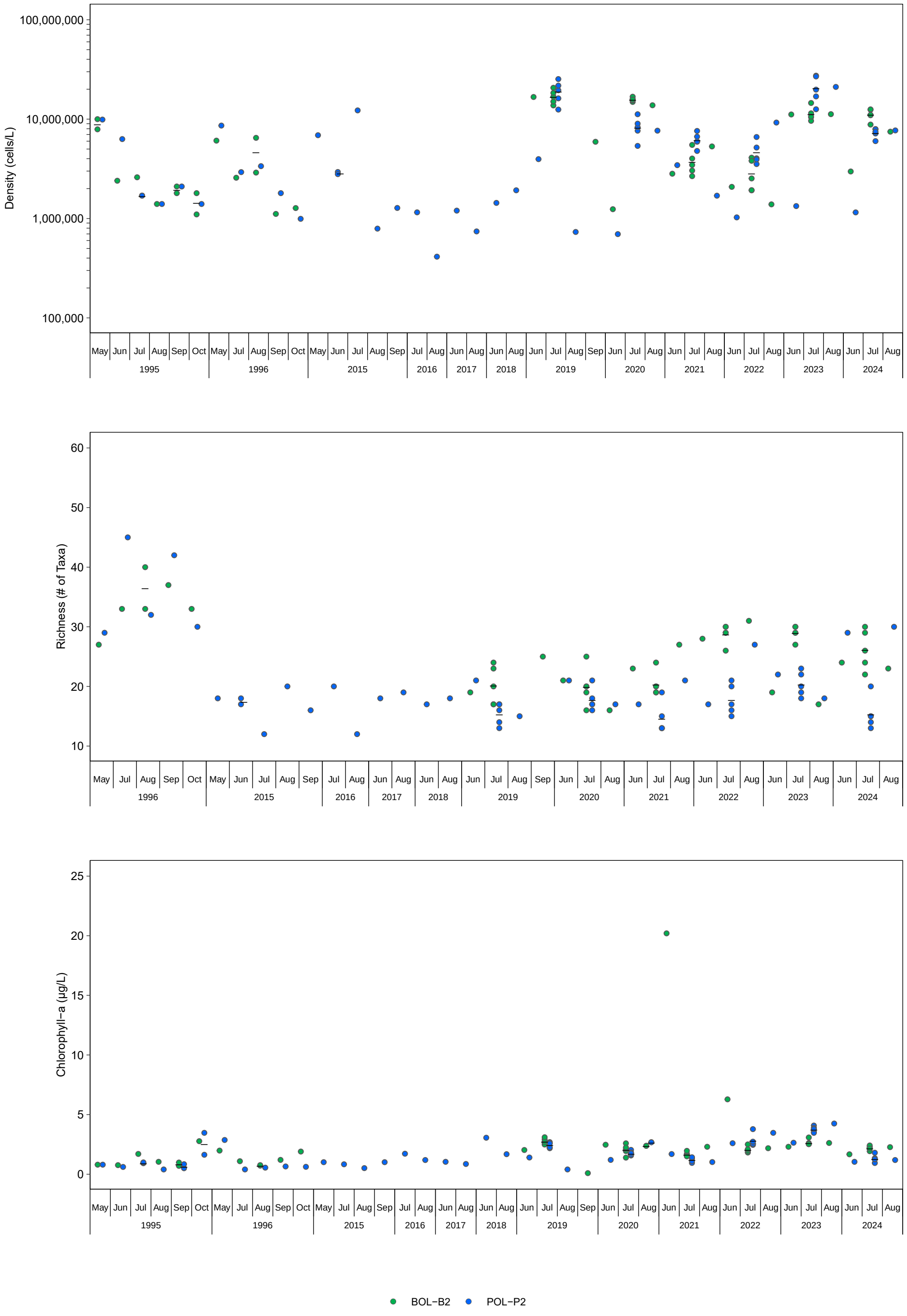


Figure E.2.1: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 1995 to 2024

Notes: µg/L = micrograms per litre. Green represents reference data and blue represents exposed data. Black bars represent mean values.

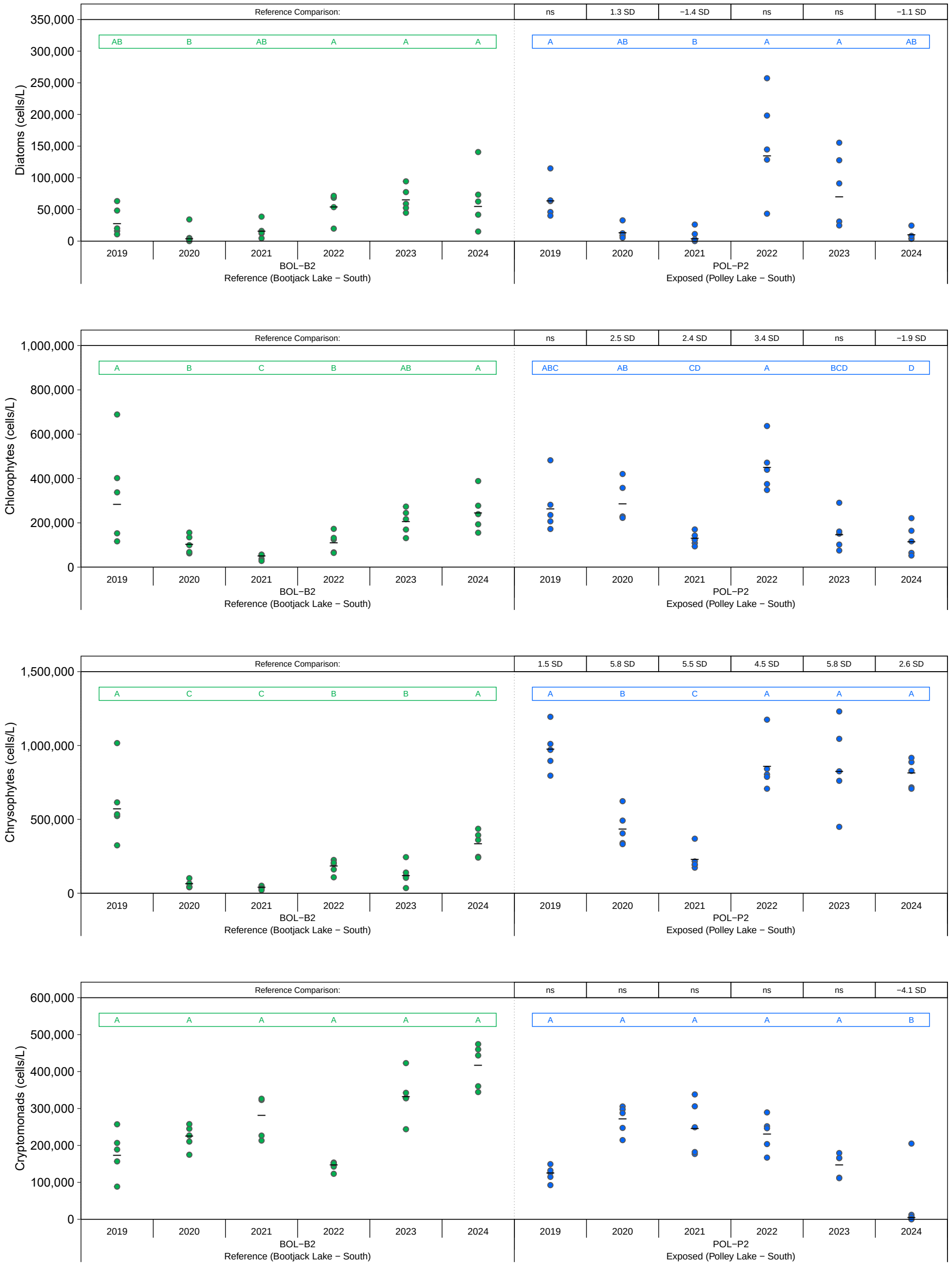


Figure E.2.2: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL−B2 in 2024 only).

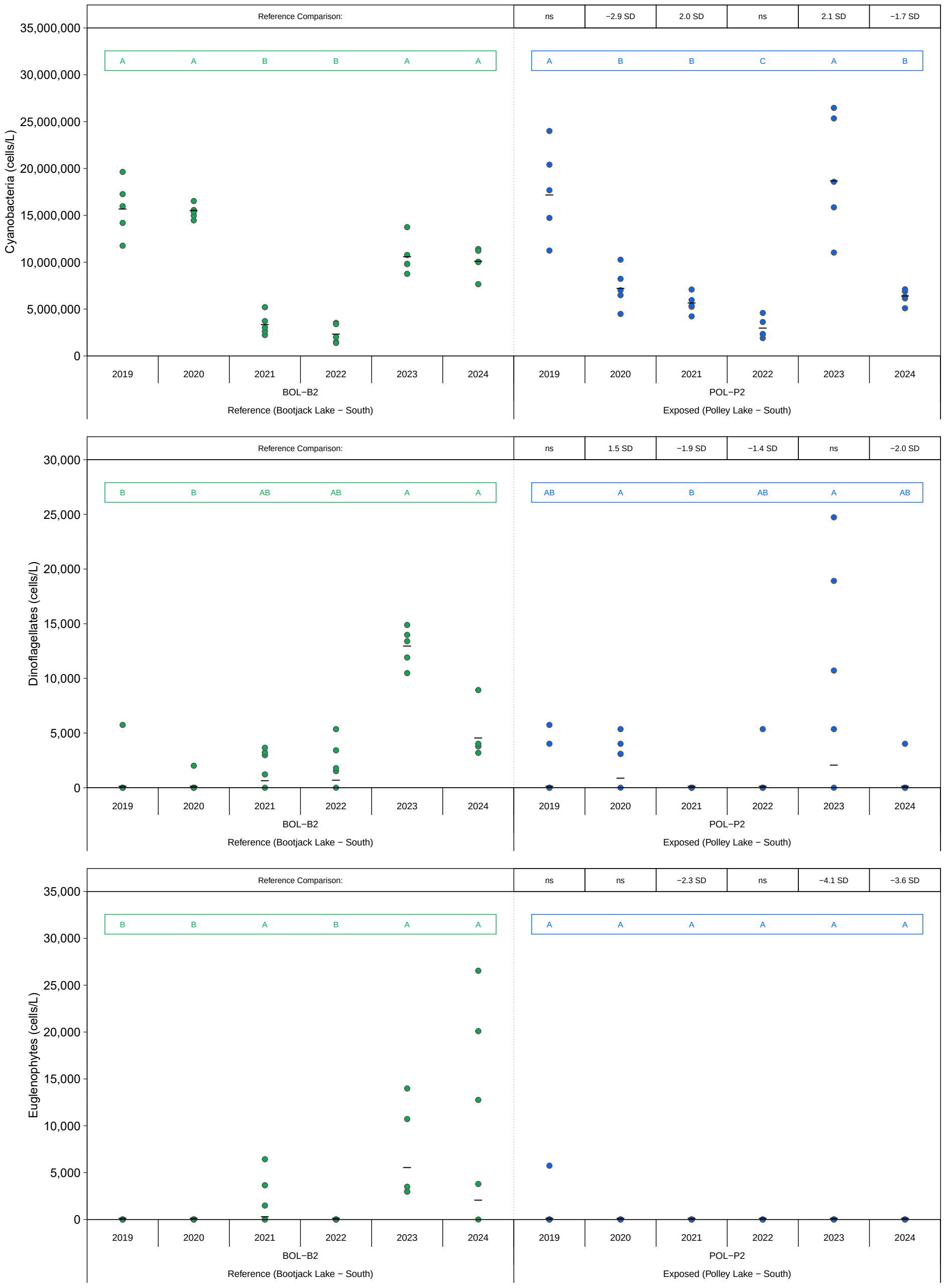


Figure E.2.2: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL−B2 in 2024 only).

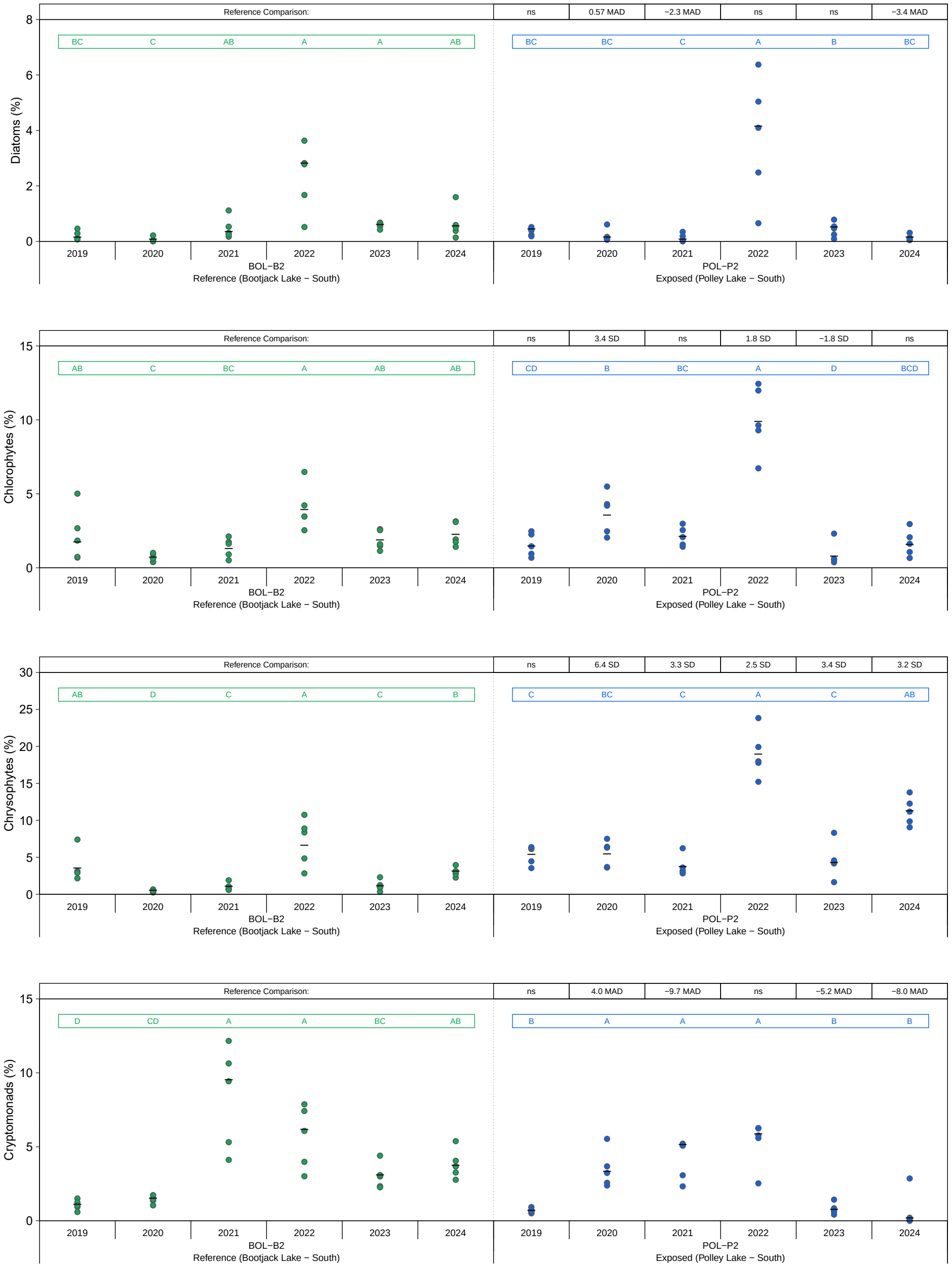


Figure E.2.2: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non-significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL−B2 in 2024 only).

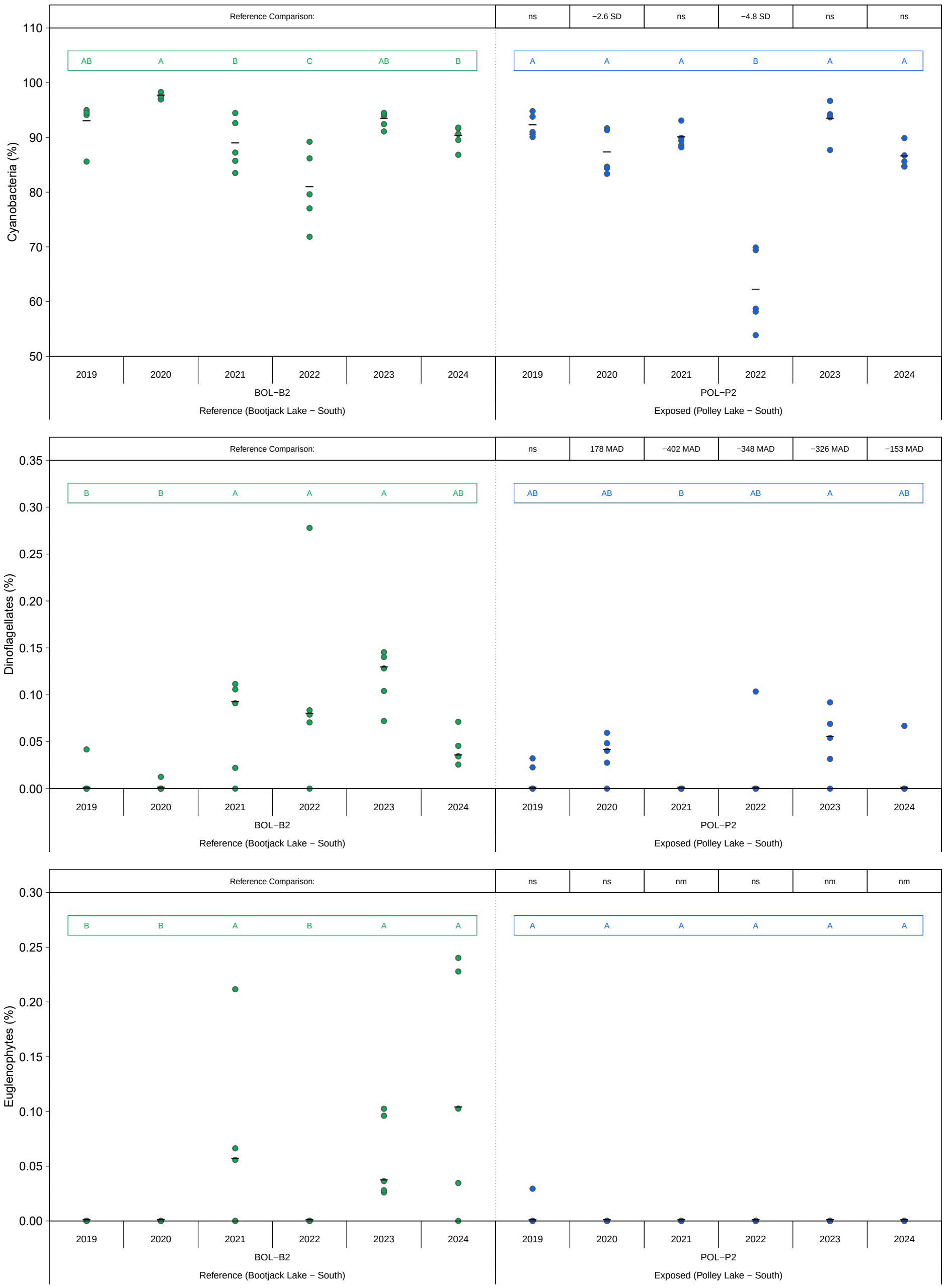


Figure E.2.2: Phytoplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For results of single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.1. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL−B2 in 2024 only).

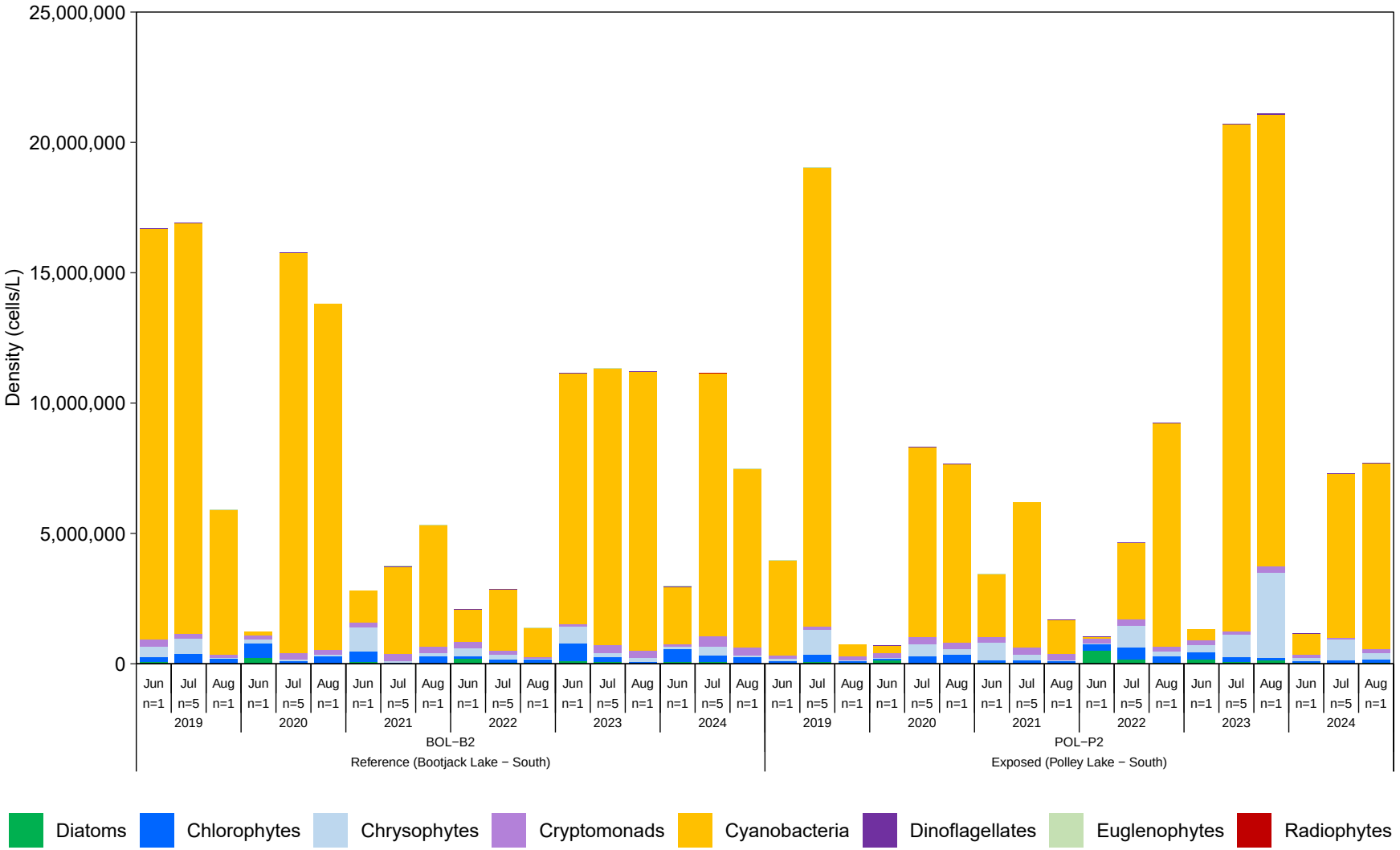


Figure E.2.3: Mean Densities of Major Phytoplankton Taxa for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 2019 to 2024

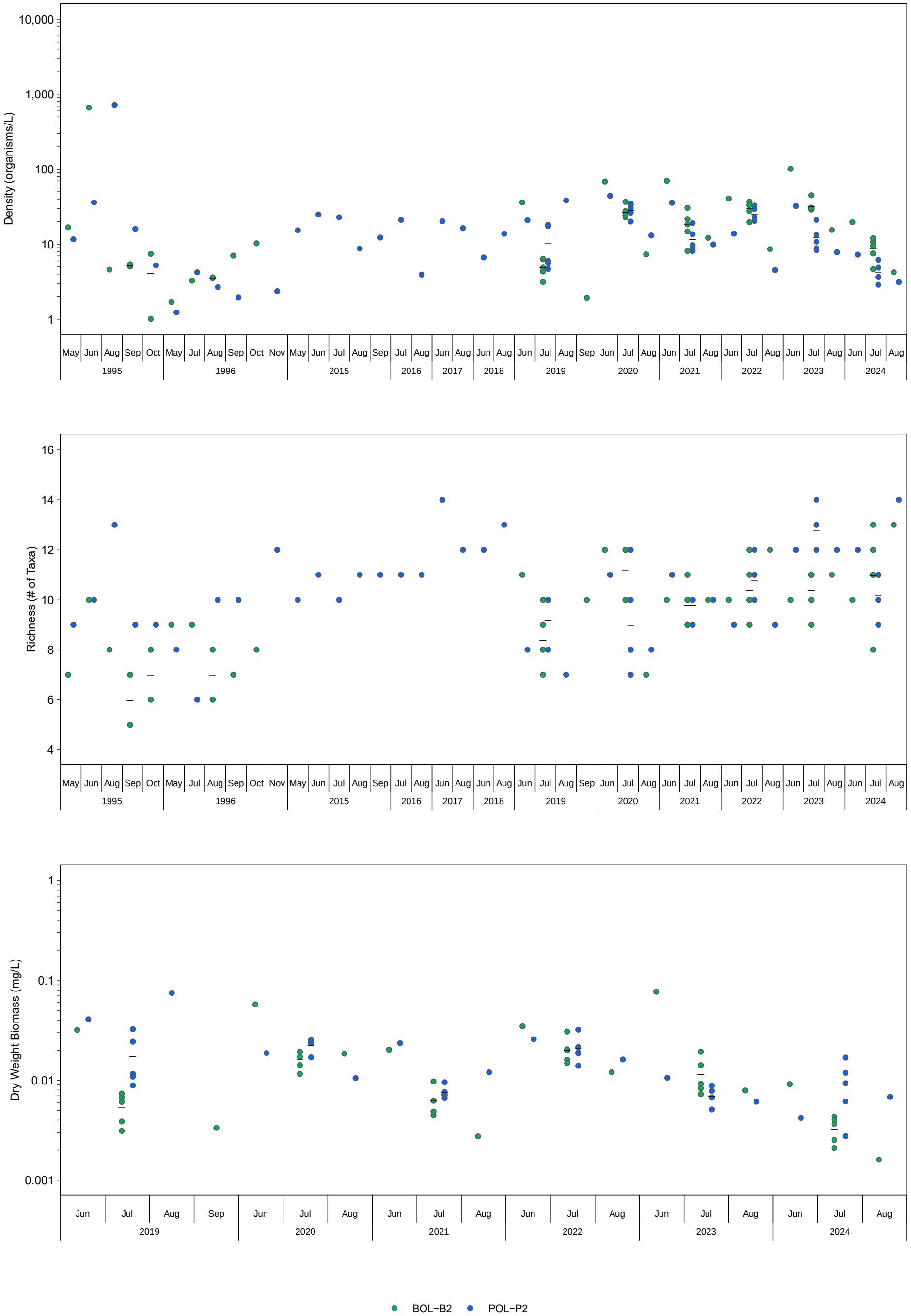


Figure E.2.4: Zooplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 1995 to 2024

Notes: mg/L = milligrams per litre. Green represents reference data and blue represents exposed data. Black bars represent mean values. Results displayed for POL-P2 (August 2019; above) for the same sampling area and date differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

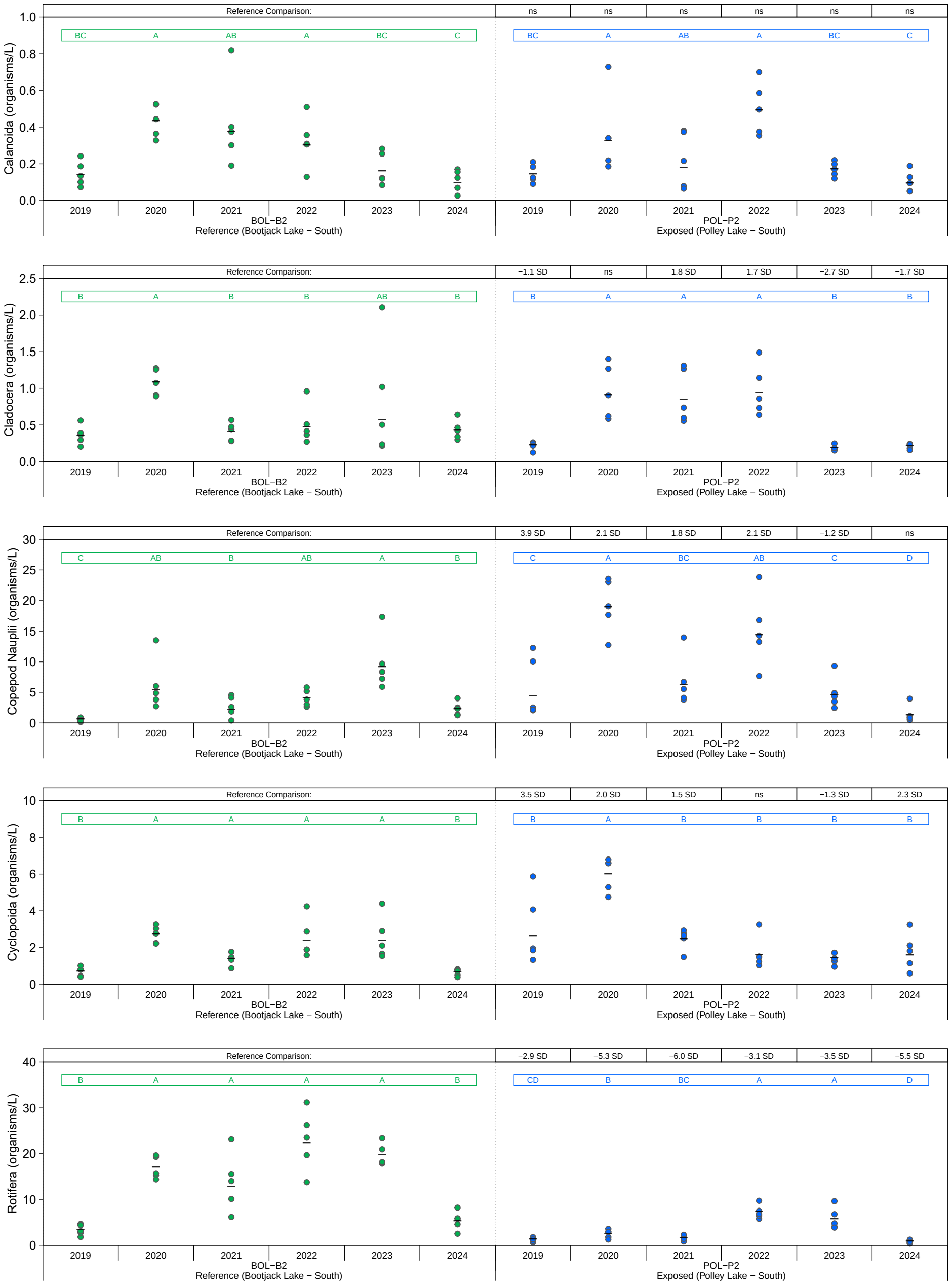


Figure E.2.5: Zooplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a, 2022a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.3.

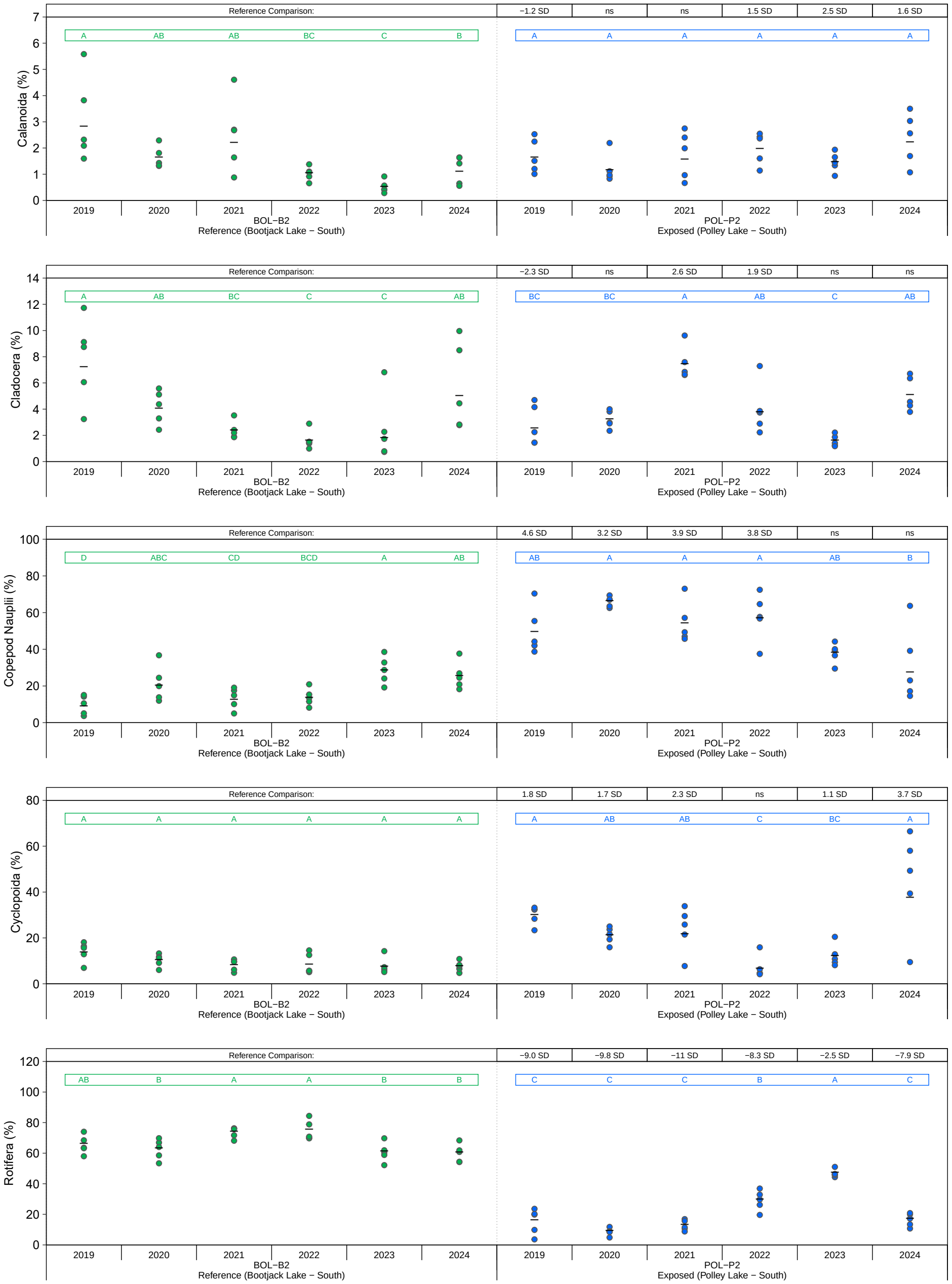


Figure E.2.5: Zooplankton Community Metrics for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a, 2022a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.3.

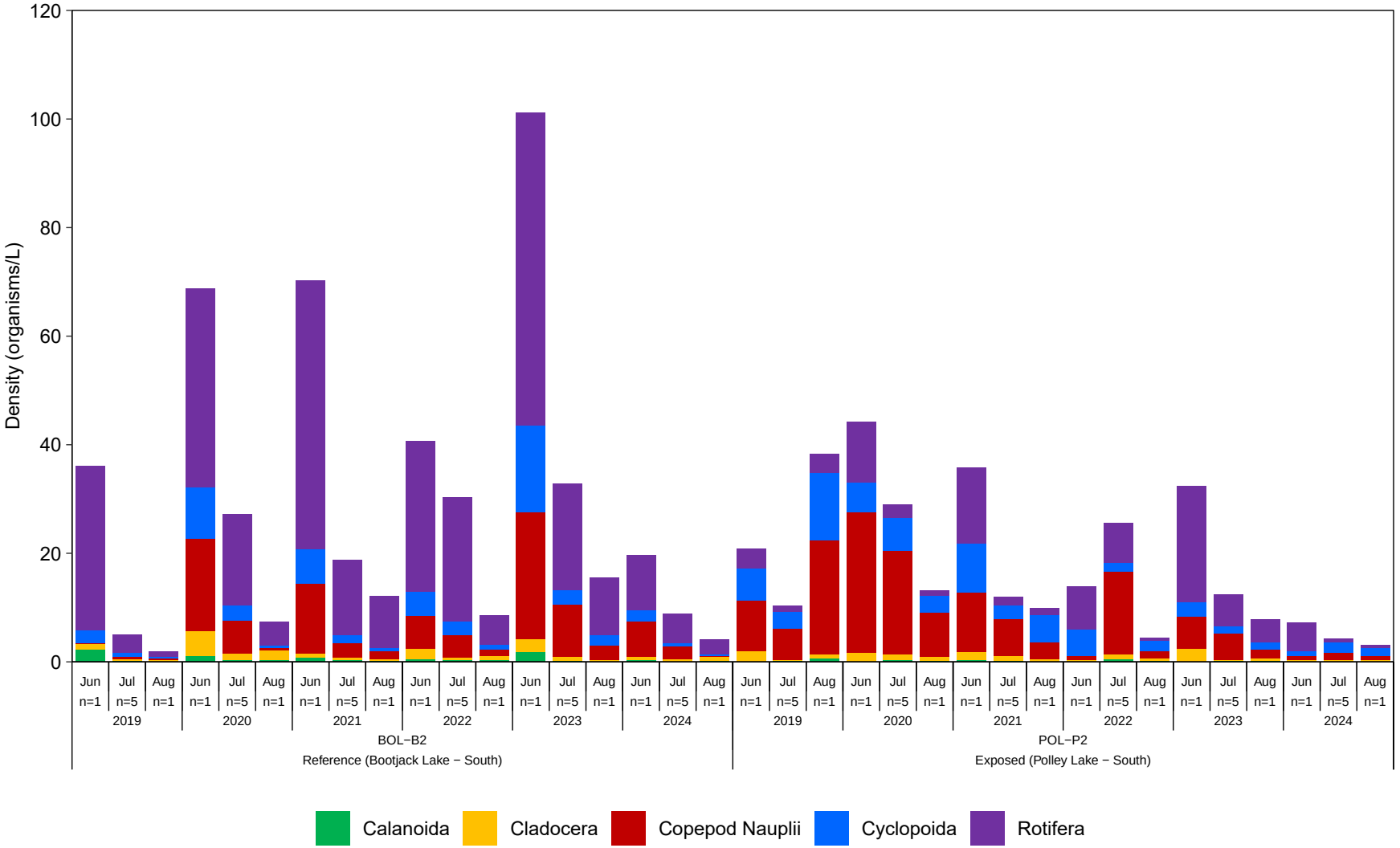


Figure E.2.6: Mean Densities of Major Zooplankton Taxa for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas, 2019 to 2024

Note: Results displayed for POL-P2 (August 2019; above) for the same sampling area and date differ from those presented in previous reports (Minnow 2020a, 2021a, 2022a) due to revised calculations.

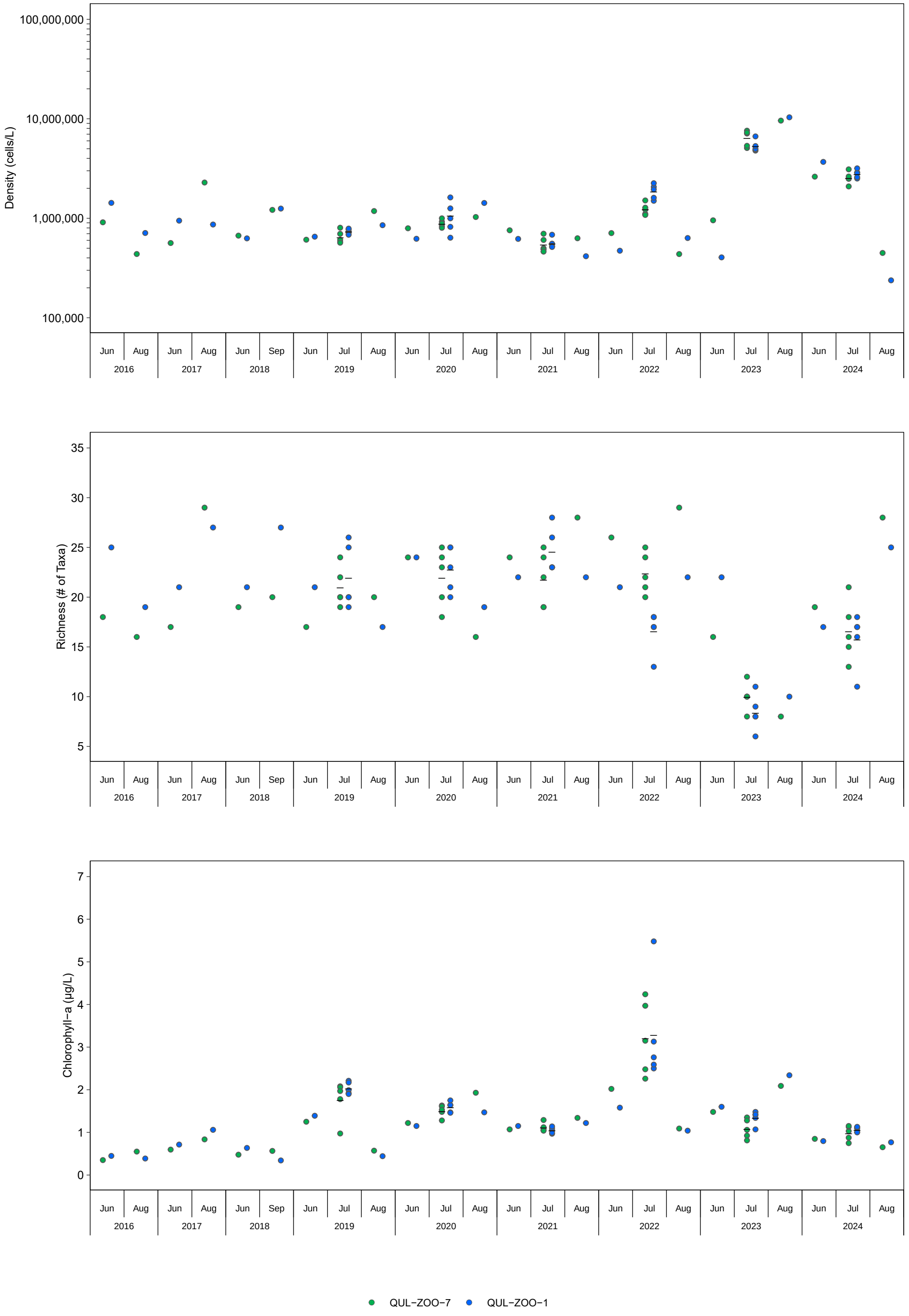


Figure E.2.7: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2016 to 2024

Notes: µg/L = micrograms per litre. Green represents reference data and blue represents exposed data. Black bars represent mean values.

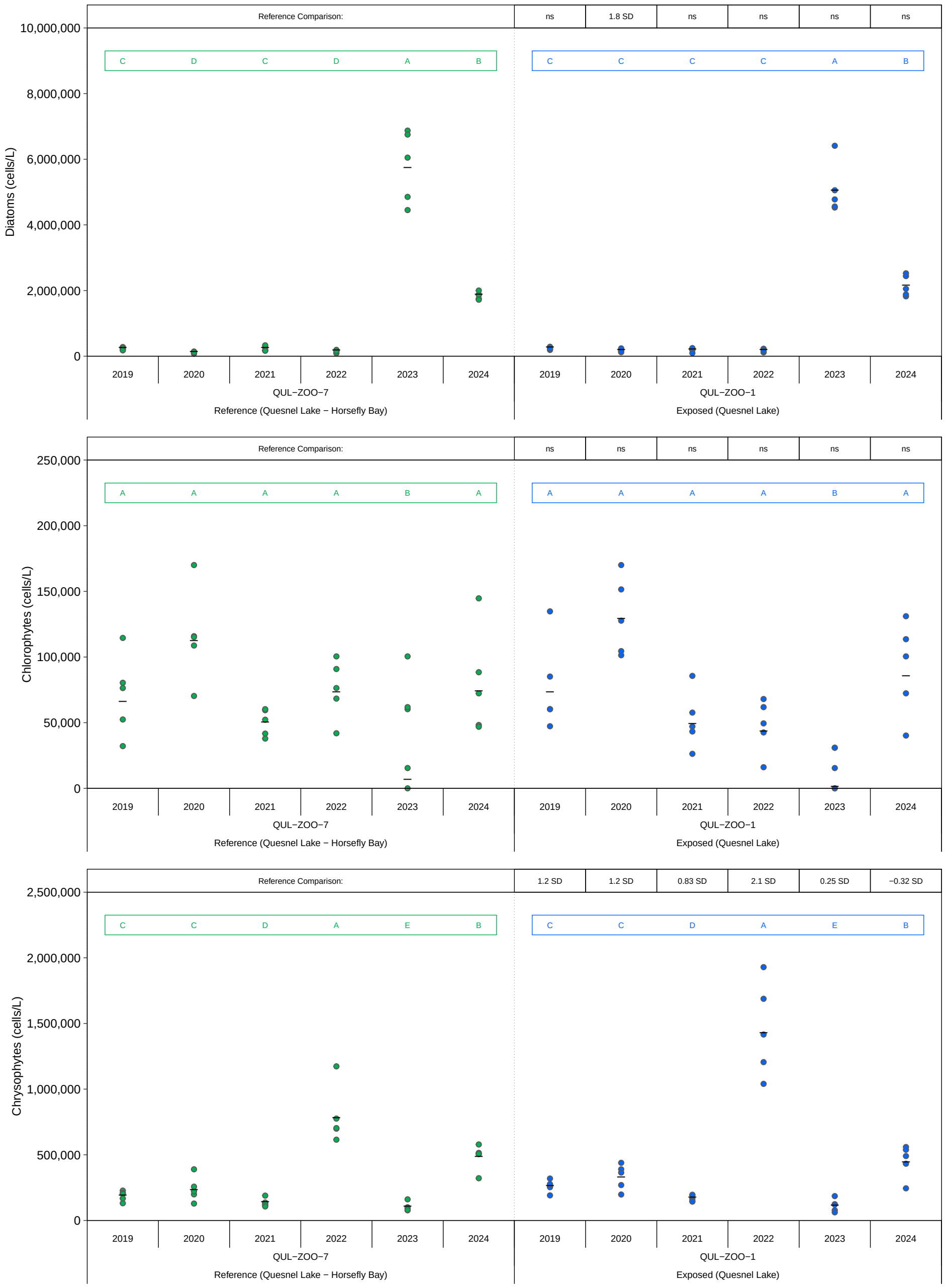


Figure E.2.8: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

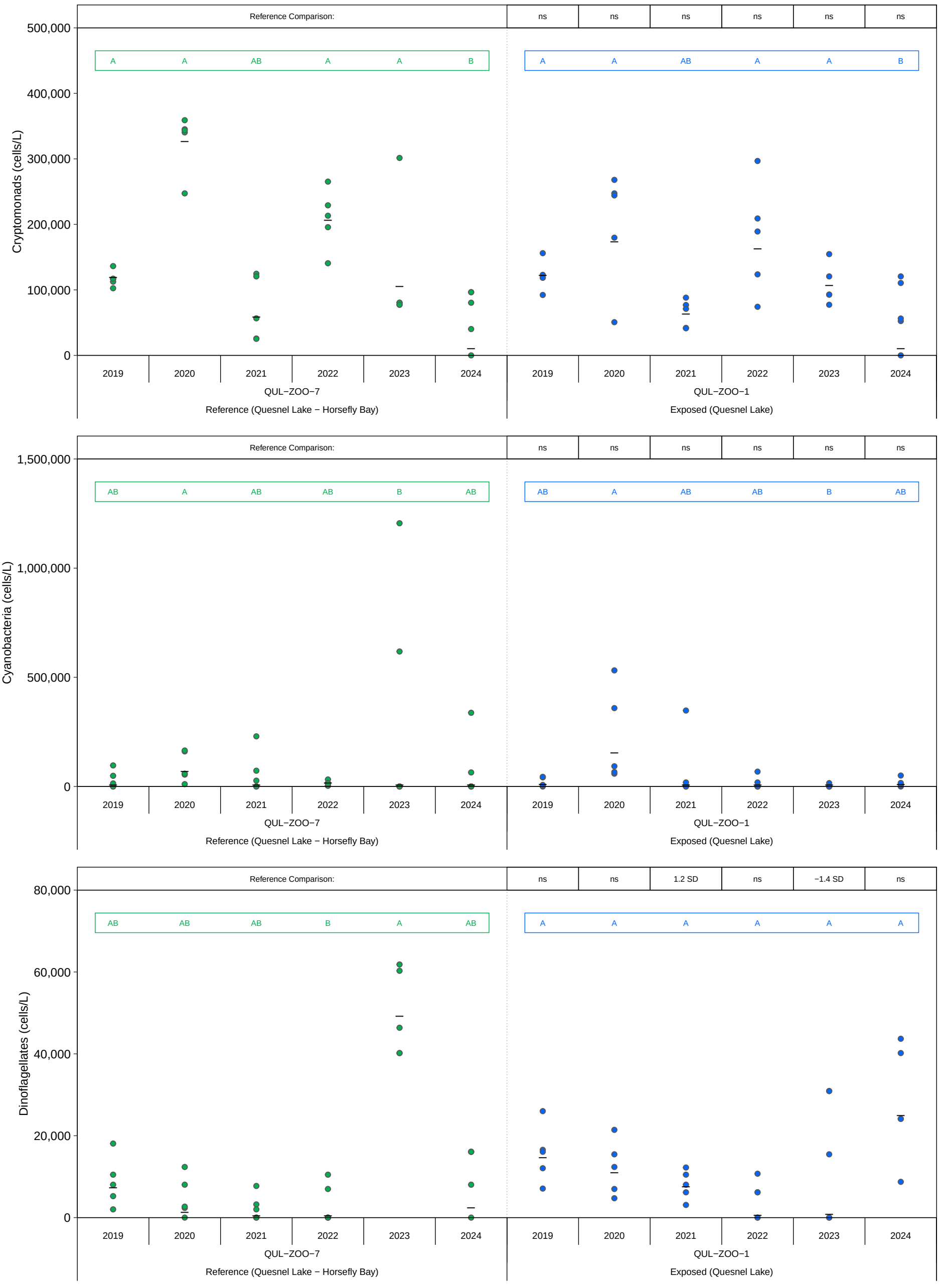
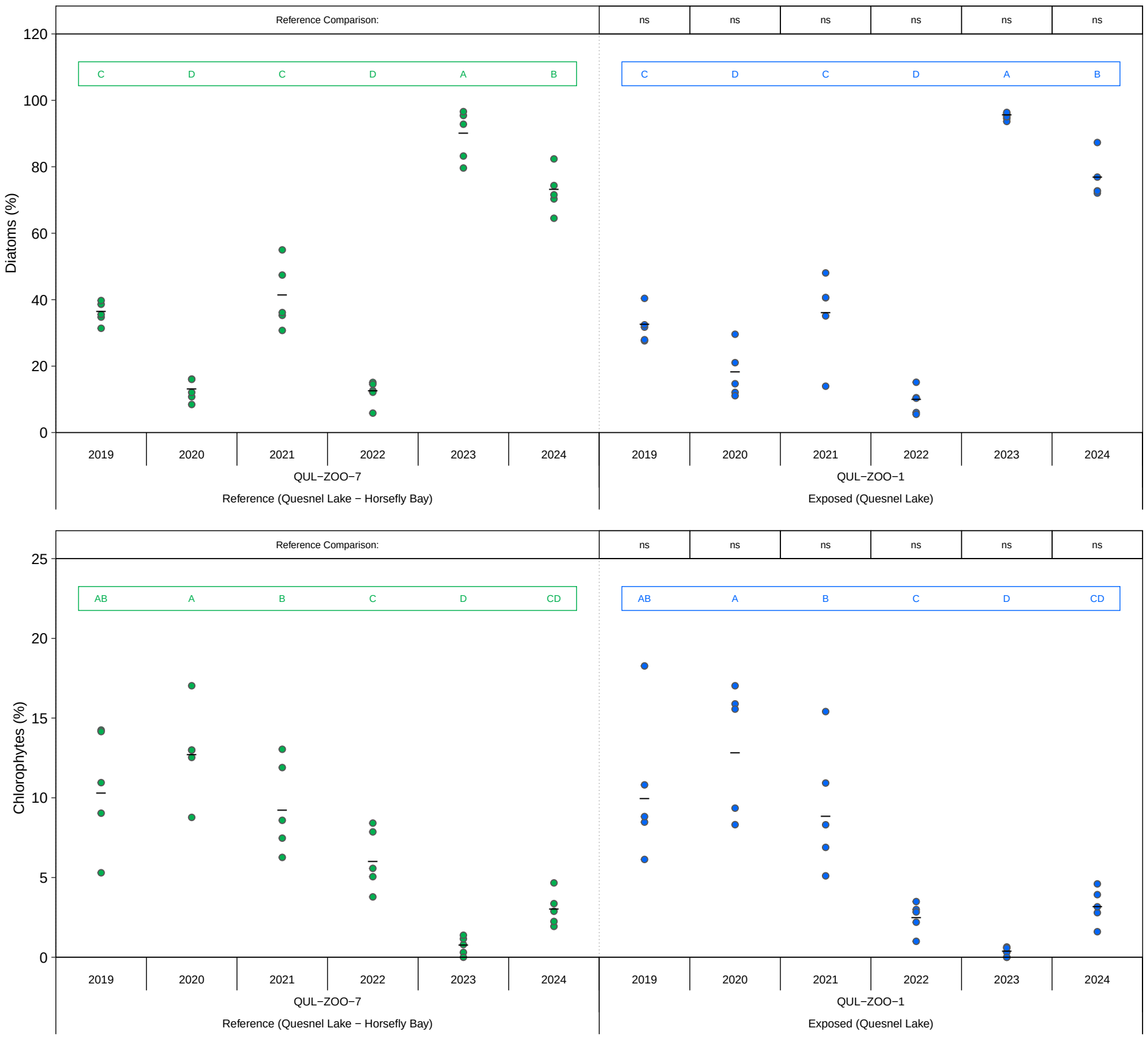


Figure E.2.8: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.



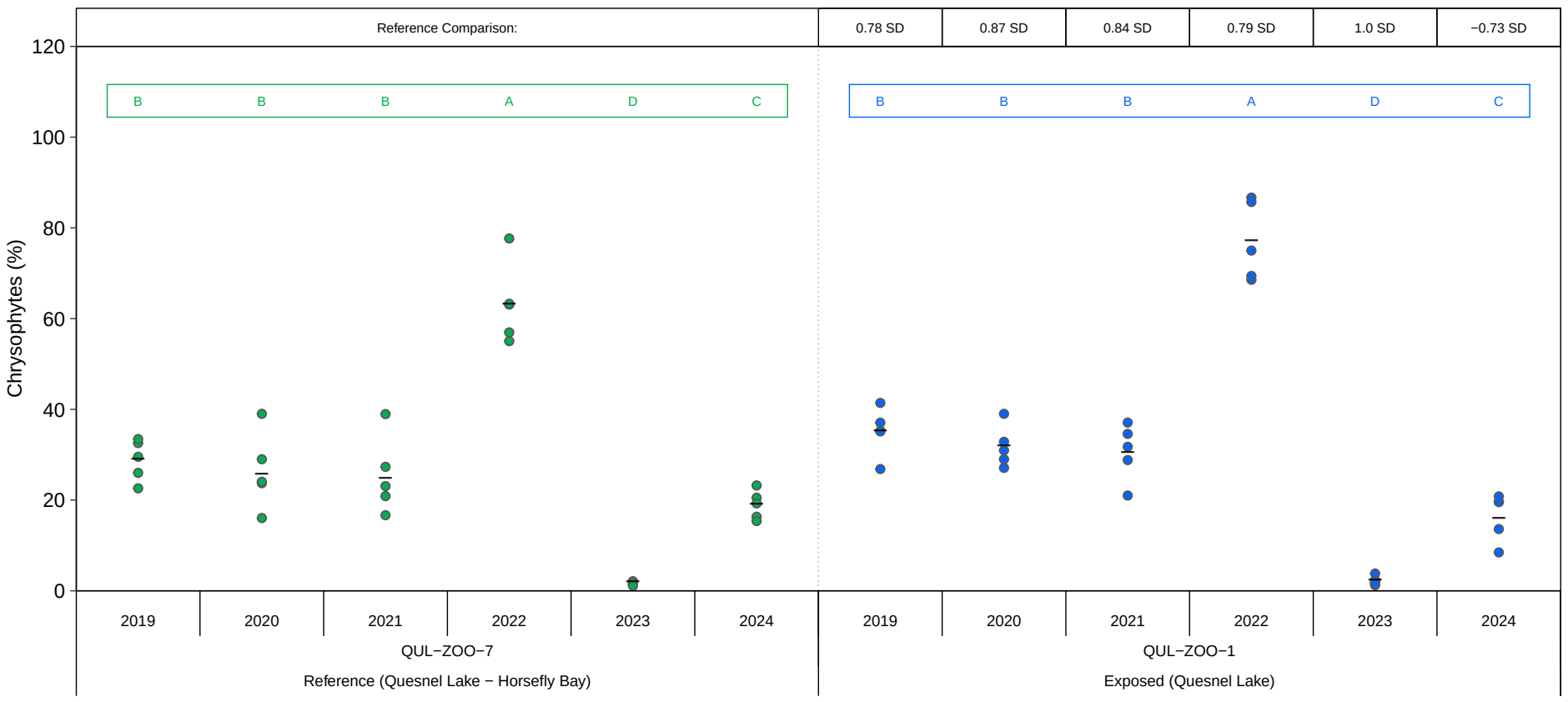


Figure E.2.8: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

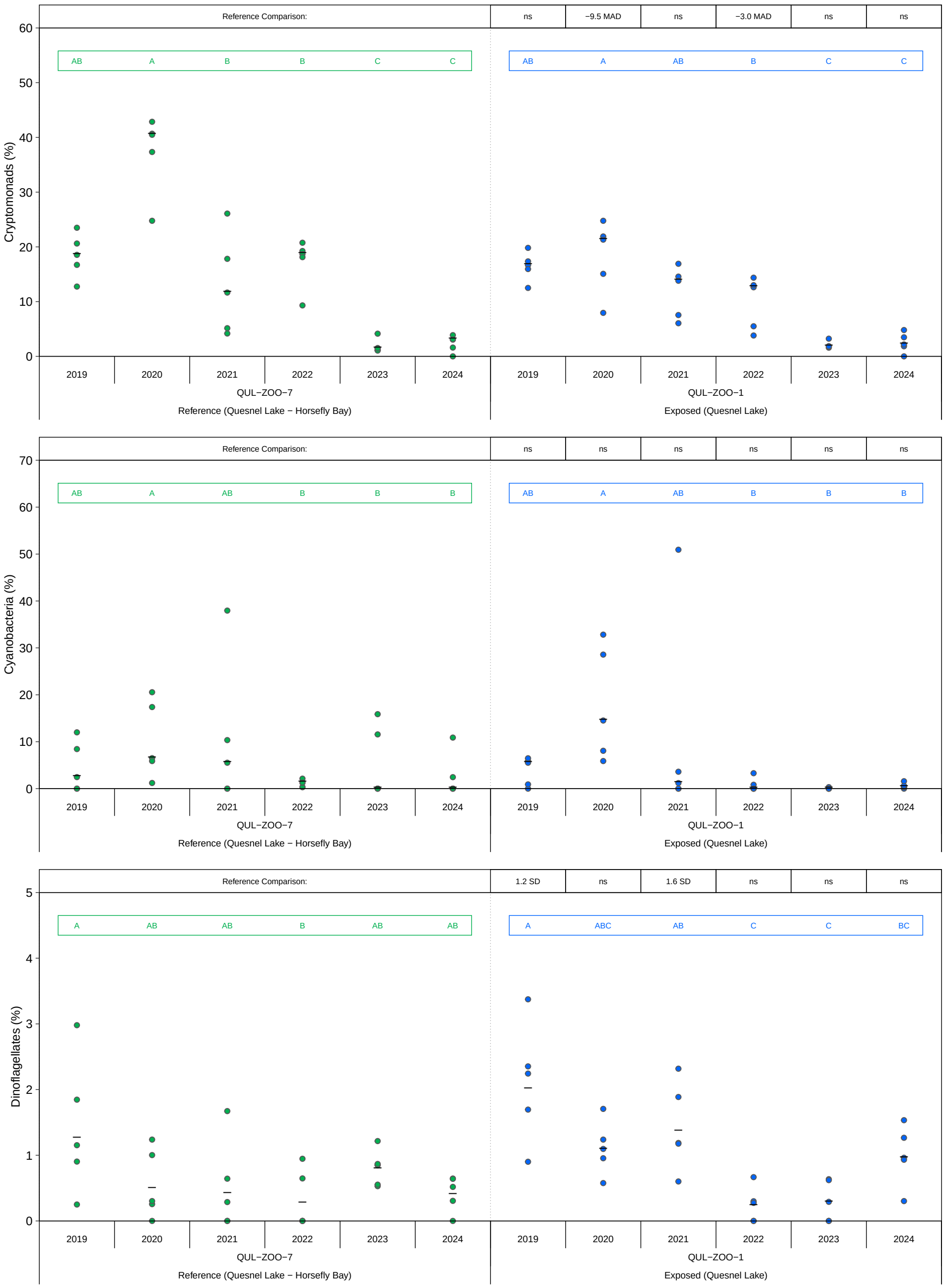


Figure E.2.8: Phytoplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value<0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast. For plots of phytoplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a). For single phytoplankton samples collected in June and August 2024, see Appendix Table C.3.5. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

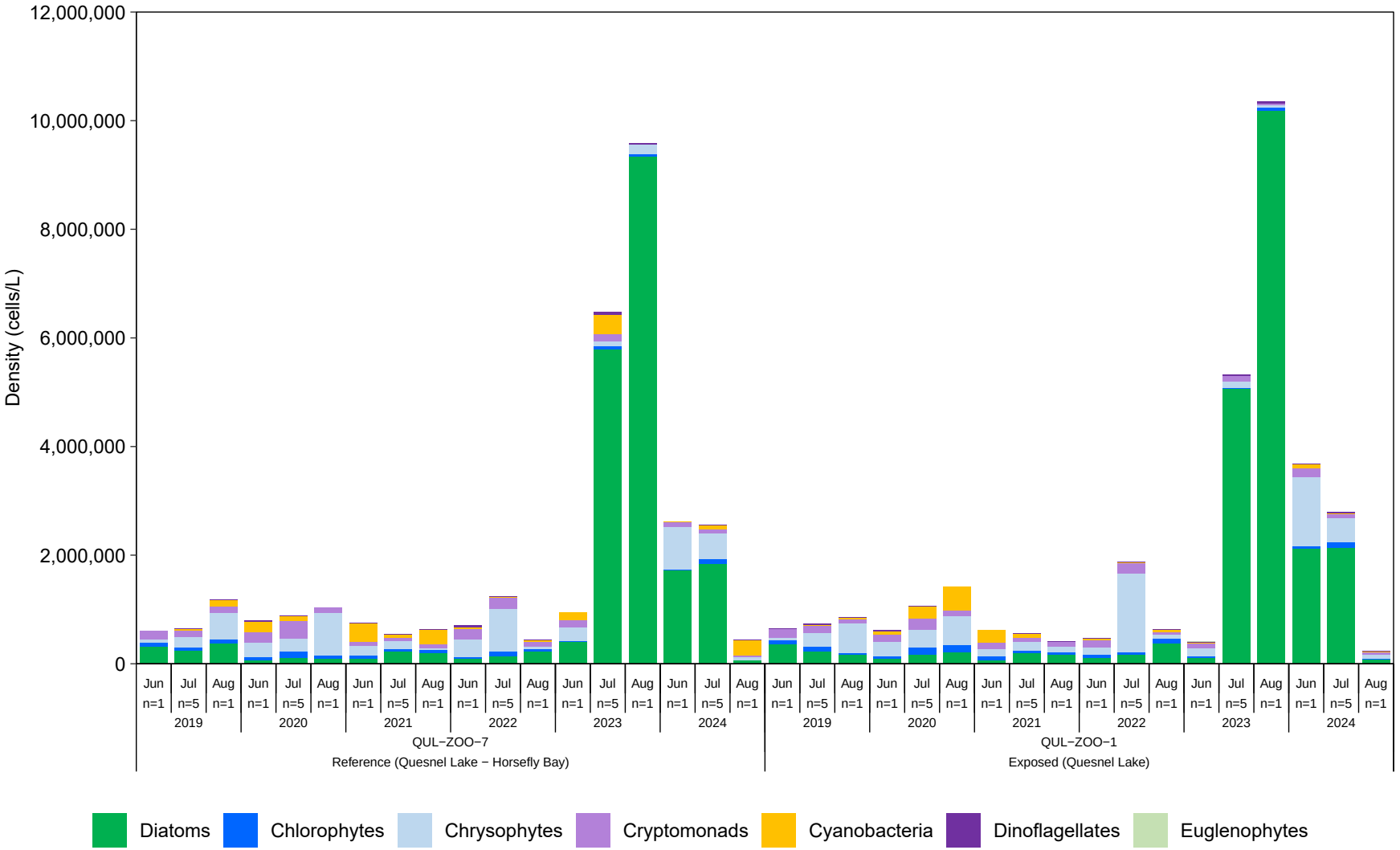


Figure E.2.9: Mean Densities of Major Phytoplankton Taxa for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2019 to 2024

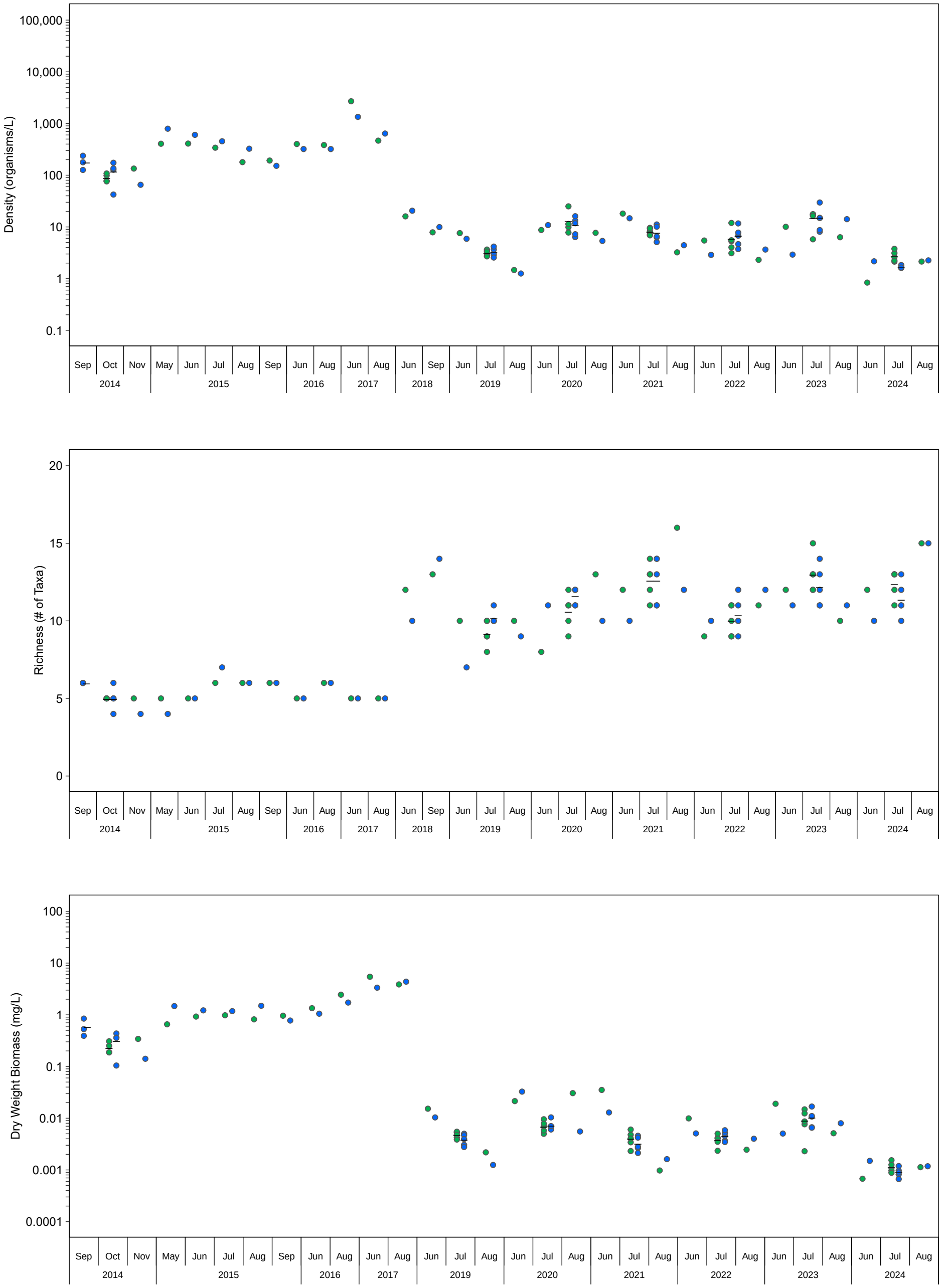


Figure E.2.10: Zooplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2014 to 2024

Notes: mg/L = milligrams per litre. Green represents reference data and blue represents exposed data. Black bars represent mean values.

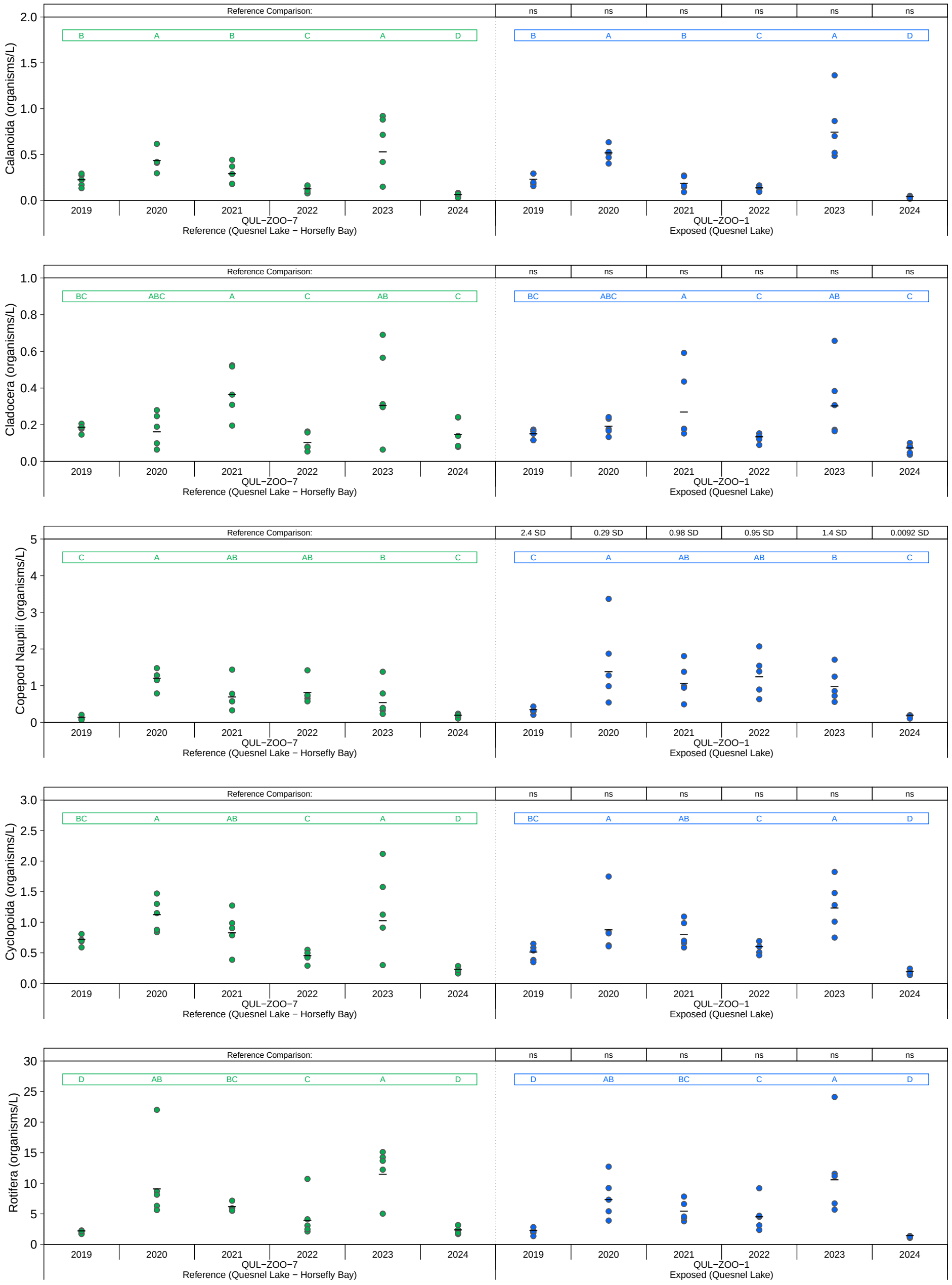


Figure E.2.11: Zooplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a, 2022a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.7.

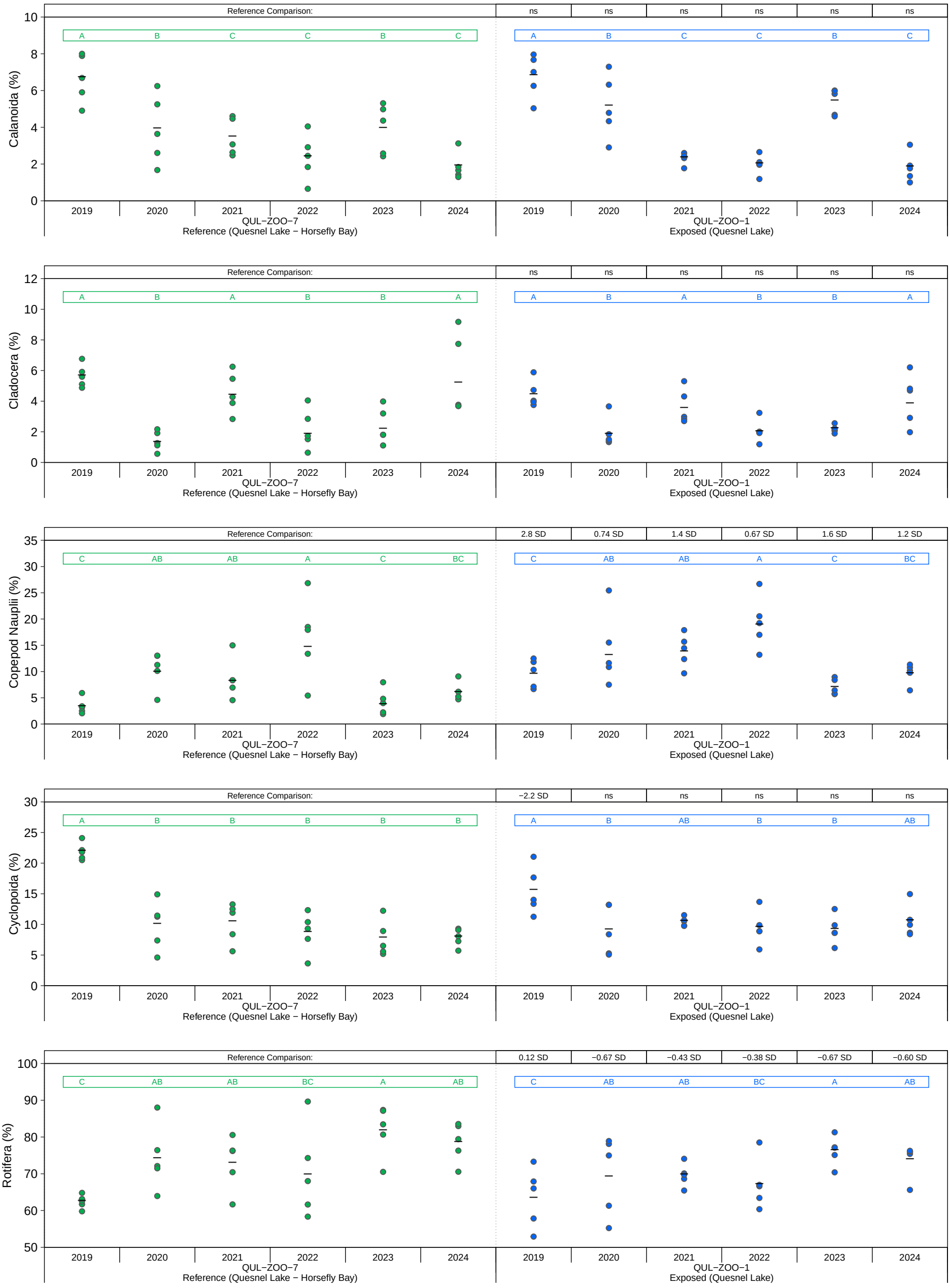


Figure E.2.11: Zooplankton Community Metrics for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas in July, 2019 to 2024

Notes: Green represents reference data and blue represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post hoc comparisons are expressed in units of standard deviation (SD). 'ns' indicates a non−significant contrast. For plots of zooplankton results prior to 2019, see Minnow (2019a, 2020a, 2021a, 2022a). For results of single zooplankton samples collected in June and August 2024, see Appendix Table C.3.7.

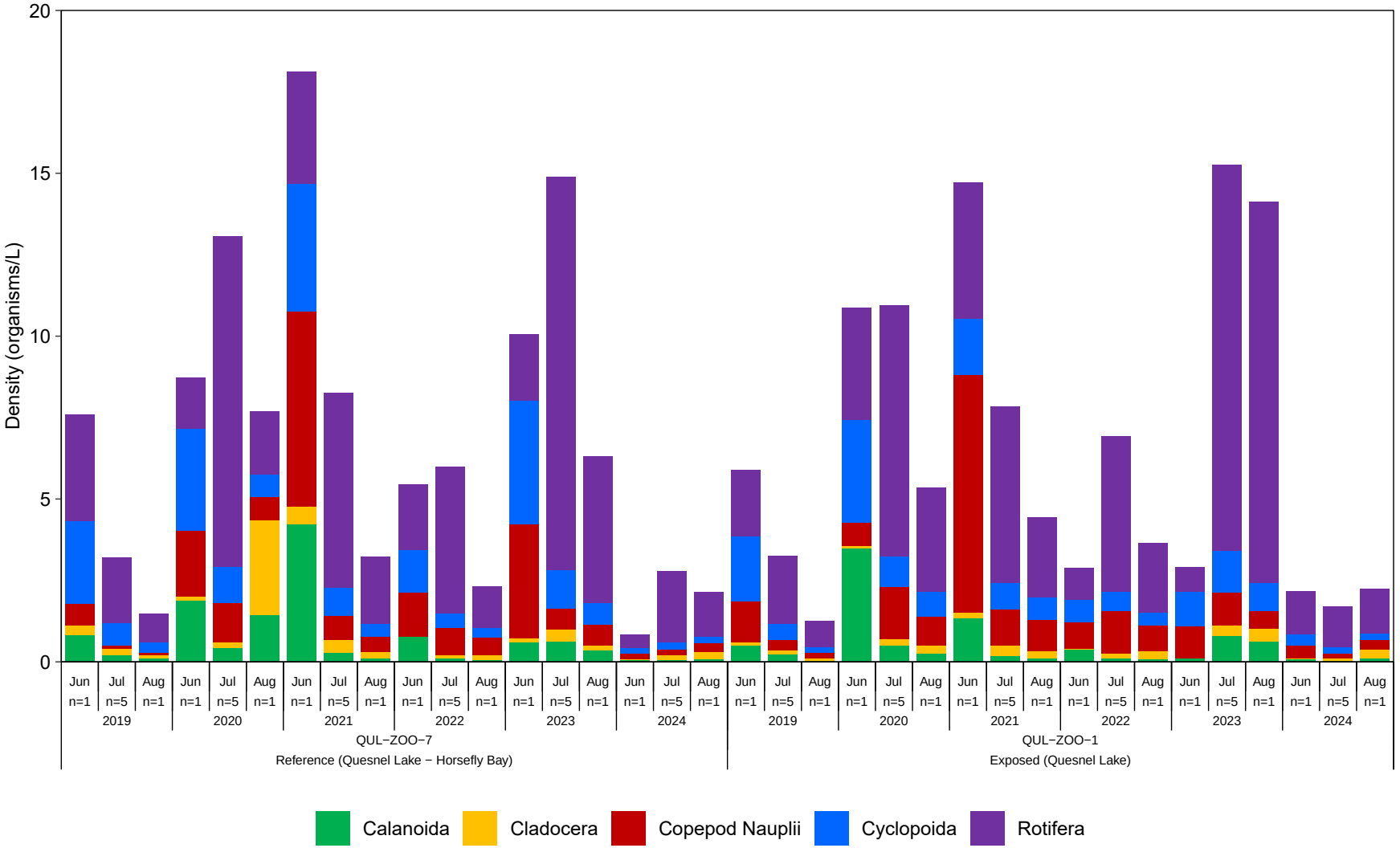


Figure E.2.12: Mean Densities of Major Zooplankton Taxa for the Quesnel Lake (QUL−ZOO−1; Exposed and QUL−ZOO−7; Reference) Monitoring Areas, 2019 to 2024

Table E.2.1: Statistical Comparisons of Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Diatoms (cells/L)	log10(x+1)	-	-	0.030	BOL-B2	Reference	2019	25,387	AB	B	AB	A	A	A	Baseline	ns	ns	ns	ns	ns	ns
							2020	1,125													1.3
							2021	13,521													-1.4
							2022	51,443													ns
							2023	63,194													ns
							2024	52,742													-1.1
					POL-P2	Exposed	2019	61,233	A	AB	B	A	A	AB	Baseline	ns	-2.3	ns	ns	ns	
							2020	11,010													
							2021	1,102													
							2022	132,652													
							2023	67,313													
							2024	7,401													
Chlorophyte (cells/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	278,118	A	B	C	B	AB	A	Baseline	-2.5	-4.3	-2.3	ns	ns	ns
							2020	280,330													2.5
							2021	44,413													2.4
							2022	443,934													3.4
							2023	200,250													ns
							2024	238,689													-1.9
					POL-P2	Exposed	2019	257,727	ABC	AB	CD	A	BCD	D	Baseline	ns	ns	ns	ns	-2.1	
							2020	280,330													
							2021	124,888													
							2022	443,934													
							2023	140,110													
							2024	107,363													
Chrysophyte (cells/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	563,030	A	C	C	B	B	A	Baseline	-6.6	-8.2	-3.3	-4.7	ns	1.5
							2020	54,989													5.8
							2021	32,094													5.5
							2022	174,143													4.5
							2023	108,035													5.8
							2024	325,792													2.6
					POL-P2	Exposed	2019	964,479	A	B	C	A	A	A	Baseline	-2.3	-4.2	ns	ns	ns	
							2020	425,720													
							2021	219,571													
							2022	443,934													
							2023	816,397													
							2024	806,533													
Cryptomonad (cells/L)	log10(x+1)	-	-	<0.001	BOL-B2	Reference	2019	169,323	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns
							2020	220,998													ns
							2021	277,719													ns
							2022	144,083													ns
							2023	328,019													ns
							2024	412,939													-4.1
					POL-P2	Exposed	2019	121,456	A	A	A	A	A	B	Baseline	ns	ns	ns	ns	-3.4	
							2020	268,135													
							2021	241,972													
							2022	849,603													
							2023	143,917													
							2024	443													
Cyanobacteria (cells/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	15,531,745	A	A	B	B	A	A	Baseline	ns	-5.8	-7.2	ns	ns	ns
							2020	15,358,522													-2.9
							2021	3,205,966													2.0
							2022	144,083													ns
							2023	10,454,461													2.1
							2024	9,972,404													-1.7
					POL-P2	Exposed	2019	17,030,989	A	B	B	C	A	B	Baseline	-3.2	-4.1	-6.6	ns	-3.7	
							2020	7,032,626													
							2021	5,494,837													
							2022	2,796,891													
							2023	18,520,017													
							2024	6,270,016													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. "nm" = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) =0. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL-B2 in 2024 only).

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.1: Statistical Comparisons of Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Dinoflagellates (cells/L)	log10(x+1)	-	-	<0.001	BOL-B2	Reference	2019	4.65	B	B	AB	AB	A	A	Baseline	ns	ns	ns	2.3	2.0	ns
							2020	3.58													1.5
							2021	531													-1.9
							2022	548													-1.4
							2023	12,833													ns
							2024	4,398													-2.0
					POL-P2	Exposed	2019	28.7	AB	A	B	AB	A	AB	Baseline	ns	ns	ns	ns	ns	
							2020	728													
							2021	0													
							2022	4.57													
							2022	1,930													
							2023	4.26													
Euglenophytes (cells/L)	log10(x+1)	-	-	<0.001	BOL-B2	Reference	2019	0	B	B	A	B	A	A	Baseline	ns	2.3	ns	4.1	3.6	ns
							2020	0													ns
							2021	127													-2.3
							2022	548													-1.4
							2023	5,412													-4.1
							2024	1,915													-3.6
					POL-P2	Exposed	2019	4.65	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	
							2020	0													
							2021	0													
							2022	4.57													
							2023	0													
							2024	0													
Diatoms (%)	rank	-	-	<0.001	BOL-B2	Reference	2019	0.110	BC	C	AB	A	A	AB	Baseline	ns	ns	23	3.9	ns	ns
							2020	0.0306													0.57
							2021	0.303													-2.3
							2022	2.78													ns
							2023	0.564													ns
							2024	0.499													-3.4
					POL-P2	Exposed	2019	0.390	BC	BC	C	A	B	BC	Baseline	ns	ns	32	ns	ns	
							2020	0.0968													
							2021	0.0399													
							2022	4.10													
							2023	0.466													
							2024	0.108													
Chlorophytes (%)	log10	-	-	<0.001	BOL-B2	Reference	2019	1.66	AB	C	BC	A	AB	AB	Baseline	-1.9	ns	ns	ns	ns	ns
							2020	0.620													3.4
							2021	1.23													ns
							2022	3.84													1.8
							2023	1.79													-1.8
							2024	2.16													ns
					POL-P2	Exposed	2019	1.39	CD	B	BC	A	D	BCD	Baseline	1.8	ns	3.8	ns	ns	
							2020	3.47													
							2021	2.04													
							2022	9.79													
							2023	0.705													
							2024	1.48													
Chrysophytes (%)	log10	-	-	<0.001	BOL-B2	Reference	2019	3.36	AB	D	C	A	C	B	Baseline	-5.4	-3.2	ns	-3.0	ns	ns
							2020	0.349													6.4
							2021	0.887													3.3
							2022	6.43													2.5
							2023	0.963													3.4
							2024	2.94													3.2
					POL-P2	Exposed	2019	5.21	C	BC	C	A	C	AB	Baseline	ns	ns	3.0	ns	1.8	
							2020	5.27													
							2021	3.59													
							2022	18.7													
							2023	4.11													
							2024	11.1													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. "nm" = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) =0. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL-B2 in 2024 only.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.1: Statistical Comparisons of Phytoplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Cryptomonads (%)	rank	-	-	<0.001	BOL-B2	Reference	2019	1.03	D	CD	A	A	BC	AB	Baseline	ns	19	11	4.4	5.9	ns
							2020	1.44													4.0
							2021	9.43													-9.7
							2022	6.07													ns
							2023	2.99													-5.2
							2024	3.67													-8.0
					POL-P2	Exposed	2019	0.607	B	A	A	A	B	B	Baseline	5.9	10.0	12	ns	ns	
							2020	3.23													
							2021	5.07													
							2022	5.77													
							2023	0.665													
							2024	0.0884													
Cyanobacteria (%)	none	-	-	<0.001	BOL-B2	Reference	2019	92.8	AB	A	B	C	AB	B	Baseline	ns	ns	-3.1	ns	ns	ns
							2020	97.5													-2.6
							2021	88.7													ns
							2022	80.8													-4.8
							2023	93.2													ns
							2024	90.1													ns
					POL-P2	Exposed	2019	92.0	A	A	A	B	A	A	Baseline	ns	ns	-7.6	ns	ns	
							2020	87.1													
							2021	89.8													
							2022	62.0													
							2023	93.2													
							2024	86.3													
Dinoflagellates (%)	rank	-	-	0.001	BOL-B2	Reference	2019	0	B	B	A	A	A	AB	Baseline	ns	402	348	565	ns	ns
							2020	0													178
							2021	0.0910													-402
							2022	0.0789													-348
							2023	0.128													-326
							2024	0.0346													-153
					POL-P2	Exposed	2019	0	AB	AB	B	AB	A	AB	Baseline	ns	ns	ns	ns	ns	
							2020	0.0404													
							2021	0													
							2022	0													
							2023	0.0541													
							2024	0													
Euglenophytes (%)	rank	-	-	<0.001	BOL-B2	Reference	2019	0	B	B	A	B	A	A	Baseline	ns	nm	ns	nm	nm	ns
							2020	0													ns
							2021	0.0558													nm
							2022	0													ns
							2023	0.0363													nm
							2024	0.103													nm
					POL-P2	Exposed	2019	0	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	
							2020	0													
							2021	0													
							2022	0													
							2023	0													
							2024	0													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. "nm" = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) =0. Radiophytes were excluded from the statistical comparisons because of insufficient data (i.e., this taxon was reported at BOL-B2 in 2024 only.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.2: Statistical Comparisons of Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Calanoida (organisms/L)	log10	0.591	<0.001	0.172	BOL-B2	Reference	2019	0.135	BC	A	AB	A	BC	C	Baseline	2.2	ns	1.5	ns	ns	ns
							2020	0.429													ns
							2021	0.371													ns
							2022	0.294													ns
							2023	0.154													ns
							2024	0.0899													ns
					POL-P2	Exposed	2019	0.139	BC	A	AB	A	BC	C	Baseline	1.6	ns	2.4	ns	ns	
							2020	0.321													
							2021	0.173													
							2022	0.485													
							2023	0.167													
							2024	0.0896													
Cladocera (organisms/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	0.345	B	A	B	B	AB	B	Baseline	2.7	ns	ns	ns	ns	-1.1
							2020	1.07													ns
							2021	0.395													1.8
							2022	0.459													1.7
							2023	0.560													-2.7
							2024	0.418													-1.7
					POL-P2	Exposed	2019	0.214	B	A	A	A	B	B	Baseline	3.4	3.2	3.5	ns	ns	
							2020	0.896													
							2021	0.834													
							2022	0.926													
							2023	0.180													
							2024	0.206													
Copepod Nauplii (organisms/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	0.407	C	AB	B	AB	A	B	Baseline	4.3	2.7	3.8	5.2	2.7	3.9
							2020	5.28													2.1
							2021	2.06													1.8
							2022	3.91													2.1
							2023	9.02													-1.2
							2024	2.10													ns
					POL-P2	Exposed	2019	4.25	C	A	BC	AB	C	D	Baseline	2.5	ns	2.0	ns	-2.2	
							2020	18.8													
							2021	6.05													
							2022	14.2													
							2023	4.42													
							2024	1.11													
Cyclopoida (organisms/L)	log10	-	-	<0.001	BOL-B2	Reference	2019	0.644	B	A	A	A	A	B	Baseline	3.6	1.8	3.2	3.2	ns	3.5
							2020	2.67													2.0
							2021	1.34													1.5
							2022	2.33													ns
							2023	2.33													-1.3
							2024	0.616													2.3
					POL-P2	Exposed	2019	2.58	B	A	B	B	B	B	Baseline	2.1	ns	ns	ns	ns	
							2020	5.94													
							2021	2.40													
							2022	1.55													
							2023	1.37													
							2024	1.53													
Rotifera (organisms/L)	log10	-	-	0.001	BOL-B2	Reference	2019	3.16	B	A	A	A	A	B	Baseline	4.5	3.8	5.3	4.9	ns	-2.9
							2020	16.7													-5.3
							2021	12.6													-6.0
							2022	22.0													-3.1
							2023	19.5													-3.5
							2024	5.04													-5.5
					POL-P2	Exposed	2019	1.11	CD	B	BC	A	A	D	Baseline	2.0	ns	5.1	4.3	ns	
							2020	2.34													
							2021	1.39													
							2022	7.14													
							2023	5.47													
							2024	0.655													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.2: Statistical Comparisons of Zooplankton Community Metrics for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	POL-P2
Calanoida (%)	log10	-	-	<0.001	BOL-B2	Reference	2019	2.78	A	AB	AB	BC	C	B	Baseline	ns	ns	-2.3	-4.0	-2.2	-1.2
							2020	1.60													ns
							2021	2.17													ns
							2022	0.996													1.5
							2023	0.477													2.5
							2024	1.06													1.6
					POL-P2	Exposed	2019	1.60	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	
							2020	1.13													
							2021	1.53													
							2022	1.93													
							2023	1.42													
							2024	2.18													
Cladocera (%)	log10	-	-	<0.001	BOL-B2	Reference	2019	7.13	A	AB	BC	C	C	AB	Baseline	ns	-2.5	-3.3	-3.1	ns	-2.3
							2020	3.98													ns
							2021	2.31													2.6
							2022	1.55													1.9
							2023	1.73													ns
							2024	4.94													ns
					POL-P2	Exposed	2019	2.47	BC	BC	A	AB	C	AB	Baseline	ns	2.4	ns	ns	ns	
							2020	3.15													
							2021	7.38													
							2022	3.68													
							2023	1.54													
							2024	5.01													
Copepod Nauplii (%)	log10	-	-	<0.001	BOL-B2	Reference	2019	8.40	D	ABC	CD	BCD	A	AB	Baseline	2.2	ns	ns	3.2	2.9	4.6
							2020	19.7													3.2
							2021	12.1													3.9
							2022	13.2													3.8
							2023	27.9													ns
							2024	24.8													ns
					POL-P2	Exposed	2019	48.9	AB	A	A	A	AB	B	Baseline	ns	ns	ns	ns	ns	
							2020	65.9													
							2021	53.6													
							2022	56.5													
							2023	37.6													
							2024	27.0													
Cyclopoida (%)	log10	-	-	0.001	BOL-B2	Reference	2019	13.3	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	1.8
							2020	9.93													1.7
							2021	7.82													2.3
							2022	7.86													ns
							2023	7.18													1.1
							2024	7.29													3.7
					POL-P2	Exposed	2019	29.7	A	AB	AB	C	BC	A	Baseline	ns	ns	-3.6	-2.1	ns	
							2020	20.9													
							2021	21.2													
							2022	6.17													
							2023	11.7													
							2024	37.2													
Rotifera (%)	none	-	-	<0.001	BOL-B2	Reference	2019	65.5	AB	B	A	A	B	B	Baseline	ns	ns	ns	ns	ns	-9.0
							2020	62.5													-9.8
							2021	73.6													-11
							2022	74.7													-8.3
							2023	60.6													-2.5
							2024	59.9													-7.9
					POL-P2	Exposed	2019	15.4	C	C	C	B	A	C	Baseline	ns	ns	2.5	5.6	ns	
							2020	8.55													
							2021	12.7													
							2022	29.1													
							2023	46.7													
							2024	16.4													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.3: Statistical Comparisons of Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Diatoms (cells/L)	log10	-	-	0.092	QUL-ZOO-7	Reference	2019	231,616	C	D	C	D	A	B	Baseline	-3.1	ns	-2.0	13	8.5	ns
							2020	109,236													1.8
							2021	217,305													ns
							2022	141,016													ns
							2023	5,709,054													ns
							2024	1,841,505													ns
					QUL-ZOO-1	Exposed	2019	233,728	C	C	C	C	A	B	Baseline	ns	ns	ns	13	9.1	
							2020	167,090													
							2021	183,565													
							2022	141,016													
							2023	5,022,655													
							2024	2,126,083													
Chlorophyte (cells/L)	log10(x+1)	0.409	<0.001	0.693	QUL-ZOO-7	Reference	2019	65,275	A	A	A	A	B	A	Baseline	ns	ns	ns	-1.1	ns	ns
							2020	111,660													ns
							2021	49,457													ns
							2022	72,460													ns
							2023	5,655													ns
							2024	73,139													ns
					QUL-ZOO-1	Exposed	2019	72,265	A	A	A	A	B	A	Baseline	ns	ns	ns	-2.4	ns	
							2020	128,345													
							2021	48,356													
							2022	72,460													
							2023	429													
							2024	84,658													
Chrysophyte (cells/L)	log10	0.002	<0.001	0.130	QUL-ZOO-7	Reference	2019	184,147	C	C	D	A	E	B	Baseline	ns	-1.2	5.0	-2.2	3.3	1.2
							2020	224,375													1.2
							2021	132,320													0.83
							2022	772,584													2.1
							2023	98,574													0.25
							2024	476,433													-0.32
					QUL-ZOO-1	Exposed	2019	256,472	C	C	D	A	E	B	Baseline	ns	-1.5	6.0	-3.1	1.9	
							2020	319,246													
							2021	167,672													
							2022	772,584													
							2023	105,737													
							2024	435,171													
Cryptomonad (cells/L)	log10(x+1)	0.823	0.005	0.999	QUL-ZOO-7	Reference	2019	116,488	A	A	AB	A	A	B	Baseline	ns	ns	ns	ns	-1.3	ns
							2020	324,272													ns
							2021	56,029													ns
							2022	204,382													ns
							2023	103,073													ns
							2024	7,862													ns
					QUL-ZOO-1	Exposed	2019	119,978	A	A	AB	A	A	B	Baseline	ns	ns	ns	ns	-1.3	
							2020	171,268													
							2021	60,862													
							2022	204,382													
							2023	104,381													
							2024	8,296													
Cyanobacteria (cells/L)	log10(x+1)	0.662	0.037	0.446	QUL-ZOO-7	Reference	2019	580	AB	A	AB	AB	B	AB	Baseline	ns	ns	ns	ns	ns	ns
							2020	61,874													ns
							2021	850													ns
							2022	10,030													ns
							2023	236													ns
							2024	116													ns
					QUL-ZOO-1	Exposed	2019	3,548	AB	A	AB	AB	B	AB	Baseline	ns	ns	ns	ns	ns	
							2020	147,047													
							2021	524													
							2022	65.1													
							2023	5.88													
							2024	2,242													

P-value < 0.05.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.3: Statistical Comparisons of Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas: Pairwise Comparisons Between Years						Temporal Contrasts Within Areas: MOD Relative to Baseline[b]						Spatial Comparison Within Years[b]
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Dinoflagellates (cells/L)	log10(x+1)	-	-	0.086	QUL-ZOO-7	Reference	2019	6,937	AB	AB	AB	B	A	AB	Baseline	ns	ns	ns	ns	ns	ns
							2020	911													ns
							2021	137													1.2
							2022	36.4													ns
							2023	48,886													-1.4
							2024	2,016													ns
					QUL-ZOO-1	Exposed	2019	14,270	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	
							2020	10,625													
							2021	7,226													
							2022	209													
							2023	429													
							2024	24,551													
Diatoms (%)	none	0.814	<0.001	0.280	QUL-ZOO-7	Reference	2019	36.0	C	D	C	D	A	B	Baseline	-3.4	ns	-3.5	7.9	5.4	ns
							2020	12.7													ns
							2021	40.9													ns
							2022	12.1													ns
							2023	89.5													ns
							2024	72.6													ns
					QUL-ZOO-1	Exposed	2019	32.0	C	D	C	D	A	B	Baseline	-2.1	ns	-3.3	9.3	6.6	
							2020	17.7													
							2021	35.7													
							2022	12.1													
							2023	95.1													
							2024	76.3													
Chlorophytes (%)	log10(x+1)	0.332	<0.001	0.557	QUL-ZOO-7	Reference	2019	10.7	AB	A	B	C	D	CD	Baseline	ns	ns	-1.7	-3.8	-2.9	ns
							2020	12.8													ns
							2021	9.42													ns
							2022	6.12													ns
							2023	0.726													ns
							2024	3.01													ns
					QUL-ZOO-1	Exposed	2019	10.4	AB	A	B	C	D	CD	Baseline	ns	ns	-3.0	-3.8	-2.7	
							2020	13.2													
							2021	9.27													
							2022	6.12													
							2023	0.307													
							2024	3.21													
Chrysophytes (%)	log10	0.025	<0.001	0.387	QUL-ZOO-7	Reference	2019	28.5	B	B	B	A	D	C	Baseline	ns	ns	3.1	-12	-1.7	0.78
							2020	25.3													0.87
							2021	24.3													0.84
							2022	62.7													0.79
							2023	1.54													1.0
							2024	18.7													-0.73
					QUL-ZOO-1	Exposed	2019	34.8	B	B	B	A	D	C	Baseline	ns	ns	3.1	-11	-3.2	
							2020	31.5													
							2021	30.1													
							2022	62.7													
							2023	2.00													
							2024	15.6													
Cryptomonads (%)	rank	-	-	0.081	QUL-ZOO-7	Reference	2019	18.5	AB	A	B	B	C	C	Baseline	ns	ns	ns	-8.5	-7.7	ns
							2020	40.5													-9.5
							2021	11.7													ns
							2022	18.7													-3.0
							2023	1.45													ns
							2024	3.06													ns
					QUL-ZOO-1	Exposed	2019	16.7	AB	A	AB	B	C	C	Baseline	ns	ns	ns	-7.4	-7.2	
							2020	21.3													
							2021	13.8													
							2022	18.7													
							2023	1.81													
							2024	2.17													

P-value < 0.05

Magnitude of Difference (MOD) < -2

Magnitude of Difference (MOD) > 2

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.3: Statistical Comparisons of Phytoplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Cyanobacteria (%)	rank	0.388	0.001	0.705	QUL-ZOO-7	Reference	2019	2.46	AB	A	AB	B	B	B	Baseline	ns	ns	ns	ns	ns	ns
							2020	6.50													ns
							2021	5.52													ns
							2022	1.26													ns
							2023	0													ns
							2024	0													ns
					QUL-ZOO-1	Exposed	2019	5.52	AB	A	AB	B	B	B	Baseline	ns	ns	ns	ns	ns	
							2020	14.5													
							2021	1.19													
							2022	0													
							2023	0													
							2024	0.321													
Dinoflagellates (%)	log10(x+1)	-	-	0.080	QUL-ZOO-7	Reference	2019	1.42	A	AB	AB	B	AB	AB	Baseline	ns	ns	-1.9	ns	ns	1.2
							2020	0.559													ns
							2021	0.519													1.6
							2022	0.318													ns
							2023	0.802													ns
							2024	0.422													ns
					QUL-ZOO-1	Exposed	2019	2.11	A	ABC	AB	C	C	BC	Baseline	ns	ns	-3.2	-3.1	-1.9	
							2020	1.11													
							2021	1.43													
							2022	0.248													
							2023	0.309													
							2024	0.998													

P-value < 0.05
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance. "-" = no data available. "ns" = non significant. Euglenophytes were recorded in June 2023, so were excluded from statistical analyses that focus on July data only.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.4: Statistical Comparisons of Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Calanoida (organisms/L)	log10	0.651	<0.001	0.109	QUL-ZOO-7	Reference	2019	0.209	B	A	B	C	A	D	Baseline	1.7	ns	-1.6	2.2	-3.6	ns
							2020	0.419													ns
							2021	0.273													ns
							2022	0.109													ns
							2023	0.515													ns
							2024	0.0480													ns
					QUL-ZOO-1	Exposed	2019	0.216	B	A	B	C	A	D	Baseline	2.1	ns	-1.4	3.0	-5.0	
							2020	0.503													
							2021	0.172													
							2022	0.109													
							2023	0.731													
							2024	0.0286													
Cladocera (organisms/L)	log10	0.276	<0.001	0.223	QUL-ZOO-7	Reference	2019	0.179	BC	ABC	A	C	AB	C	Baseline	ns	1.4	ns	ns	ns	ns
							2020	0.152													ns
							2021	0.359													ns
							2022	0.0966													ns
							2023	0.297													ns
							2024	0.140													ns
					QUL-ZOO-1	Exposed	2019	0.142	BC	ABC	A	C	AB	C	Baseline	ns	1.2	ns	ns	ns	
							2020	0.185													
							2021	0.262													
							2022	0.0966													
							2023	0.294													
							2024	0.0644													
Copepod Nauplii (organisms/L)	log10	<0.001	<0.001	0.139	QUL-ZOO-7	Reference	2019	0.101	C	A	AB	AB	B	C	Baseline	5.3	4.1	4.4	3.5	ns	2.4
							2020	1.17													0.29
							2021	0.656													0.98
							2022	0.777													0.95
							2023	0.504													1.4
							2024	0.160													0.0092
					QUL-ZOO-1	Exposed	2019	0.302	C	A	AB	AB	B	C	Baseline	3.3	2.7	3.0	2.5	ns	
							2020	1.34													
							2021	1.03													
							2022	0.777													
							2023	0.941													
							2024	0.161													
Cyclopoida (organisms/L)	log10	0.537	<0.001	0.242	QUL-ZOO-7	Reference	2019	0.696	BC	A	AB	C	A	D	Baseline	1.3	ns	ns	1.1	-3.4	ns
							2020	1.10													ns
							2021	0.808													ns
							2022	0.429													ns
							2023	1.01													ns
							2024	0.211													ns
					QUL-ZOO-1	Exposed	2019	0.486	BC	A	AB	C	A	D	Baseline	1.6	ns	ns	2.6	-2.9	
							2020	0.853													
							2021	0.782													
							2022	0.429													
							2023	1.21													
							2024	0.174													
Rotifera (organisms/L)	log10	0.197	<0.001	0.540	QUL-ZOO-7	Reference	2019	1.99	D	AB	BC	C	A	D	Baseline	3.7	2.7	1.5	4.3	ns	ns
							2020	8.87													ns
							2021	5.96													ns
							2022	3.72													ns
							2023	11.3													ns
							2024	2.13													ns
					QUL-ZOO-1	Exposed	2019	2.03	D	AB	BC	C	A	D	Baseline	3.1	2.3	1.8	4.0	ns	
							2020	7.10													
							2021	5.21													
							2022	3.72													
							2023	10.3													
							2024	1.25													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance; "-" = no data available. "ns" = non significant.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

Table E.2.4: Statistical Comparisons of Zooplankton Community Metrics for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Area	Type	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years[b]
									Pairwise Comparisons Between Years						MOD Relative to Baseline[b]						
		Area	Year	Area x Year					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	QUL-ZOO-1
Calanoida (%)	none	0.505	<0.001	0.121	QUL-ZOO-7	Reference	2019	6.68	A	B	C	C	B	C	Baseline	-2.4	-2.8	-3.7	-2.4	-4.2	ns
							2020	3.88													ns
							2021	3.45													ns
							2022	2.38													ns
							2023	3.93													ns
							2024	1.87													ns
					QUL-ZOO-1	Exposed	2019	6.79	A	B	C	C	B	C	Baseline	-1.4	-3.9	-4.2	-1.2	-4.3	
							2020	5.13													
							2021	2.32													
							2022	1.98													
							2023	5.41													
							2024	1.82													
Cladocera (%)	log10	0.601	<0.001	0.468	QUL-ZOO-7	Reference	2019	5.61	A	B	A	B	B	A	Baseline	-3.6	ns	-2.8	-2.4	ns	ns
							2020	1.27													ns
							2021	4.38													ns
							2022	1.81													ns
							2023	2.15													ns
							2024	5.15													ns
					QUL-ZOO-1	Exposed	2019	4.40	A	B	A	B	B	A	Baseline	-2.2	ns	-2.0	-1.7	ns	
							2020	1.80													
							2021	3.49													
							2022	1.81													
							2023	2.16													
							2024	3.81													
Copepod Nauplii (%)	log10	<0.001	<0.001	0.214	QUL-ZOO-7	Reference	2019	3.18	C	AB	AB	A	C	BC	Baseline	2.9	2.4	3.9	ns	ns	2.8
							2020	9.76													0.74
							2021	8.01													1.4
							2022	14.5													0.67
							2023	3.65													1.6
							2024	5.90													1.2
					QUL-ZOO-1	Exposed	2019	9.37	C	AB	AB	A	C	BC	Baseline	0.84	0.98	1.8	ns	ns	
							2020	13.0													
							2021	13.7													
							2022	14.5													
							2023	6.92													
							2024	9.51													
Cyclopoida (%)	none	-	-	0.020	QUL-ZOO-7	Reference	2019	21.9	A	B	B	B	B	B	Baseline	-4.1	-4.0	-4.5	-4.9	-4.8	-2.2
							2020	9.92													ns
							2021	10.3													ns
							2022	8.66													ns
							2023	7.68													ns
							2024	7.88													ns
					QUL-ZOO-1	Exposed	2019	15.5	A	B	AB	B	B	AB	Baseline	-2.2	ns	-2.1	-2.2	ns	
							2020	9.03													
							2021	10.4													
							2022	8.66													
							2023	9.15													
							2024	10.5													
Rotifera (%)	log10	0.084	<0.001	0.949	QUL-ZOO-7	Reference	2019	62.4	C	AB	AB	BC	A	AB	Baseline	1.7	1.5	ns	2.6	2.2	0.12
							2020	74.0													-0.67
							2021	72.7													-0.43
							2022	69.6													-0.38
							2023	81.6													-0.67
							2024	78.4													-0.60
					QUL-ZOO-1	Exposed	2019	63.2	C	AB	AB	BC	A	AB	Baseline	0.86	0.93	ns	1.8	1.5	
							2020	69.0													
							2021	69.5													
							2022	66.9													
							2022	76.1													
							2023	73.7													

P-value < 0.05.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: ANOVA = Analysis of Variance; "-" = no data available. "ns" = non significant.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way ANOVA as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

APPENDIX E.3
ZOOPLANKTON TISSUE QUALITY

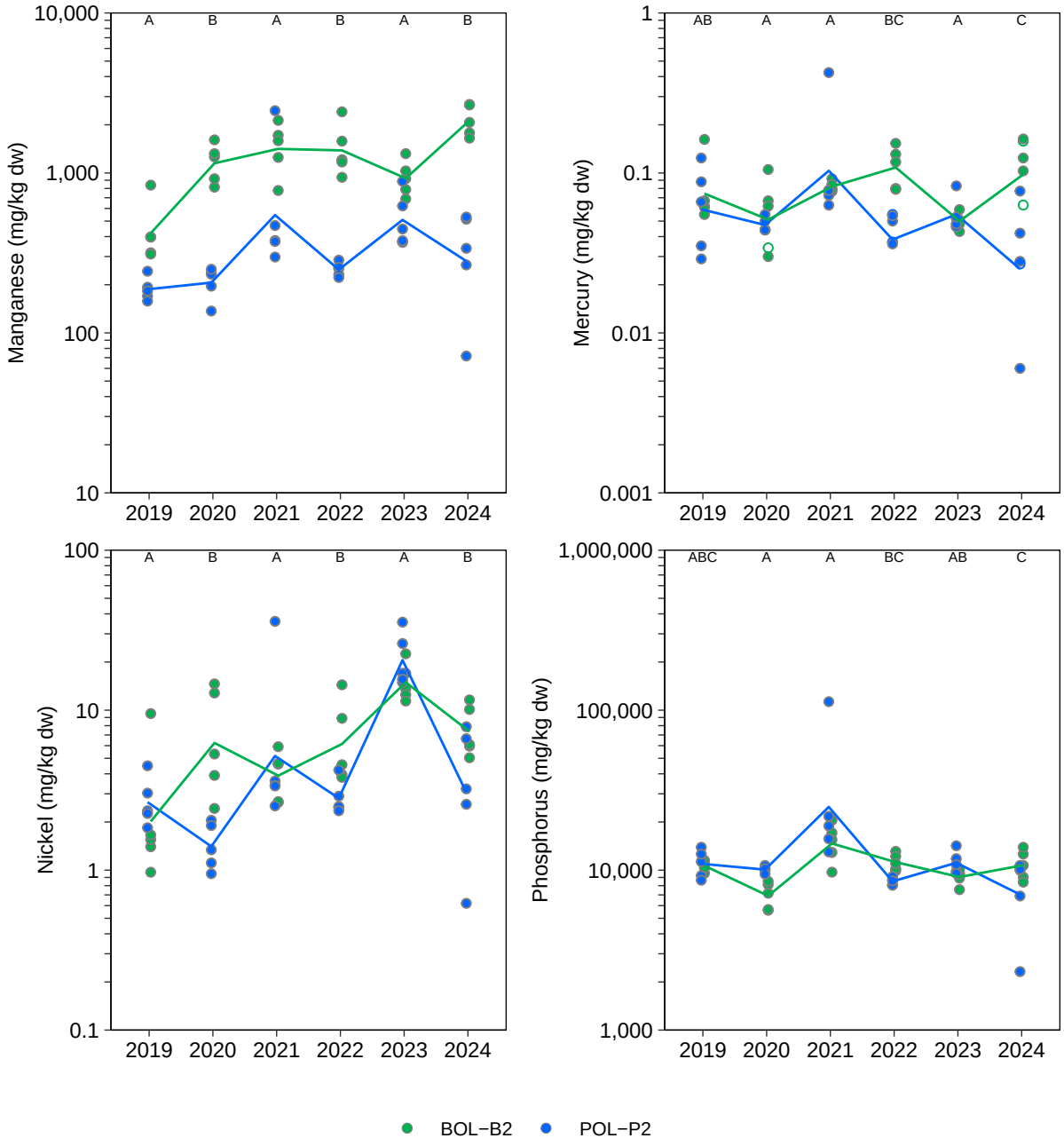


Figure E.3.1: Zooplankton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed : Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed : Reference). Only years with samples from both reference and exposed areas are plotted.

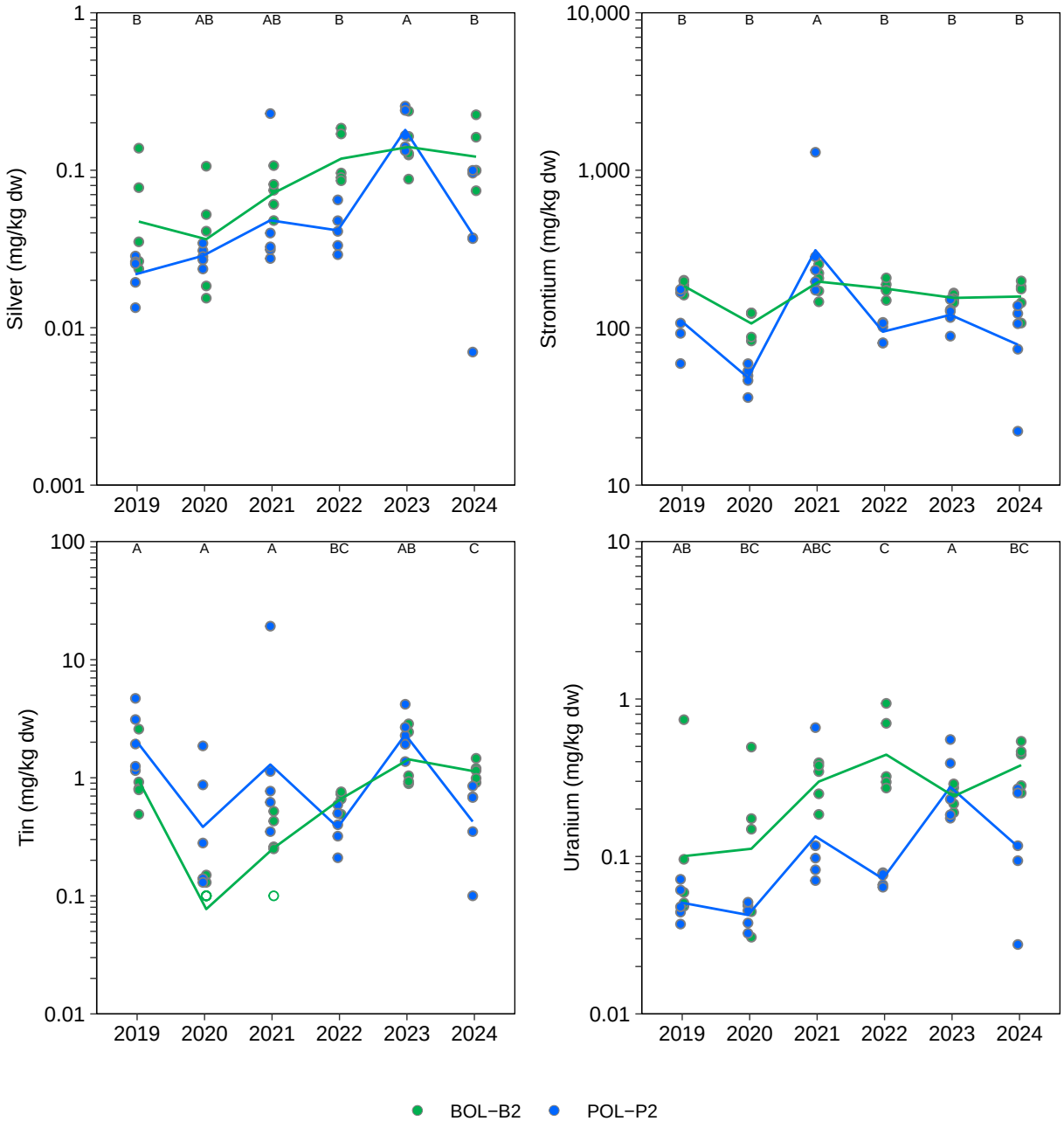


Figure E.3.1: Zooplankton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed : Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed : Reference). Only years with samples from both reference and exposed areas are plotted.

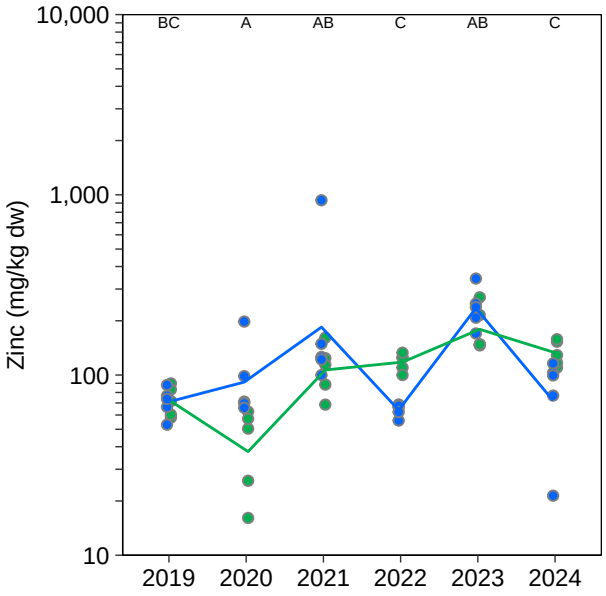


Figure E.3.1: Zooplankton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Polley Lake (POL−P2; Exposed) and Bootjack Lake (BOL−B2; Reference) Monitoring Areas in July, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. Green represents reference areas and blue represents exposed areas. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed : Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed : Reference). Only years with samples from both reference and exposed areas are plotted.

Table E.3.1: Statistical Comparisons of Exposed - Reference Relative Differences of Metal Concentrations in Zooplankton Tissue for the Polley Lake (POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Monitoring Areas in July, 2019 to 2024

Analyte	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for Polley Mean Relative to Bootjack (%)[c]					
		Area	Year	Area × Year	Post-Breach Period						Post-Breach Period						Post-Breach Period					
					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.190	<0.001	0.271	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Antimony	MLE	0.971	<0.001	<0.001	BCD	AB	A	D	ABC	CD	baseline	ns	262	ns	ns	ns	ns	130	194	-64	ns	-56
Arsenic	MLE	0.334	<0.001	0.006	A	A	A	B	A	A	baseline	ns	ns	-72	ns	ns	ns	ns	ns	-64	ns	ns
Barium	MLE	<0.001	<0.001	0.142	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-61					
Beryllium	MLE	0.026	<0.001	0.417	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-37					
Bismuth	MLE	0.080	<0.001	0.005	<LRL	<LRL	A	B	A	B	<LRL	<LRL	baseline	-71	ns	-66	<LRL	<LRL	ns	-67	ns	-61
Boron	MLE	0.029	<0.001	0.052	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-27					
Cadmium	MLE	0.008	<0.001	<0.001	BC	A	A	BC	AB	C	baseline	141	205	ns	ns	ns	ns	109	164	ns	56	ns
Calcium	MLE	0.299	<0.001	0.002	B	B	A	B	B	B	baseline	ns	177	ns	ns	ns	ns	ns	124	ns	ns	ns
Cesium	MLE	0.006	<0.001	0.148	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-38					
Chromium	MLE	0.024	<0.001	0.040	A	AB	A	B	A	AB	baseline	ns	ns	-86	ns	ns	ns	ns	ns	-83	ns	-63
Cobalt	MLE	0.171	<0.001	0.052	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Copper	MLE	0.289	<0.001	0.004	A	A	A	B	AB	B	baseline	ns	ns	-69	ns	-72	ns	177	118	ns	ns	ns
Iron	MLE	0.001	<0.001	0.101	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-44					
Lead	MLE	0.747	<0.001	0.024	A	A	AB	B	A	B	baseline	ns	ns	-86	ns	-85	ns					
Lithium	MLE	0.367	0.052	0.029	<LRL	<LRL	AB	C	A	BC	<LRL	<LRL	baseline	-67	ns	ns	<LRL	<LRL	ns	-57	ns	ns
Magnesium	MLE	0.647	<0.001	0.009	ABC	BC	A	C	AB	C	baseline	ns	ns	ns	ns	ns	ns	ns	80	ns	67	ns
Manganese	MLE	<0.001	<0.001	<0.001	A	B	A	B	A	B	baseline	-60	ns	-60	ns	-70	-55	-82	-61	-82	-45	-87
Mercury	MLE	0.013	0.075	0.001	AB	A	A	BC	A	C	baseline	ns	ns	ns	ns	-68	ns	ns	ns	-65	ns	-74
Molybdenum	MLE	0.462	<0.001	0.011	AB	BC	A	C	AB	C	baseline	ns	ns	-56	ns	-55	ns	ns	107	ns	ns	ns
Nickel	MLE	0.030	<0.001	0.001	A	B	A	B	A	B	baseline	-83	ns	-65	ns	-68	ns	-77	ns	-54	ns	-58
Phosphorus	MLE	0.424	<0.001	0.008	ABC	A	A	BC	AB	C	baseline	ns	ns	ns	ns	ns	ns	ns	69	ns	ns	-34
Potassium	MLE	0.265	<0.001	0.014	BCD	ABC	A	CD	AB	D	baseline	ns	83	ns	ns	ns	ns	ns	65	ns	49	ns
Rubidium	MLE	0.031	<0.001	0.015	ABC	AB	A	BC	AB	C	baseline	ns	ns	ns	ns	ns	-32	ns	ns	-34	ns	-48
Selenium	MLE	<0.001	<0.001	0.013	ABC	AB	A	C	ABC	BC	baseline	ns	ns	ns	ns	ns	50	104	162	ns	62	ns
Silver	MLE	<0.001	<0.001	0.037	B	AB	AB	B	A	B	baseline	ns	ns	ns	178	ns	-54	ns	ns	-65	ns	-68
Sodium	MLE	0.057	<0.001	0.043	B	AB	A	B	B	B	baseline	ns	127	ns	ns	ns	ns	ns	108	ns	ns	ns
Strontium	MLE	<0.001	<0.001	0.001	B	B	A	B	B	B	baseline	ns	162	ns	ns	ns	-39	-55	58	-47	ns	-51
Tellurium	MLE	nt	nt	nt	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	<0.001	0.006	D	ABC	AB	CD	A	BCD	baseline	178	285	ns	310	ns	-87	-64	-49	-84	ns	-78
Tin	MLE	0.028	<0.001	<0.001	A	A	A	BC	AB	C	baseline	ns	ns	-74	ns	-83	ns	396	409	ns	ns	-62
Titanium	MLE	0.877	<0.001	0.280	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Uranium	MLE	<0.001	<0.001	0.021	AB	BC	ABC	C	A	BC	baseline	ns	ns	-68	ns	ns	ns	-62	-55	-84	ns	-70
Vanadium	MLE	0.152	<0.001	0.484	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Zinc	MLE	0.521	<0.001	<0.001	BC	A	AB	C	AB	C	baseline	146	ns	ns	ns	ns	ns	143	73	-46	ns	-45
Zirconium	MLE	0.047	<0.001	0.511	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	-33					

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (POL-P2:BOL-B2) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (POL-P2:BOL-B2).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table E.3.2: Seasonal Kendall Trend Analysis of Primary and Secondary Analyte Concentrations in Post-Breach Surface Water for the Polley Lake (P1 and P2; Exposed) Routine Water Quality Monitoring Stations, 2015 to 2024

Analyte		P1 (Exposed)		P2 (Exposed)	
		P-Value	Slope	P-Value	Slope
Total Metals	Arsenic	<0.001	-8.29	<0.001	-7.86
	Barium	<0.001	-2.15	<0.001	-2.47
	Cadmium	<LRL	<LRL	<LRL	<LRL
	Calcium	<0.001	-2.08	<0.001	-2.08
	Cobalt	<LRL	<LRL	<LRL	<LRL
	Copper	0.562	NS	0.914	NS
	Iron	<LRL	<LRL	<LRL	<LRL
	Manganese	<0.001	-9.98	<0.001	-9.12
	Molybdenum	<0.001	-7.49	<0.001	-7.40
	Nickel	<LRL	<LRL	<LRL	<LRL
	Phosphorus	<0.001	-6.37	<0.001	-5.51
	Selenium	<0.001	-4.53	<0.001	-4.75
	Silver	<LRL	<LRL	<LRL	<LRL
	Sodium	<0.001	-3.63	<0.001	-3.72
	Strontium	<0.001	-3.41	<0.001	-3.64
	Tin	<LRL	<LRL	<LRL	<LRL
	Titanium	<LRL	<LRL	<LRL	<LRL
	Vanadium	<0.001	4.26	<0.001	4.49
	Uranium	<0.001	-4.81	<0.001	-5.09
	Zinc	<LRL	<LRL	<LRL	<LRL
Dissolved Metals	GEF Dissolved Copper Chronic	0.800	NS	0.406	NS
	GEF Dissolved Copper Acute	0.800	NS	0.367	NS
	Arsenic	<0.001	-7.79	<0.001	-7.14
	Barium	<0.001	-1.64	<0.001	-1.84
	Cadmium	<LRL	<LRL	<LRL	<LRL
	Calcium	<0.001	-2.26	<0.001	-2.41
	Cobalt	<LRL	<LRL	<LRL	<LRL
	Copper	<0.001	2.62	<0.001	2.30
	Iron	<LRL	<LRL	<LRL	<LRL
	Manganese	0.261	NS	0.056	NS
	Molybdenum	<0.001	-6.69	<0.001	-7.02
	Nickel	<LRL	<LRL	<LRL	<LRL
	Selenium	<0.001	-3.87	<0.001	-4.67
	Silver	<LRL	<LRL	<LRL	<LRL
	Sodium	<0.001	-3.33	<0.001	-3.63
	Strontium	<0.001	-3.18	<0.001	-3.17
	Tin	<LRL	<LRL	<LRL	<LRL
	Titanium	<LRL	<LRL	<LRL	<LRL
	Vanadium	<0.001	6.43	<0.001	6.76
	Uranium	<0.001	-3.42	<0.001	-3.72
	Zinc	<LRL	<LRL	<LRL	<LRL

P-Value < 0.05.

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: GEF = Guideline Exceedance Factor. NS = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). "<LRL" not enough detected data to test for trend (> 75 % of values below laboratory reporting limit).

Table E.3.3: **Statistical Comparisons of Exposed - Reference Relative Differences of Metal Concentrations in Zooplankton Tissue for the Quesnel Lake (QUL-ZOO-1; Exposed and QUL-ZOO-7; Reference) Monitoring Areas in July, 2019 to 2024**

Analyte	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for QUL-ZOO-1 Mean Relative to QUL-ZOO-7 (%)[c]					
					Post-Breach Period						Post-Breach Period						Post-Breach Period					
		Area	Year	Area × Year	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.622	<0.001	0.073	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Antimony	MLE	0.397	<0.001	0.091	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Arsenic	MLE	0.868	<0.001	0.381	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Barium	MLE	0.675	<0.001	0.205	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Beryllium	MLE	0.395	0.061	<0.001	BC	C	B	B	B	A	baseline	ns	ns	ns	ns	583	ns	-71	ns	ns	ns	347
Bismuth	MLE	0.769	<0.001	0.020	<LRL	<LRL	<LRL	B	A	<LRL	<LRL	<LRL	<LRL	baseline	114	<LRL	<LRL	<LRL	<LRL	ns	ns	<LRL
Boron	MLE	0.426	<0.001	0.002	B	B	<LRL	B	B	A	baseline	ns	<LRL	ns	ns	**8,187**	ns	ns	<LRL	ns	ns	**ns**
Cadmium	MLE	0.095	<0.001	0.805	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Calcium	MLE	0.471	<0.001	0.414	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Cesium	MLE	0.595	<0.001	0.129	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Chromium	MLE	0.798	<0.001	0.024	B	B	B	B	AB	A	baseline	ns	ns	ns	ns	414	ns	ns	ns	ns	ns	313
Cobalt	MLE	0.586	<0.001	0.075	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Copper	MLE	0.752	0.001	0.031	B	B	B	B	B	A	baseline	ns	ns	ns	ns	603	ns	ns	ns	ns	ns	280
Iron	MLE	0.631	0.005	0.114	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Lead	MLE	0.290	<0.001	0.011	B	B	B	B	B	A	baseline	ns	ns	ns	ns	379	ns	-71	ns	ns	ns	216
Lithium	MLE	0.030	<0.001	0.710	A	A	A	A	A	<LRL	baseline	ns	ns	ns	ns	<LRL	-28	-28	-28	-28	-28	<LRL
Magnesium	MLE	0.709	<0.001	0.331	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Manganese	MLE	0.408	<0.001	0.325	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Mercury	MLE	0.234	<0.001	0.708	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Molybdenum	MLE	0.657	<0.001	0.024	B	B	B	AB	B	A	baseline	ns	ns	ns	ns	646	ns	ns	ns	ns	ns	267
Nickel	MLE	0.602	<0.001	0.159	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Phosphorus	MLE	0.597	<0.001	0.592	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Potassium	MLE	0.730	<0.001	0.425	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Rubidium	MLE	0.859	<0.001	0.381	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Selenium	MLE	0.362	<0.001	0.764	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Silver	MLE	1.000	<0.001	0.104	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Sodium	MLE	0.810	<0.001	0.437	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Strontium	MLE	0.441	<0.001	0.534	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.940	<0.001	0.185	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Tin	MLE	0.554	<0.001	0.022	B	B	B	B	B	A	baseline	ns	ns	ns	ns	748	ns	ns	ns	ns	ns	495
Titanium	MLE	0.648	0.025	0.030	B	B	B	B	B	A	baseline	ns	ns	ns	ns	599	ns	ns	ns	ns	ns	283
Uranium	MLE	0.725	<0.001	0.280	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Vanadium	MLE	0.846	0.255	0.109	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Zinc	MLE	0.216	<0.001	0.607	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns					
Zirconium	MLE	0.918	0.003	0.011	B	B	B	B	B	A	baseline	ns	ns	ns	ns	612	ns	ns	ns	ns	ns	399

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (QUL-ZOO-1 [Exposed] : QUL-ZOO-7 [Reference]) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (QUL-ZOO-1 [Exposed]:QUL-ZOO-7 [Reference]).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table E.3.4: Seasonal Kendall Trend Analysis of Primary and Secondary Analyte Concentrations in Post-Breach Surface Water for the Quesnel Lake (QUL-18 and QUL-2a; Exposed and QUL-120a; Reference) Routine Water Quality Monitoring Stations, 2015 to 2024

Analyte		Surface					
		QUL-120a (Reference)		QUL-18 (Exposed)		QUL-2a (Exposed)	
		P-Value	Slope	P-Value	Slope	P-Value	Slope
Total Metals	Arsenic	0.157	NS	0.531	NS	0.466	NS
	Barium	0.217	NS	0.721	NS	0.270	NS
	Cadmium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Calcium	0.270	NS	0.384	NS	0.249	NS
	Cobalt	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Copper	0.108	NS	0.222	NS	0.685	NS
	Iron	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Manganese	0.410	NS	0.083	NS	0.880	NS
	Molybdenum	0.783	NS	0.025	1.53	0.096	NS
	Nickel	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Phosphorus	0.175	NS	0.872	NS	0.119	NS
	Selenium	0.302	NS	0.019	3.39	<0.001	4.01
	Silver	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Sodium	0.371	NS	0.646	NS	0.841	NS
	Strontium	1.000	NS	0.184	NS	0.615	NS
	Tin	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Titanium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Vanadium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Uranium	0.629	NS	0.576	NS	0.726	NS
	Zinc	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
Dissolved Metals	GEF Dissolved Copper Chronic	0.408	NS	0.611	NS	0.070	NS
	GEF Dissolved Copper Acute	0.410	NS	0.509	NS	0.045	-4.76
	Arsenic	1.000	NS	1.000	NS	0.122	NS
	Barium	0.406	NS	1.000	NS	0.727	NS
	Cadmium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Calcium	0.166	NS	0.720	NS	0.364	NS
	Cobalt	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Copper	1.000	NS	0.875	NS	0.707	NS
	Iron	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Manganese	0.114	NS	0.141	NS	0.210	NS
	Molybdenum	0.490	NS	0.003	2.01	0.002	1.14
	Nickel	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Selenium	0.536	NS	0.004	3.21	0.016	3.03
	Silver	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Sodium	0.784	NS	0.140	NS	0.040	0.667
	Strontium	0.083	NS	0.285	NS	0.228	NS
	Tin	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Titanium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Vanadium	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
	Uranium	0.168	NS	0.202	NS	0.616	NS
	Zinc	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL

P-Value < 0.05.

Significant decreasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Significant increasing temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). Value reported is the Sen's slope reported as a percentage of the median concentration or value.

Notes: GEF = Guideline Exceedance Factor. NS = no significant temporal trend (Seasonal Kendall test for monotonic trend at α = 0.05). "<LRL" not enough detected data to test for trend (> 75 % of values below laboratory reporting limit).

APPENDIX E.4
BENTHIC INVERTEBRATE COMMUNITY

APPENDIX E4 RESOLVING MIXED-LEVELS OF TAXONOMIC RESOLUTION FOR BENTHIC INVERTEBRATES

E.4.1 INTRODUCTION 1
E.4.2 DECISION KEY 3
E.4.3 REFERENCES 4

E.4.1 INTRODUCTION

Processing of benthic invertebrate data for ecological assessment generally involves determining taxonomic richness (number of taxa present) as well as community composition, which is typically assessed using abundances (and/or density) of all taxa present and their relative proportion of the total community. Taxonomic richness and community composition can be informative metrics on their own, however they are also utilized in the calculation of diversity indices (e.g., Simpson's Evenness and Simpson's Diversity). Determination of taxonomic richness and community composition from taxonomic data can be complicated by inconsistencies in taxonomic data, relating to the taxonomic level to which organisms can practicably be identified by the laboratory ("resolution"). Taxonomists endeavour to classify organisms within the most specific taxon (a defined taxonomic identity of any rank) possible, generally Genus or Species, however specimens that are damaged or are in an early developmental stage may lack the morphological features necessary to confirm an identification to the same level that can be achieved for some adult specimens. Furthermore, the information needed to confirm the identification of specimens may not be available in taxonomic keys or other resources. When individuals of a single taxon are identified to different levels of resolution within a single sample they are considered redundant or "ambiguous" taxa. The presence of these ambiguous taxa may result in inflated estimates of richness or distorted patterns of diversity across sites. For example, some specimens may be identified to the genus level (e.g., *Baetis*) while others are identified to the species level (e.g., *Baetis tricaudatus*). If ambiguous taxa are not resolved, then the coarser-resolution taxon (i.e., the Genus-level, *Baetis*) is counted as a unique taxon when it may actually be the same species as the finer-level taxon (i.e., species-level, *B. tricaudatus*). Therefore, one consequence of the common practice of identifying organisms to the lowest practicable taxonomic level (LPL) is that the "species list" (complete list of taxa identified) from any site contains a mixture of taxa (or "mixed level") wherein an individual taxon may have multiple specimens identified to several different levels of taxonomic resolution. As a result, benthic invertebrate data typically comprise a mixture of identification levels due to difficulties in achieving a uniform Species, Genus, or even Family-level identification for aquatic macroinvertebrates (Cranston 1990) and must undergo additional consolidation steps prior to data analysis.

At least four options are available for dealing with taxa identified to mixed-levels of taxonomic resolution:

1. remove data for any organisms identified to a level less specific than the target resolution (i.e., anything not at the Genus or Species level);

2. group all data for any organisms identified to a level less specific than the target resolution into an "Other" group, a standalone but undefined taxon;

3. proportionally distribute data for any organisms identified to a level less specific than the target resolution into values for organisms positively identified to target resolution according to the ratios of those positively identified taxa (i.e. “rolling down” unidentified taxa to more specific taxonomic levels); or

4. combine all related taxa least-specific taxon to which consistent identification is possible (i.e. “rolling up” unidentified taxa to less-specific taxonomic levels – often family-level).

Option 1 (though sometimes used) is unsatisfactory because a bias is introduced into the sample (as taxa that are difficult to identify are not randomly distributed, but rather occur more frequently in particular Classes, Orders, and Families). The second option (also sometimes used) is unsatisfactory because organisms grouped as “Other” contribute no useful information (beyond increasing the total density estimate), and complicate further analyses. The third option assumes that the ratio of taxa among ambiguous taxa is the same as in specimens of identified decisively, which may or may not be accurate. The fourth option is most conservative but may lead to a significant loss of data. For example, specimens of the genera *Baetis* and *Pseudocloeon* might be lumped together and analyzed as Baetidae. The preferred option for analysis depends on the distribution of the organisms among taxa. If identified specimens in the two genera above constitute only 10% of the total abundance, it may be most appropriate to lump them together with the other 90% in the less-specific taxon (Family: Baetidae). Conversely, if 90% of the identified organisms fall into the two Genera, it is more defensible to apportion the ambiguous taxa identified only to Baetidae (Family) into the values for specimens identified to Genus, and any resulting error may not seriously bias the analysis. In order to standardize the decision-making process, reduce subjectivity, and improve the efficiency of benthic community data processing, Minnow has developed and applied a decision key which is used in the processing of all benthic invertebrate community data.

E.4.2 DECISION KEY

Resolution of redundant or ambiguous taxa was achieved through implementation of a decision key that dictated criteria for data processing (Figure E.4.1). The first two options for dealing with taxa identified to mixed-levels of taxonomic resolution outlined in Section E.4.1 were considered unsatisfactory, therefore the decision key makes use of abundance and richness criteria to apply options 3 (roll-down) and 4 (roll-up) for each level of the taxonomic hierarchy. This method preserves as much detailed taxonomic information as possible, while addressing issues of taxonomic ambiguities. The decision key was modified from the Puget Sound Long-Term Marine Sediment Benthic Invertebrate Summary and is outlined below (Weakland et al. 2018).

The decision key rules are summarised as follows (see Figure E.4.1 for details).

- If identifications have not been taken to the same level consistently over multiple years of monitoring, data are rolled up to a less-specific taxonomic level. If identifications have been taken to the same level consistently over multiple years or only one year of data is available, they are kept at their respective taxonomic levels.
- If for a taxa identified to mixed-levels of resolution it is known that differentiating among specimens at more-specific levels of identification is notably challenging (e.g. due to inconsistencies in taxonomic keys or fragility of defining features) then all taxa are rolled up to a less-specific taxonomic level. If the difficulty of identifications are of mixed levels of difficulty, then easy-to-identify taxa are left at their respective level of identification, whereas difficult-to-identify taxa are rolled up to a less-specific level. If the identifications are easy, then they are kept at their respective taxonomic levels.
- For examples that have satisfied the above criteria, if there are no more-specific levels of identification or there are no organisms identified to a more-specific taxon, they are left at that level of identification.

E.4.3 REFERENCES

Cranston, P.S. 1990. Biomonitoring and invertebrate taxonomy. Environmental Monitoring and Assessment 14: 265-273

Weakland, S., V. Partridge, and M. Dutch. 2018. Sediment Quality in Puget Sound: Changes in chemistry, toxicity, and benthic invertebrates at multiple geographic scales, 1989–2015. Publication Number: 18-03-004.https://fortress.wa.gov/ecy/publications/SummaryPages/1803004.html

Identifications have NOT been taken to the same level consistently over multiple years

Identifications have been taken to the same level consistently over multiple years (or only 1 year of data available)

More specific identifications are not easily achievable

Mixed levels of difficulty to achieve identification at more specific levels

More specific identifications are easily achievable

Leave easy-to-identify levels separate and roll up levels that are difficult to identify into the less specific taxonomic level

Taxon is redundant (representatives of ≥1 more-specific taxon identified in samples)

Taxon is at most-specific identified level and there are no redundant more-specifically identified taxa

Roll Up to less-specific level

Taxon level contains only one more specific identification

Taxon level contains >1 more specific identification

Keep assigned identifications at their levels

Abundance at less-specifically identified level is ≤50% of the combined total abundance of that taxon and more specifically identified taxa (family/genus/species, etc.).

Abundance at less-specific level is >50% of the combined total abundance of that taxon and more-specifically identified taxa (family/genus/species, etc.)

Proportionally assign less-specifically identified abundance to more specifically identified taxa

Less-specifically identified taxon contains only 2 more specific identifications and ≥50% of the combined abundance of that taxon and more specifically identified taxa

Less-specifically identified taxon contains >2 more specific identifications and ≥50% of the combined abundance of that taxon and more specifically identified taxa

Roll to higher level

Leave the less AND more-specific levels of identification

Decision Key for Resolving Mixed Levels of Taxonomic Resolution

Date: March 2025
Project 247202.0004

minnow environmental inc. A Tetra Tech Consultants Company

Figure E.4.1

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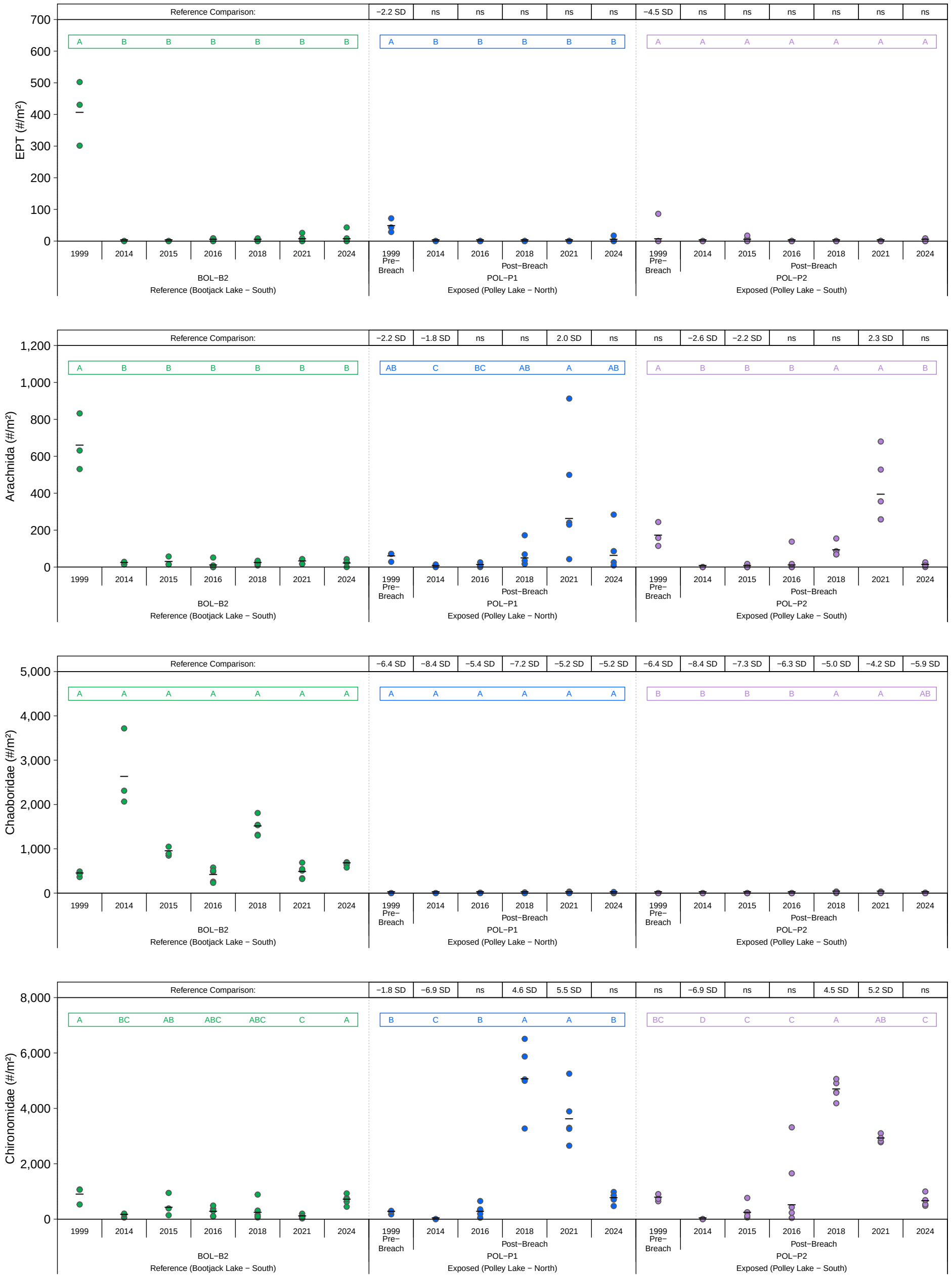


Figure E.4.2: Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0.

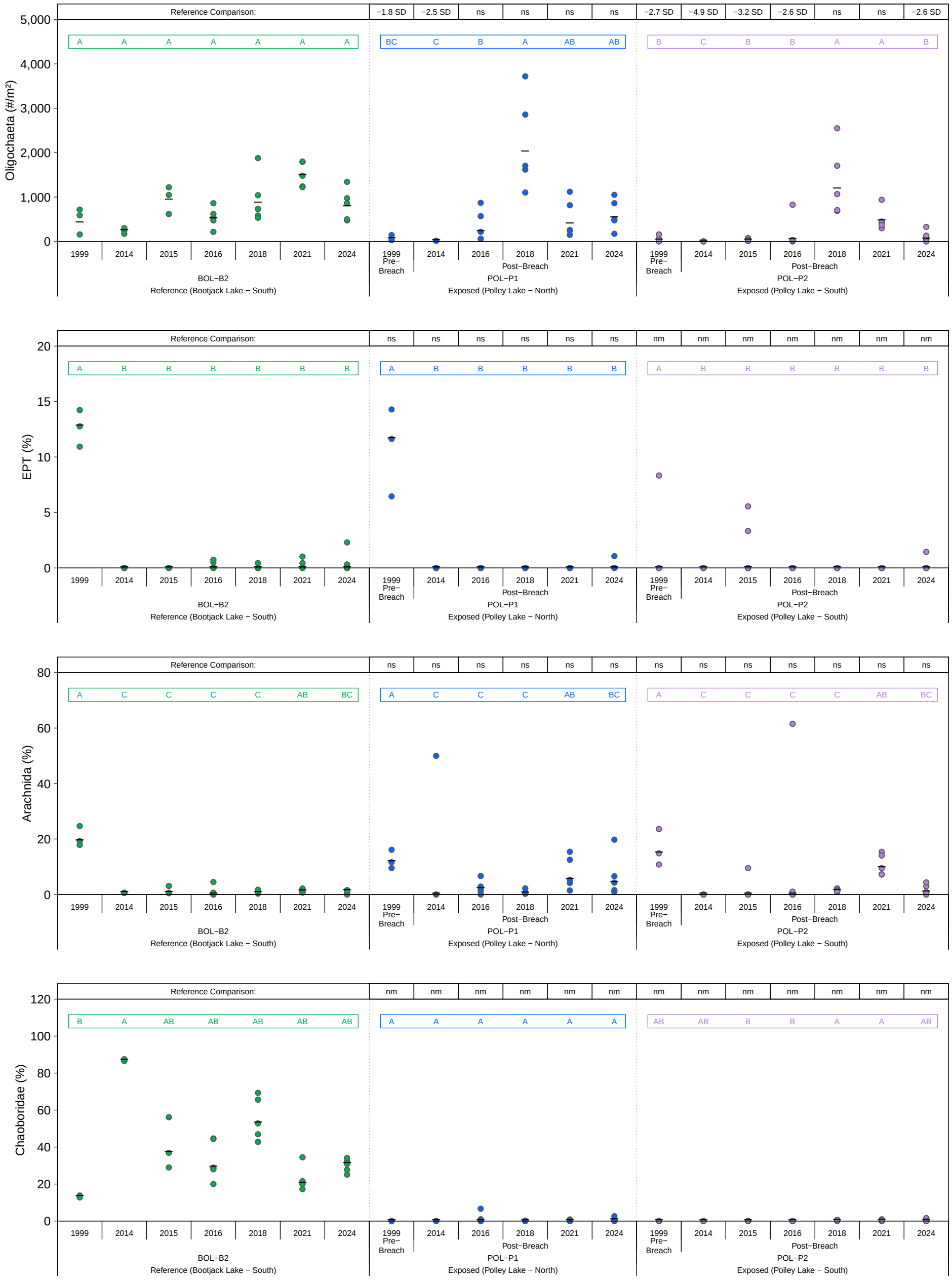


Figure E.4.2: Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0.

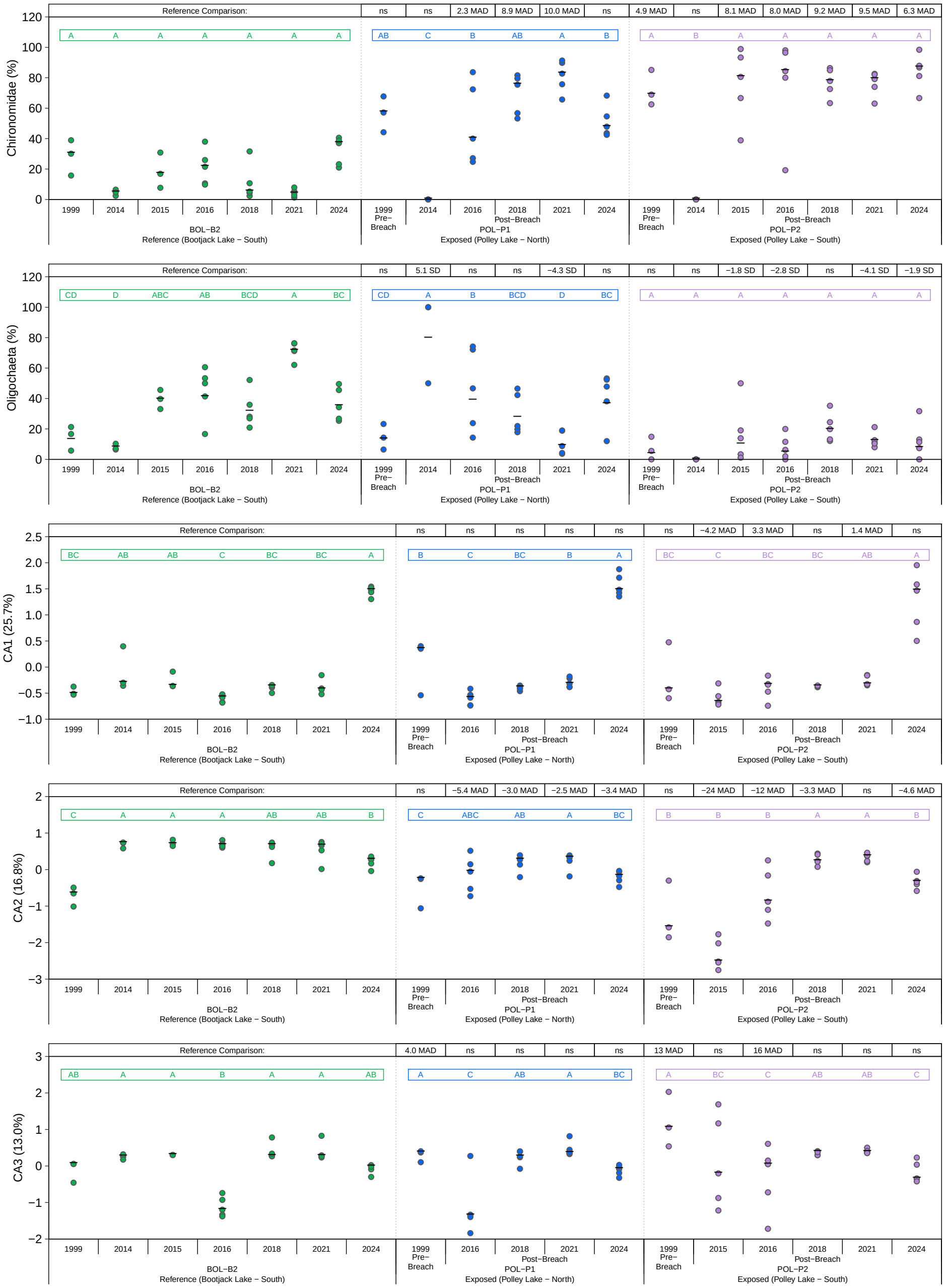


Figure E.4.2: Benthic Invertebrate Community Metrics for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'ns' indicates a non−significant contrast; 'nm' indicates that the MOD could not be calculated because MAD = 0.

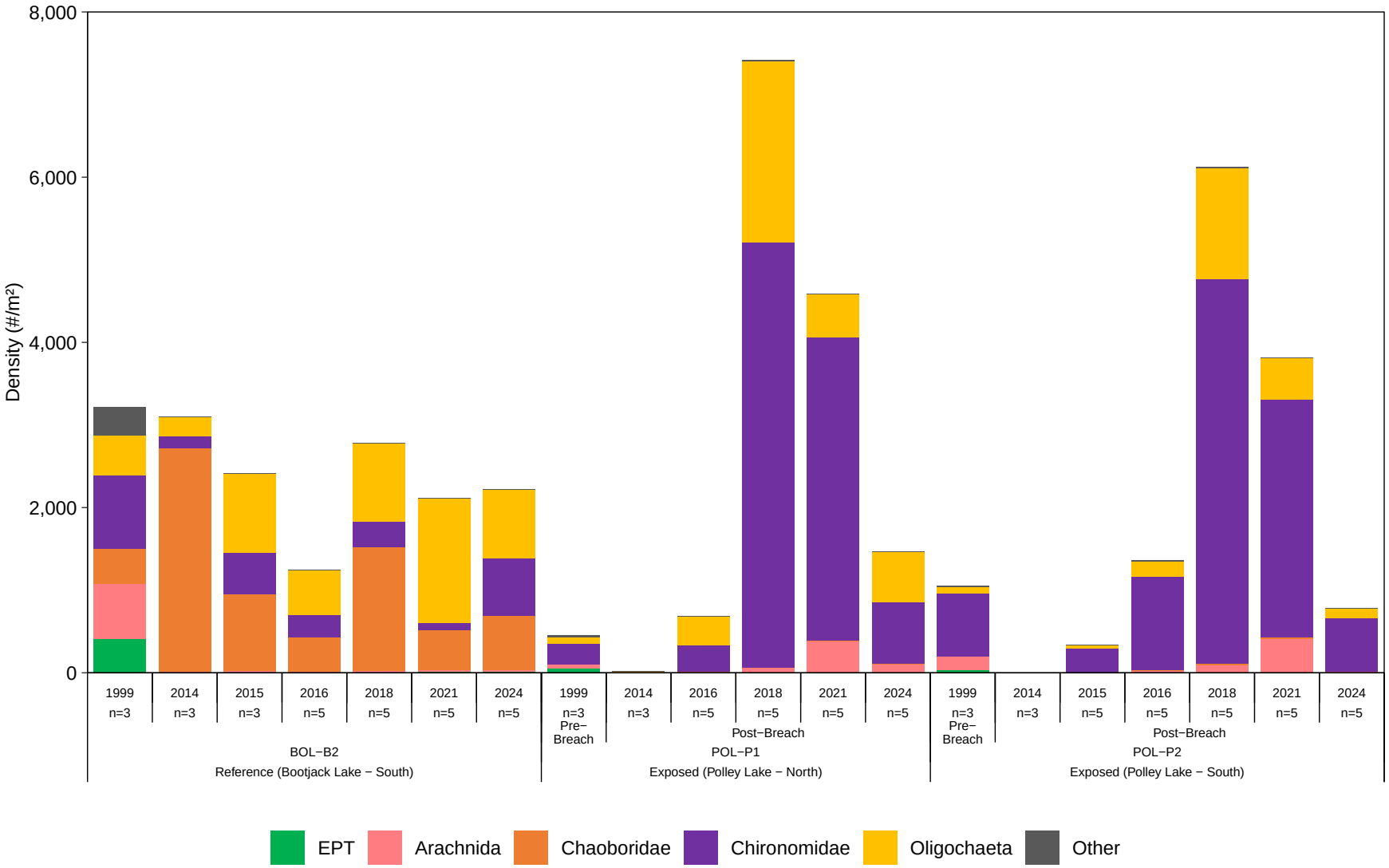


Figure E.4.3: Mean Densities of Major Benthic Invertebrate Taxa for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: #/m² = number per square metre. EPT = Ephemeroptera, Plecoptera, Trichoptera. Total organism density at POL−P2 was zero in all replicates collected in 2014.

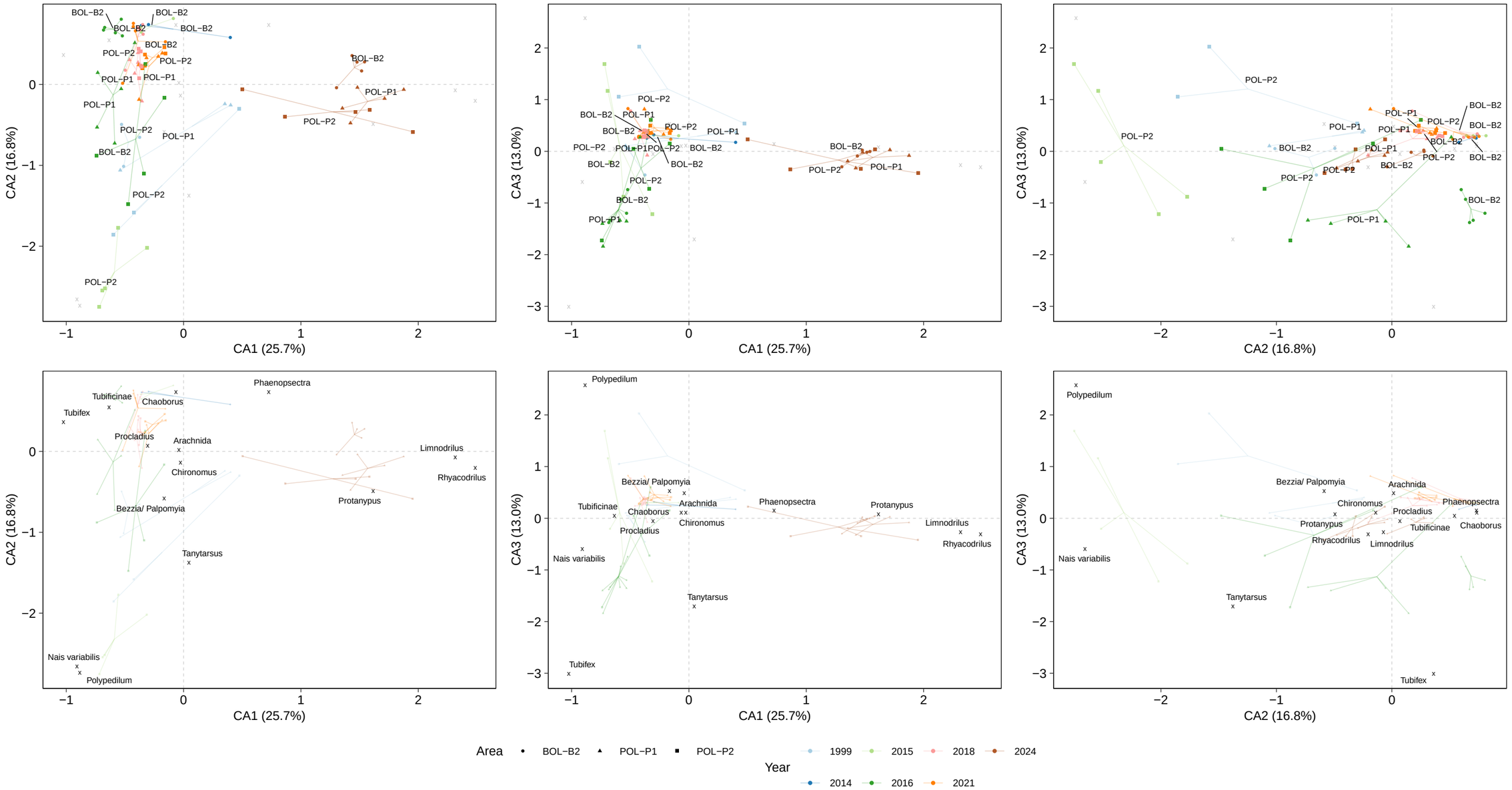


Figure E.4.4: Biplots of Correspondence Analysis Station and Taxon Scores of Benthic Invertebrate Community Data for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: Analysis was completed using data at the Lowest Practicable Level (LPL). Taxa present at fewer than 1% of samples or less than 1% of total abundance were excluded from the analysis. Correspondence Analysis was conducted on ln(x+1)−transformed densities. Results from POL−P1 and POL−P2 in 2014 were excluded from CA due to insufficient taxon richness in samples (≤1 taxon / sample).

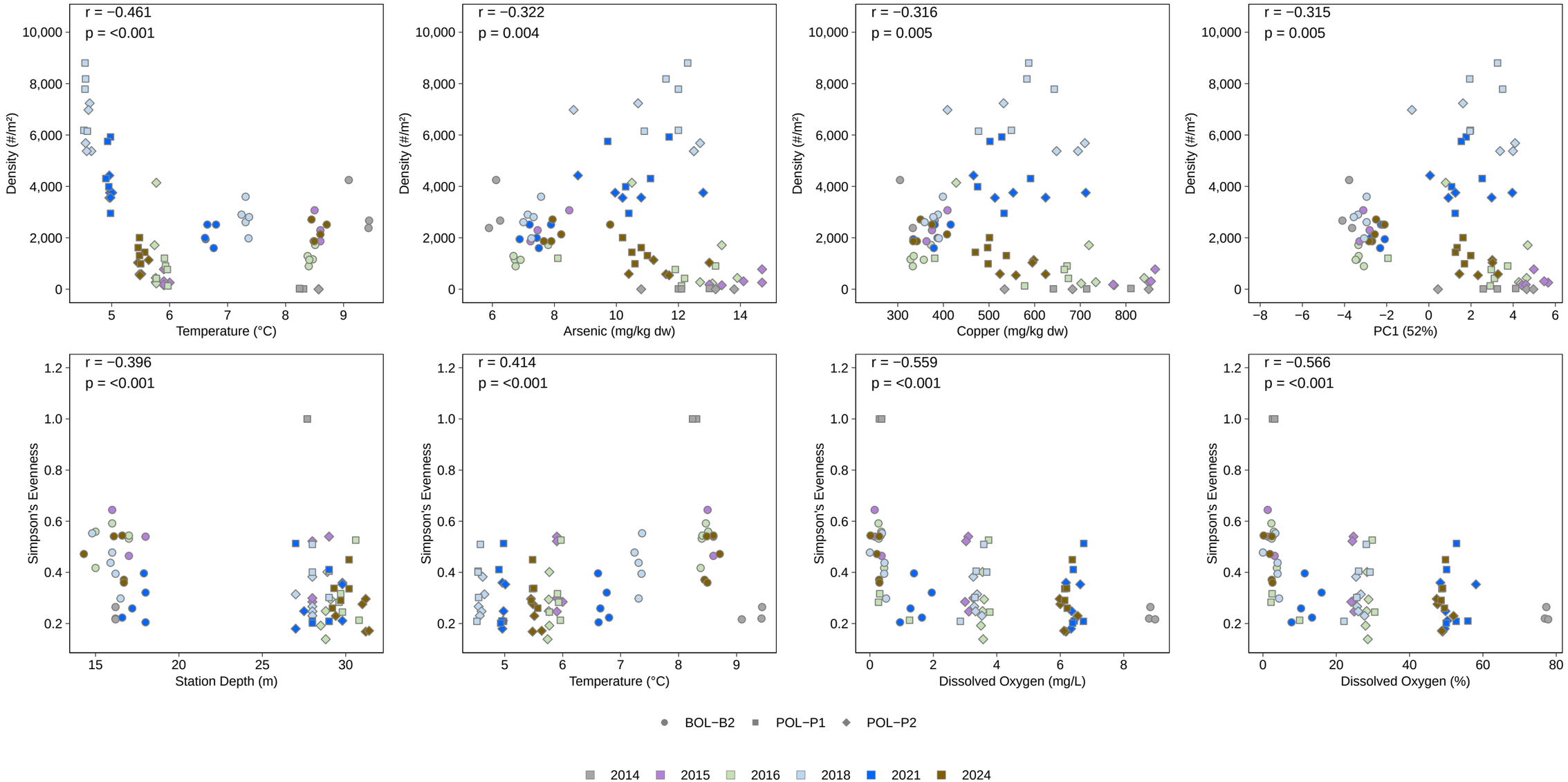
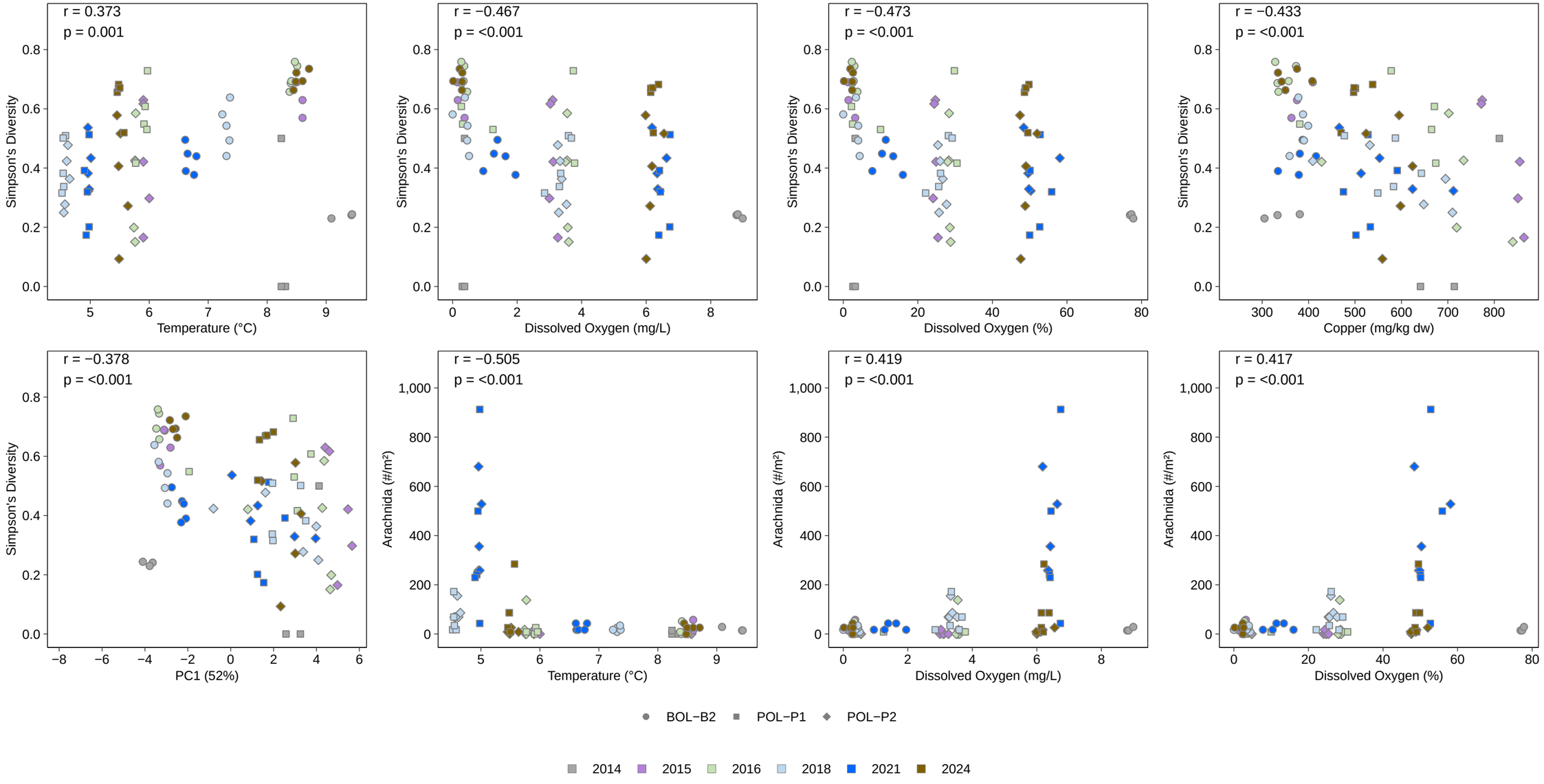


Figure E.4.5: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.00416, Bonferroni Corrected) between Benthic Invertebrate Community Metrics and Chemical and Physical Sediment Quality Parameters for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Notes: #/m²= number per square metre, mg/kg dw = milligrams per kilogram dry weight. Correlations were completed using data from 2014 to 2024.



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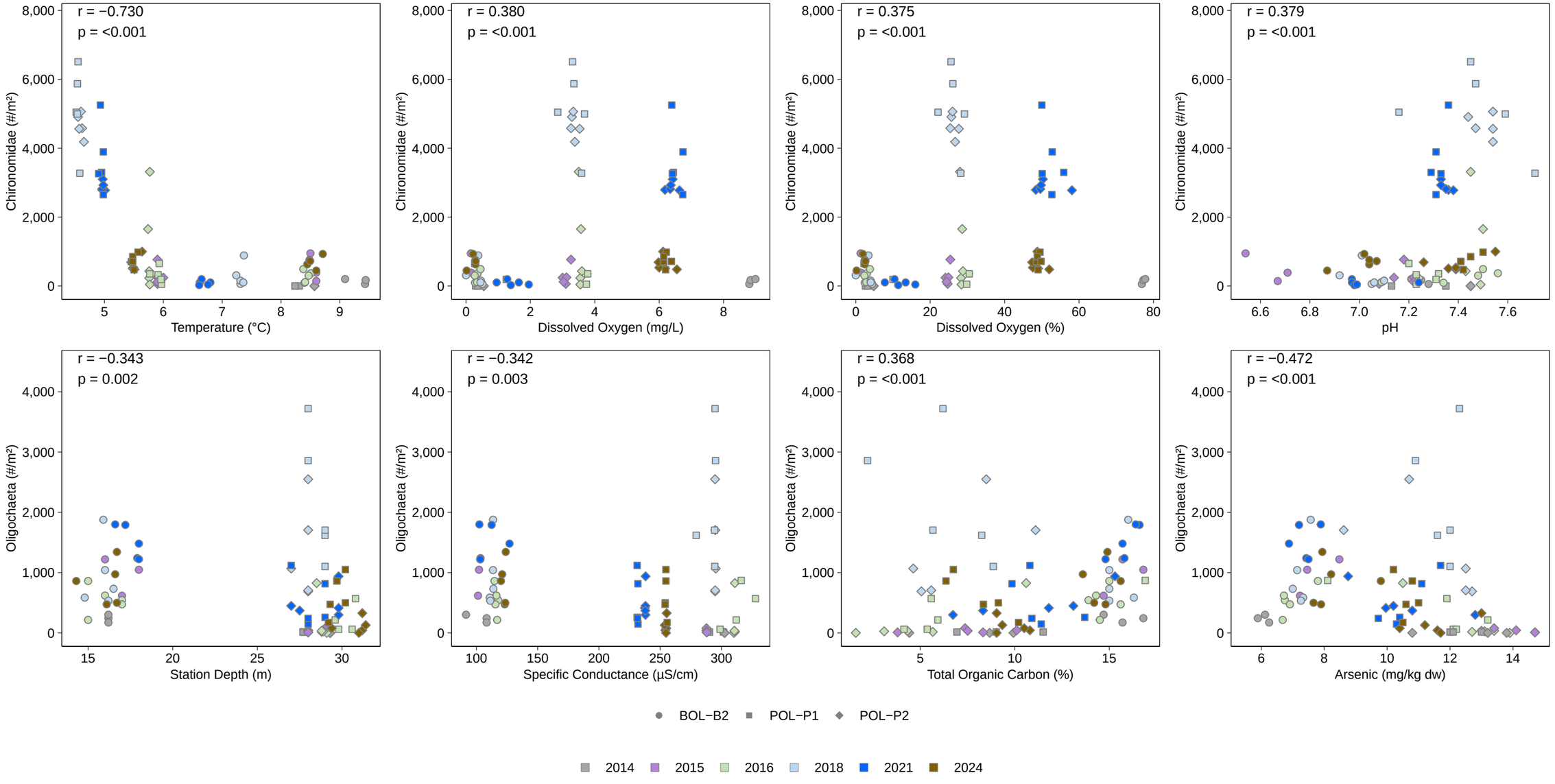

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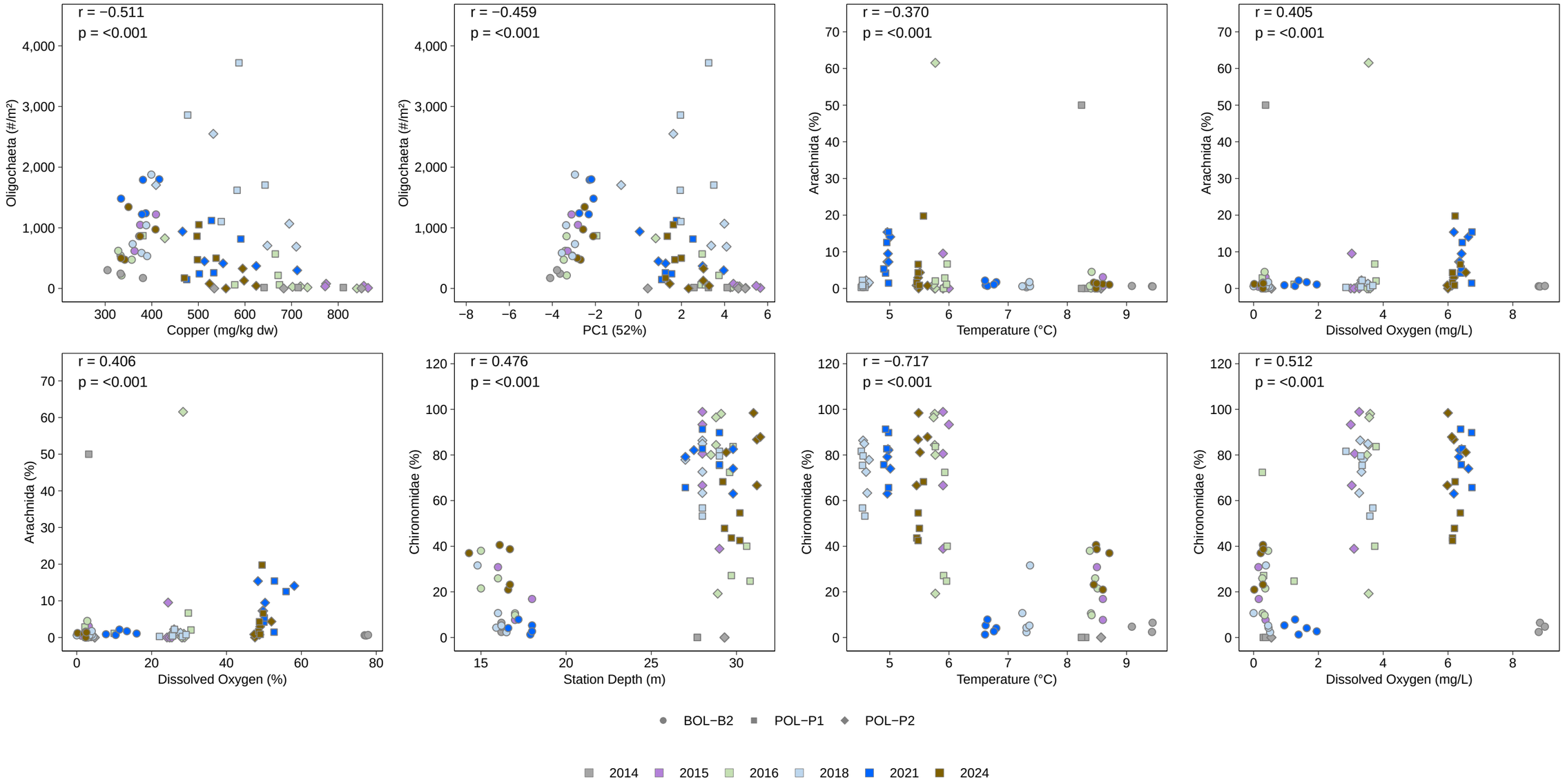

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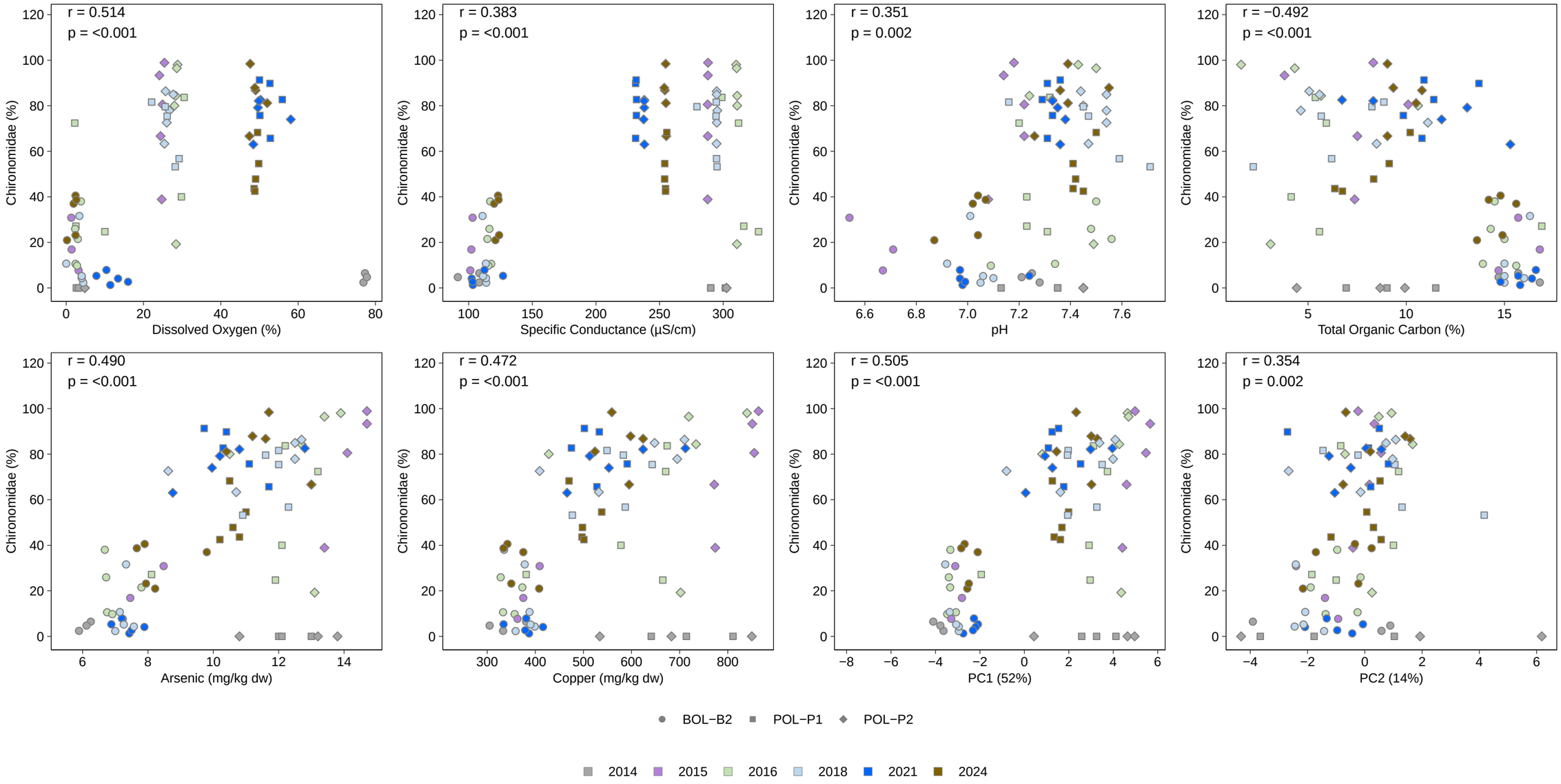

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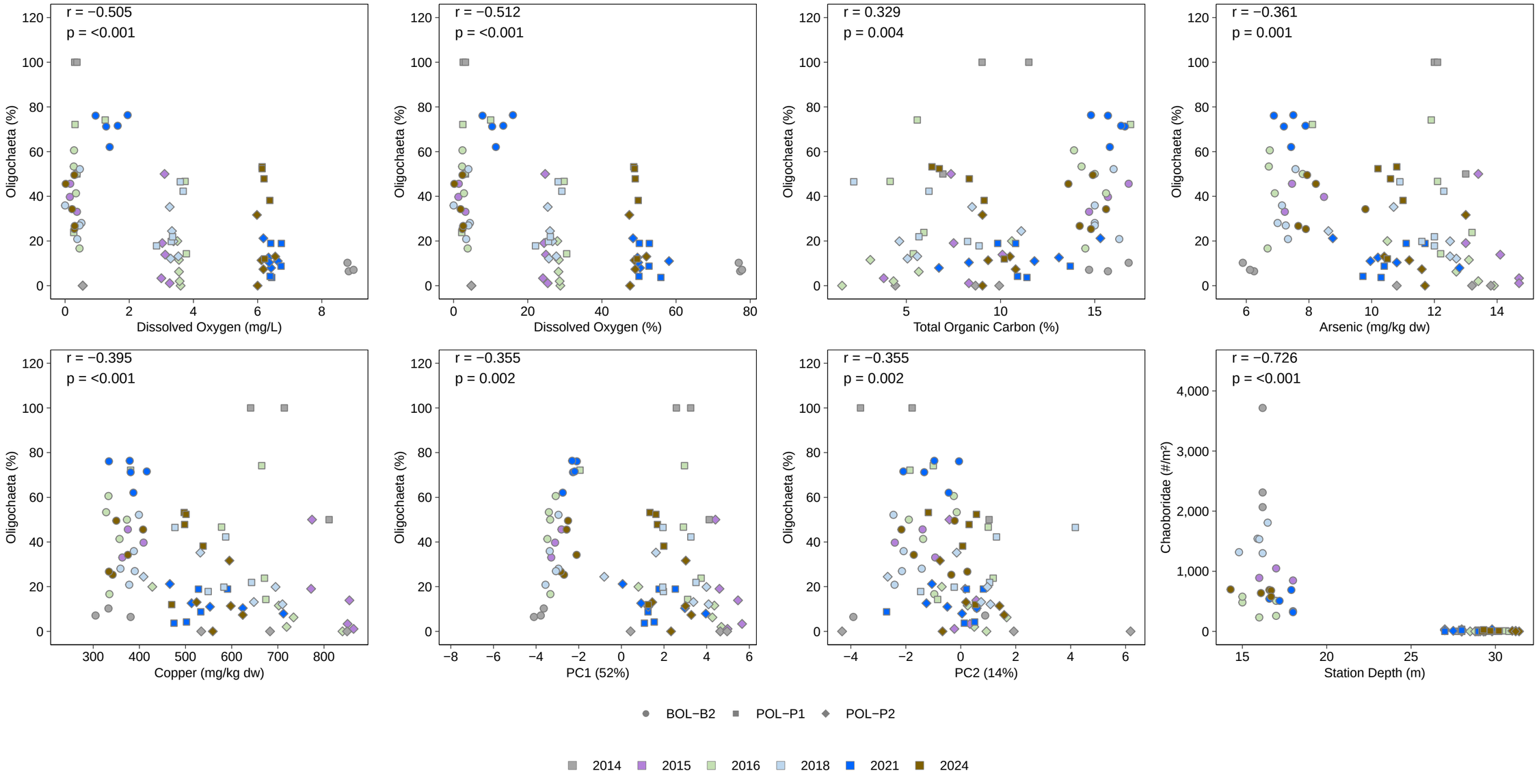

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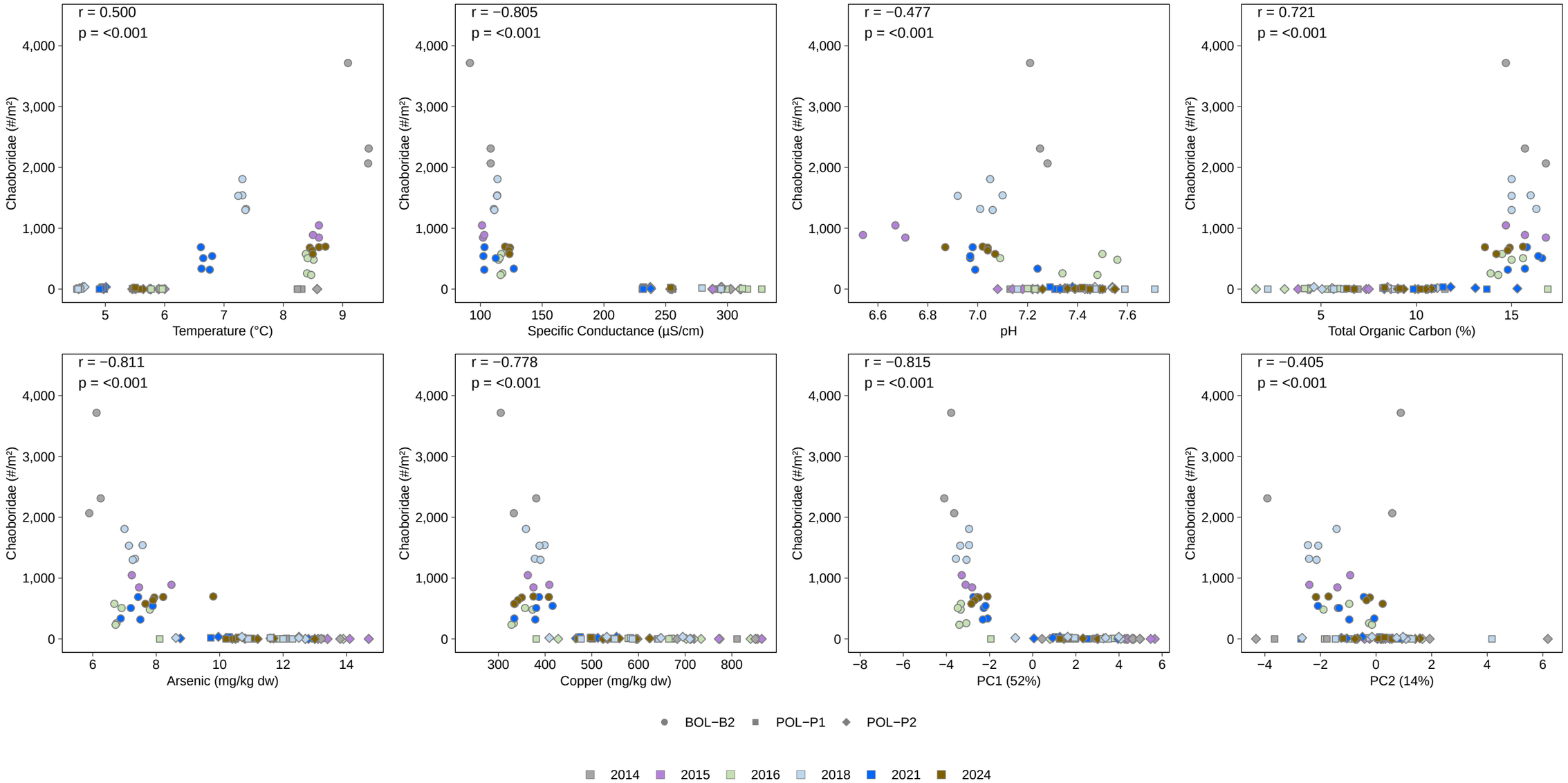

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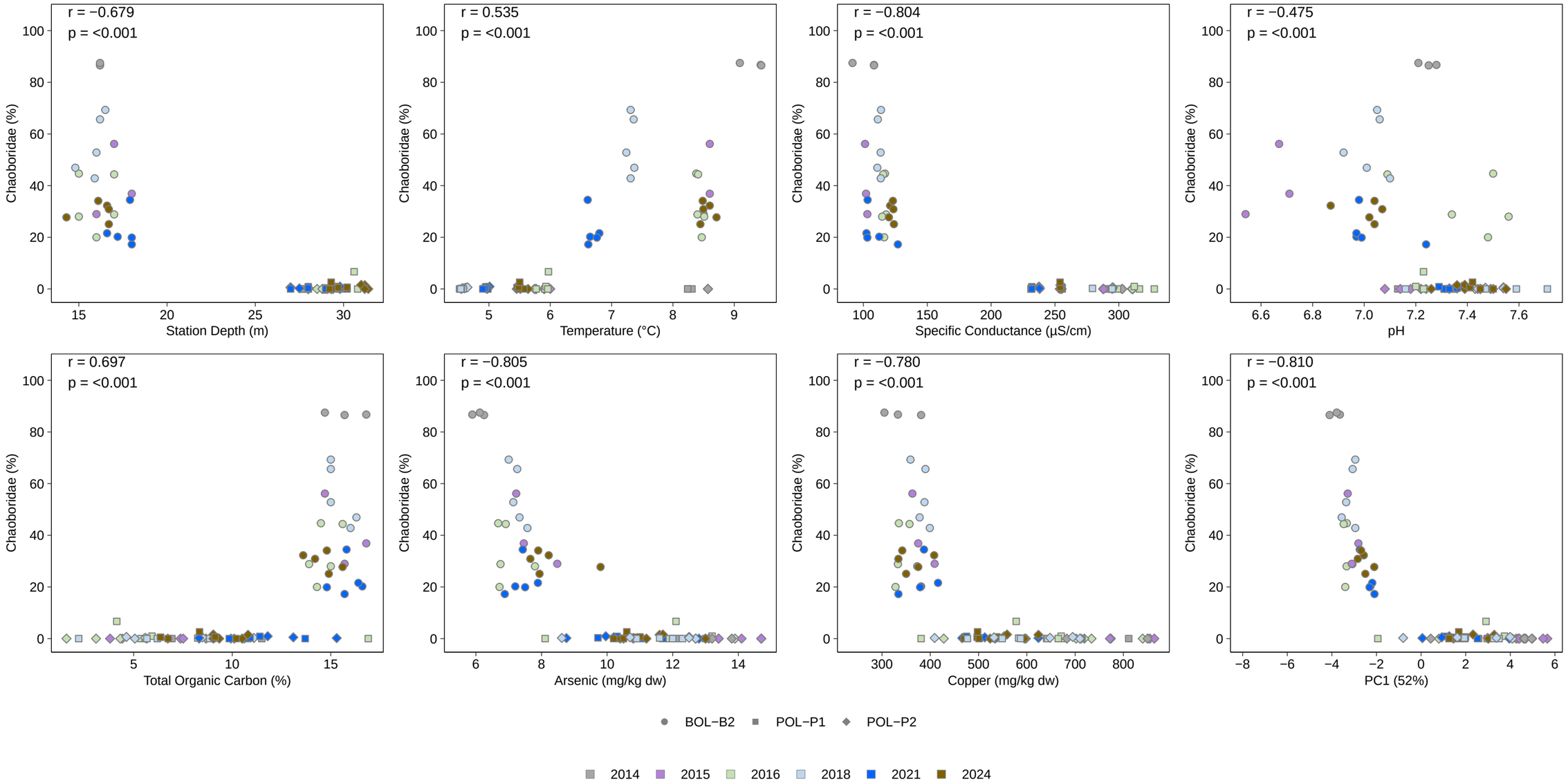

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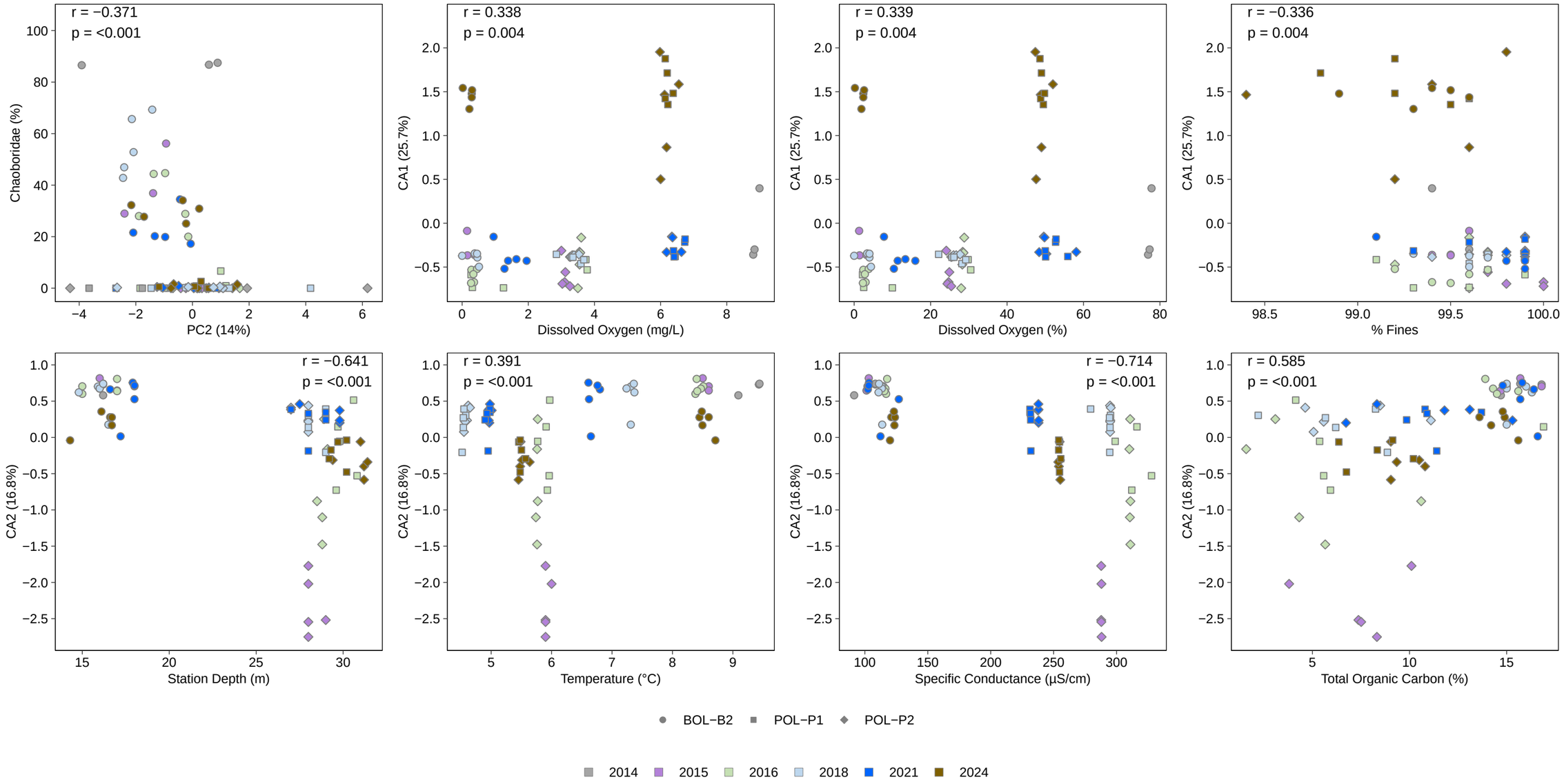

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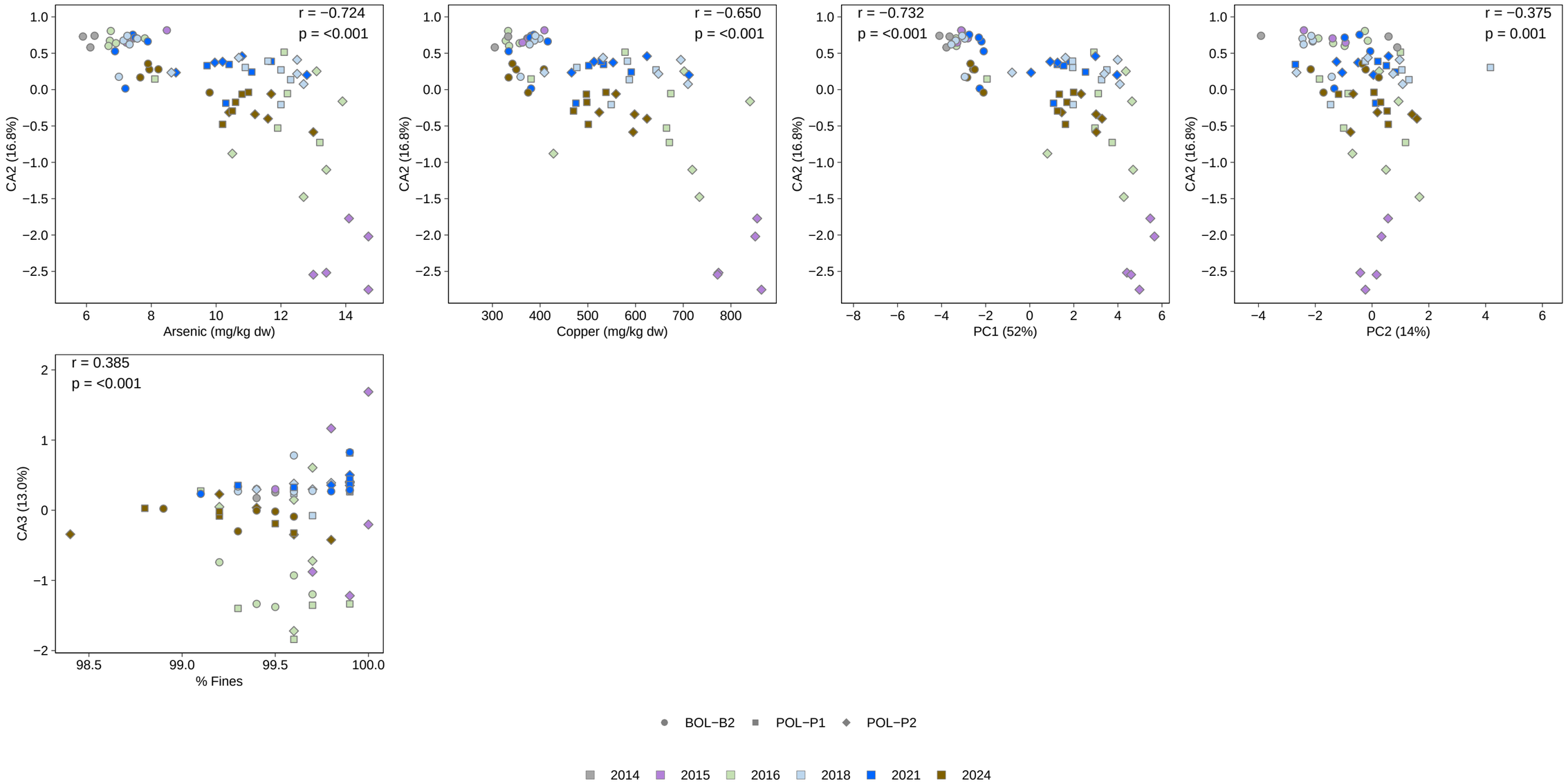

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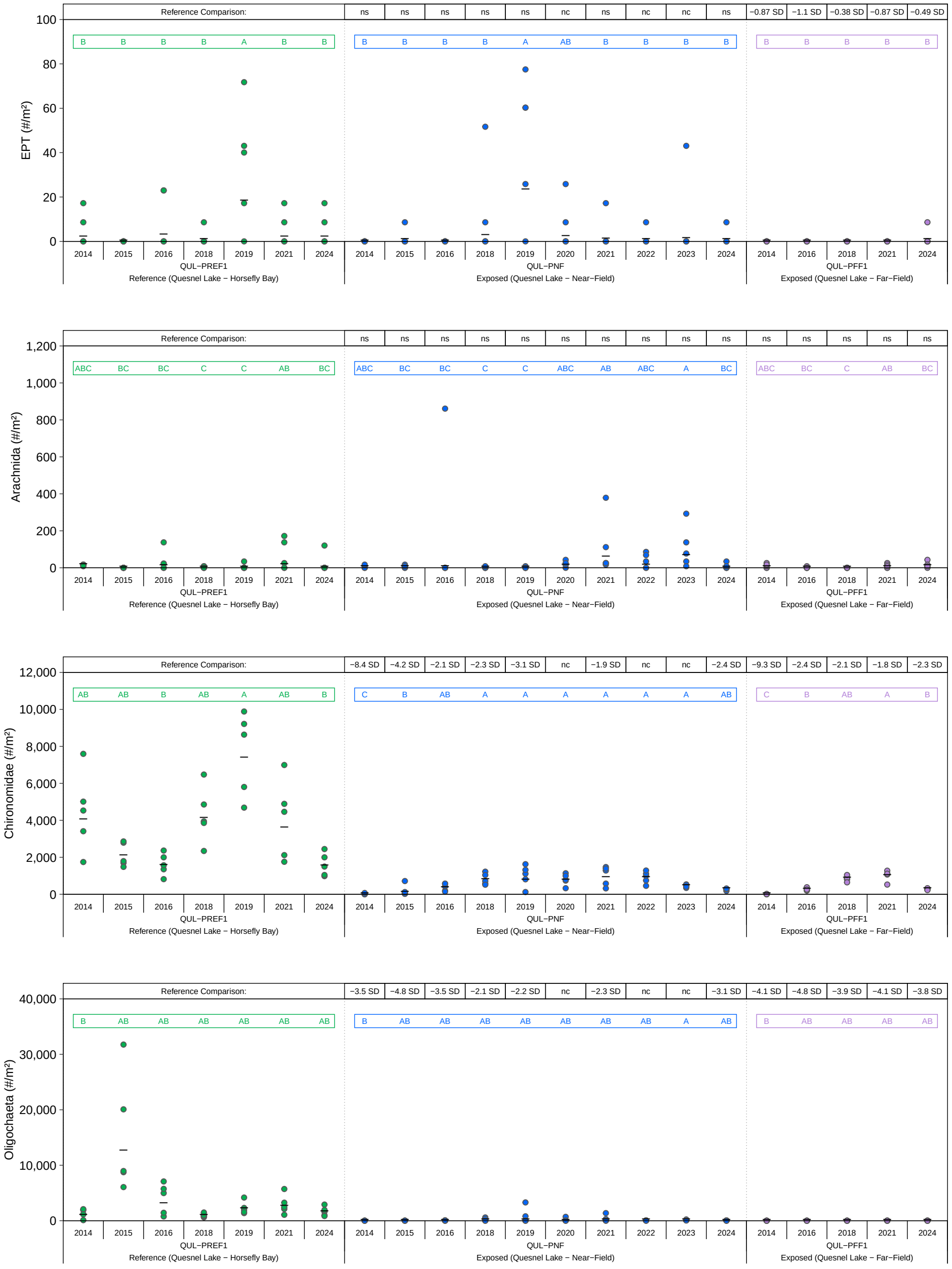
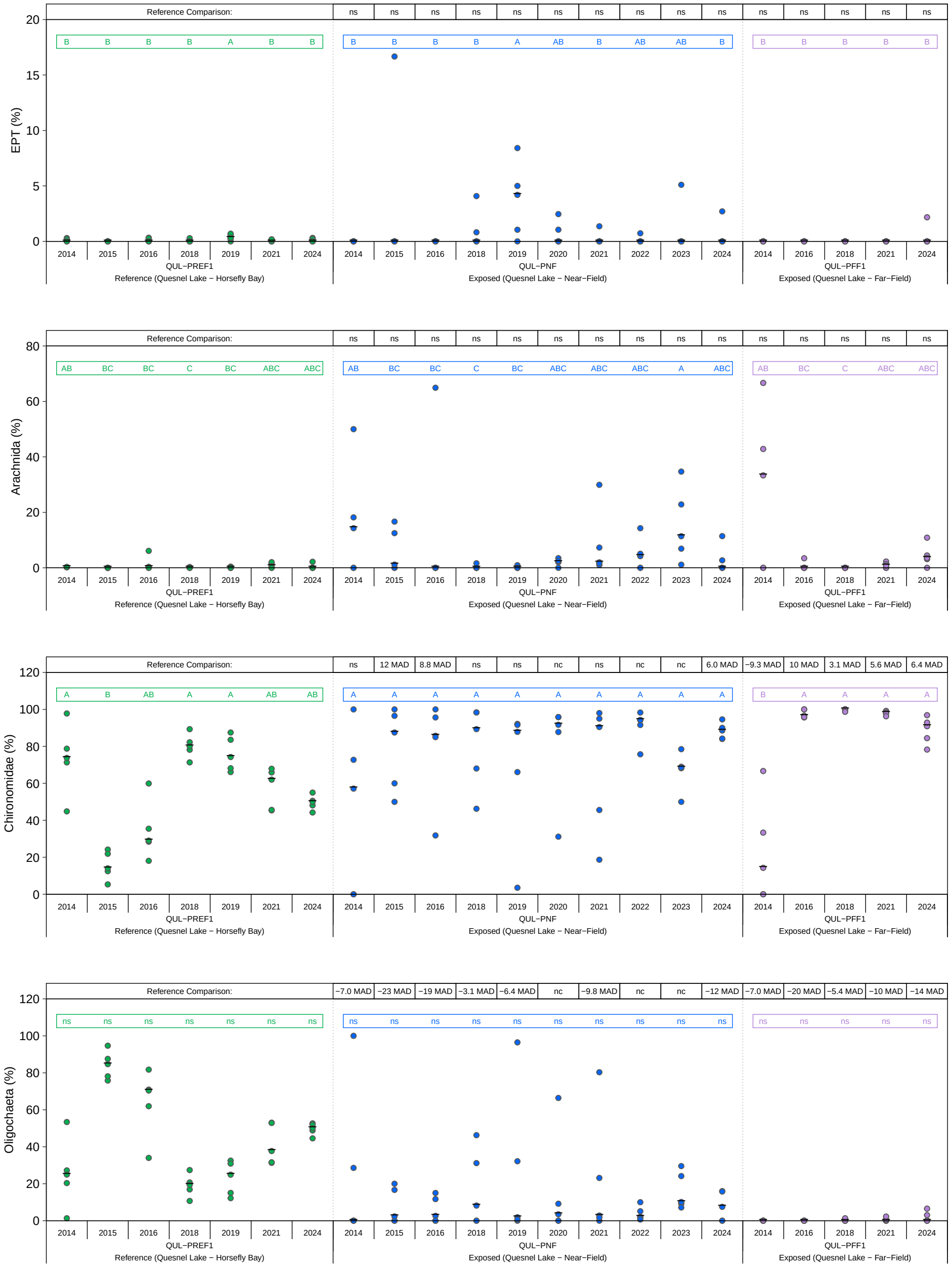


Figure E.4.6: Benthic Invertebrate Community Metrics for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Green represents reference data and blue or purple represents exposed data. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10− transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. 'nc' indicates no comparisons were possible; 'ns' indicates a non−significant contrast.



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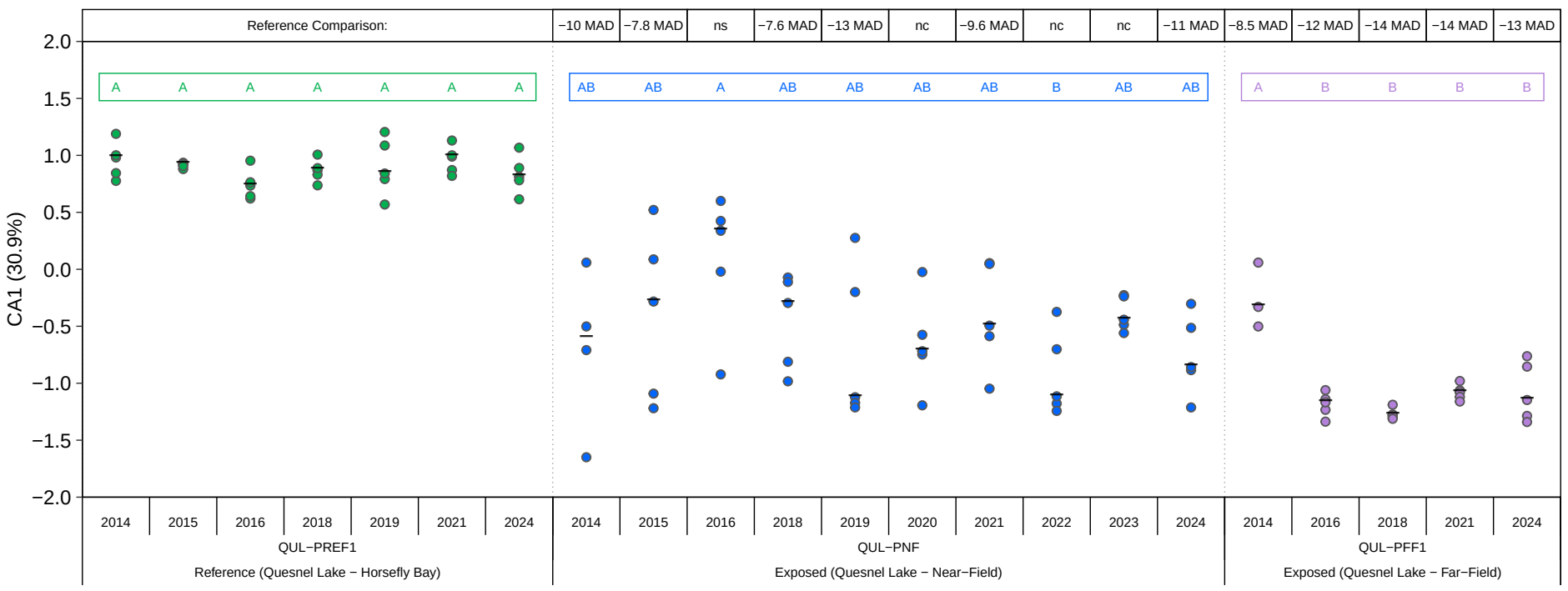

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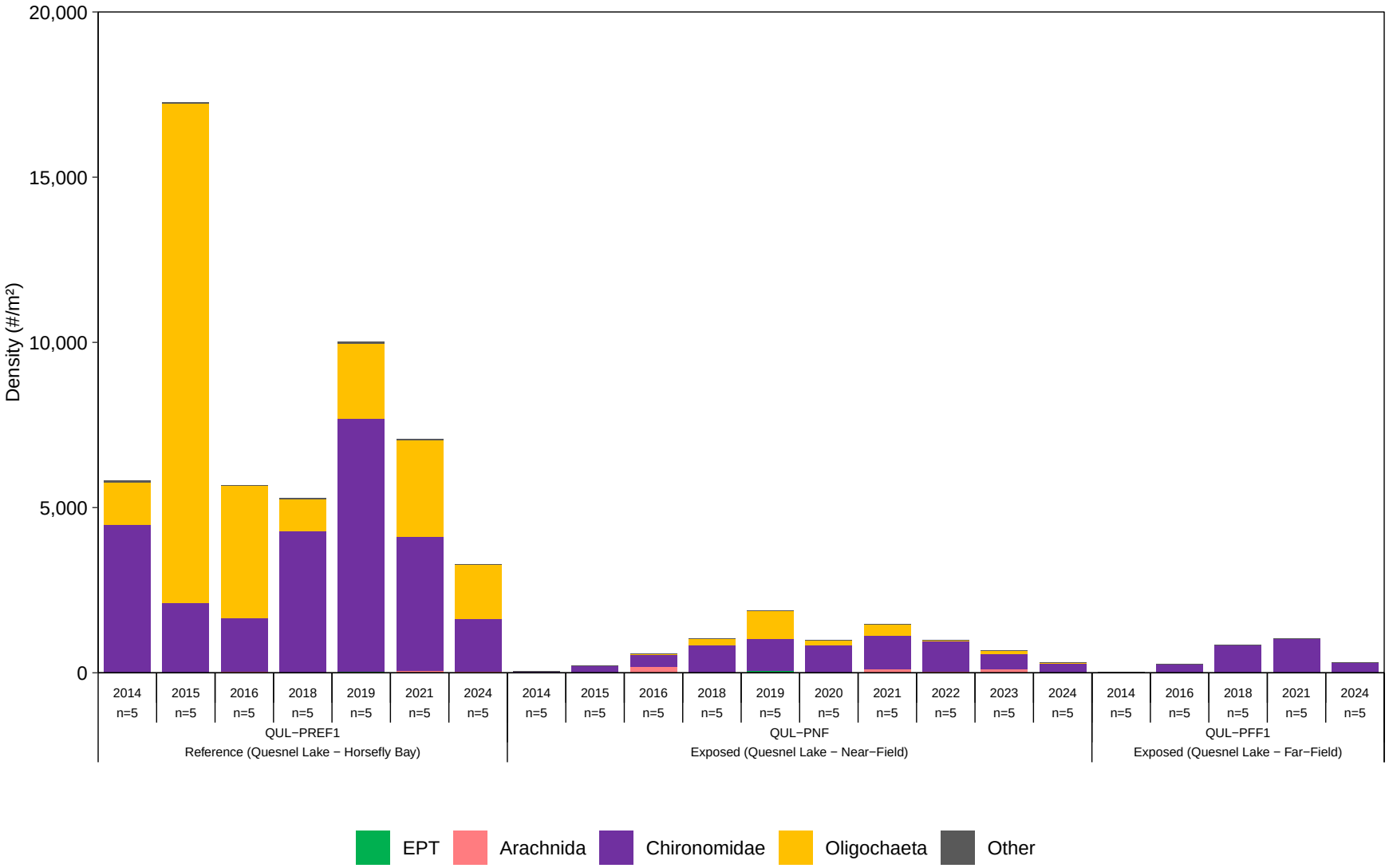


Figure E.4.7: Mean Densities of Major Benthic Invertebrate Taxa for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: #/m² = number per square metre. EPT = Ephemeroptera, Plecoptera, Trichoptera. QUL-PREF1 was not sampled in 2020, 2022, or 2023; QUL-PFF1 was not sampled in 2015, 2019, 2020, 2022, or 2023.

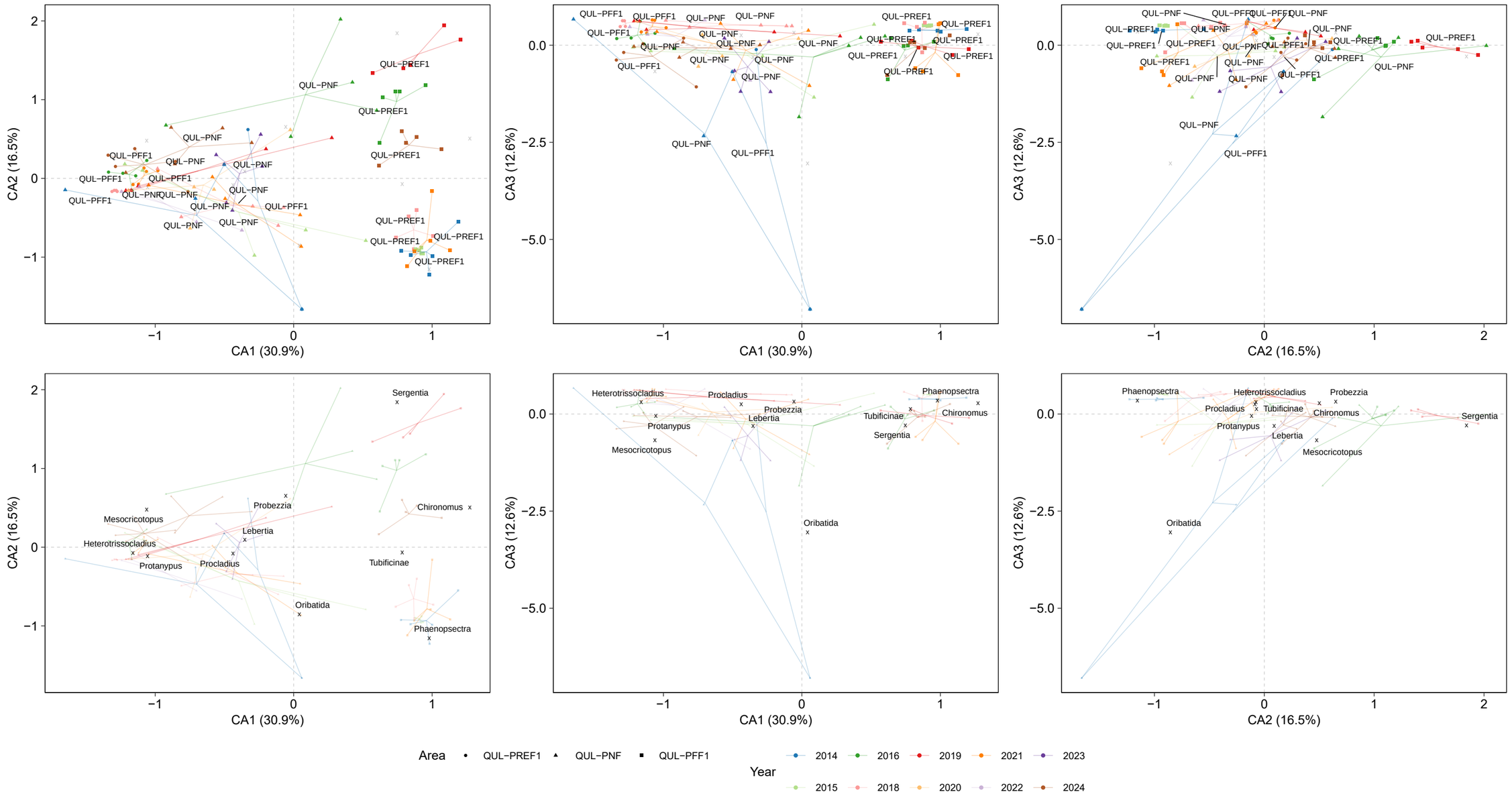


Figure E.4.8: Biplots of Correspondence Analysis Station and Taxon Scores of Benthic Invertebrate Community Data for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas

Notes: Analysis was completed using data at the Lowest Practicable Level (LPL). Taxa present at fewer than 1% of samples or less than 1% of total abundance were excluded from the analysis. Correspondence Analysis was conducted on ln(x+1)−transformed densities. No organisms were present in all replicate samples from QUL−PFF1−1 and QUL−PFF1−2 in 2014, therefore CA site scores could not be calculated.

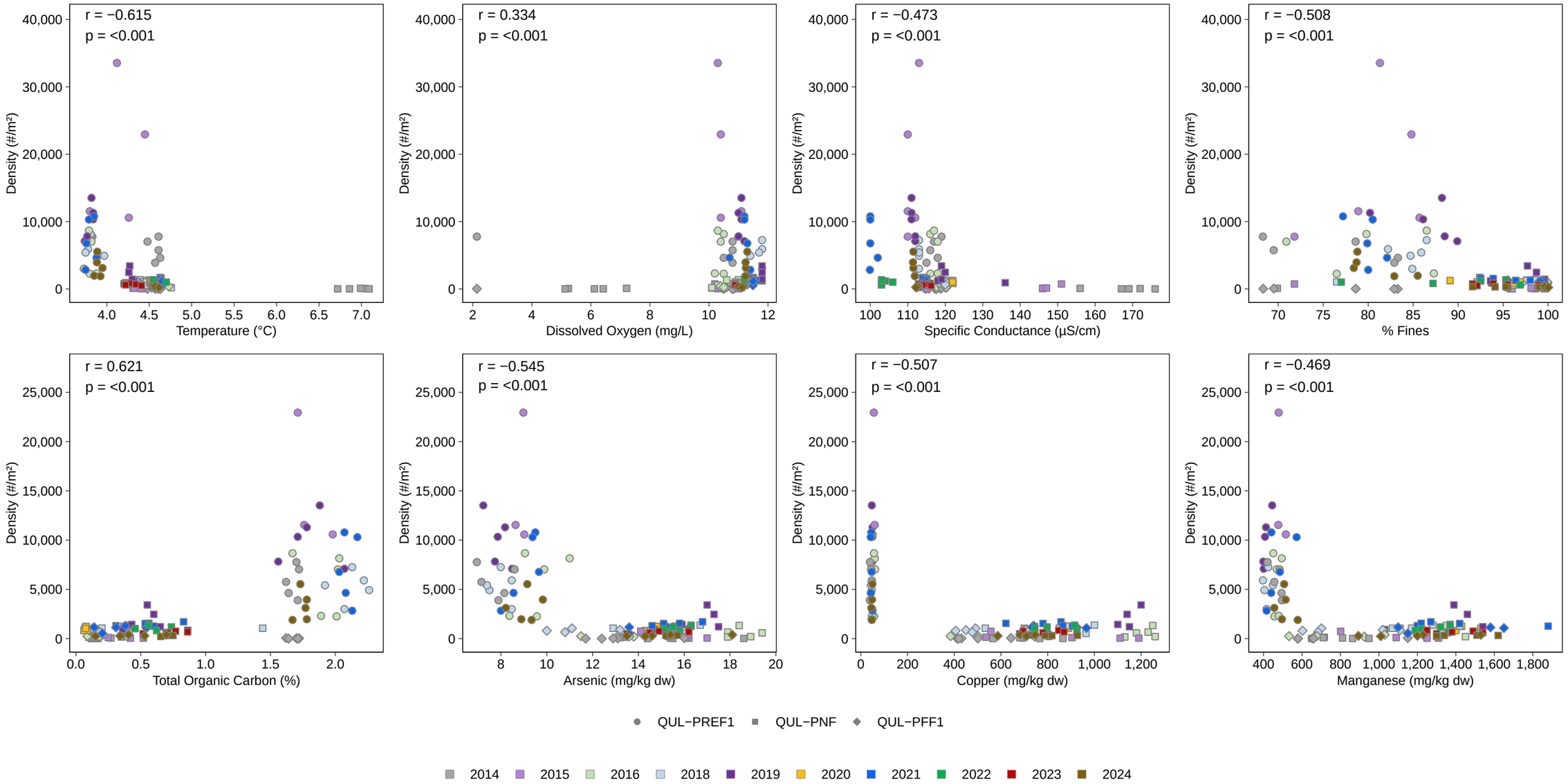
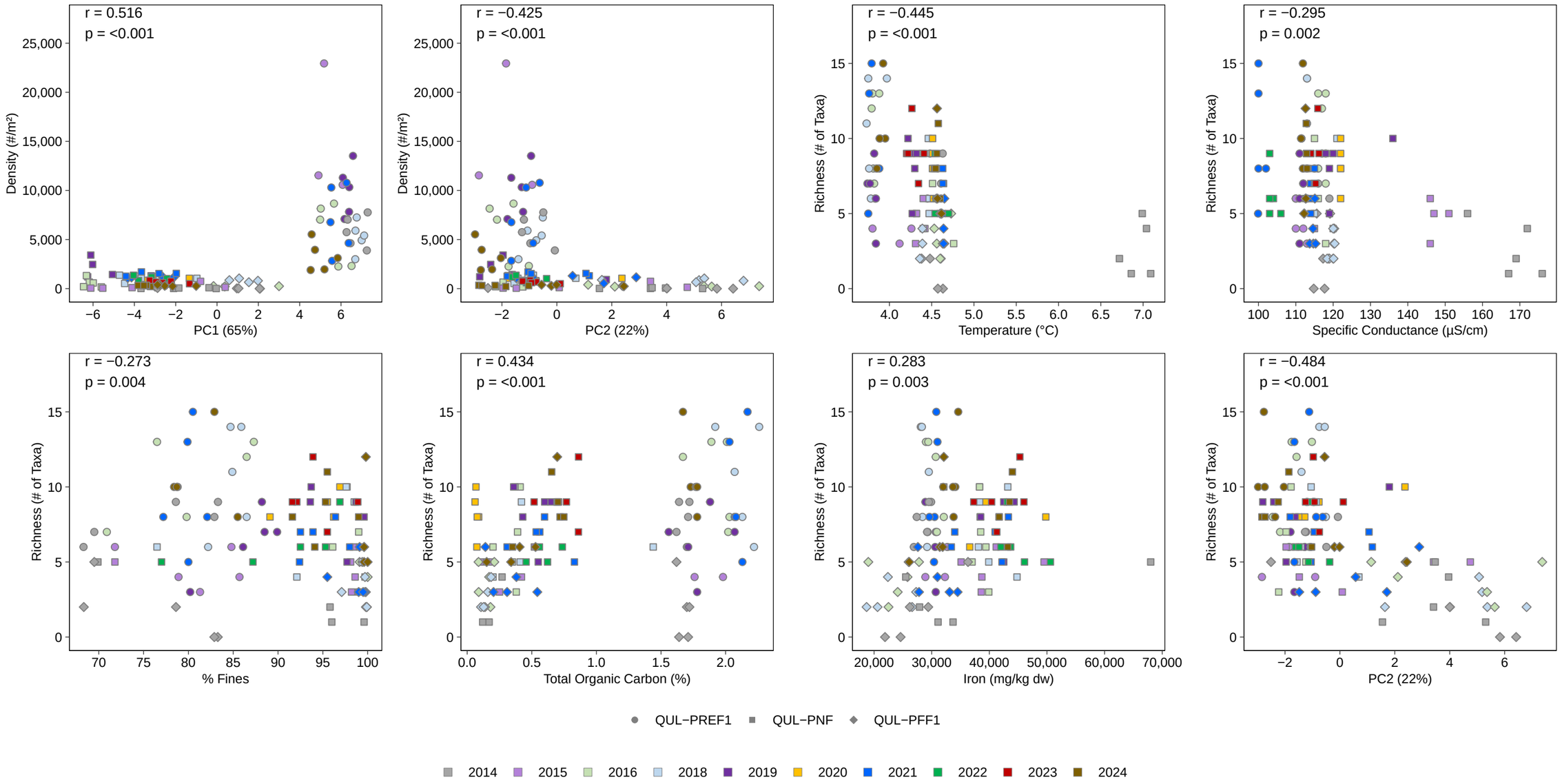


Figure E.4.9: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.00357, Bonferroni Corrected) Between Benthic Invertebrate Community Metrics and Chemical and Physical Sediment Quality Parameters for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Notes: #/m²= number per square metre, mg/kg dw = milligrams per kilogram dry weight. Correlations were completed using data from 2014 to 2024. QUL−PREF1 was not sampled in 2020, 2022, or 2023.



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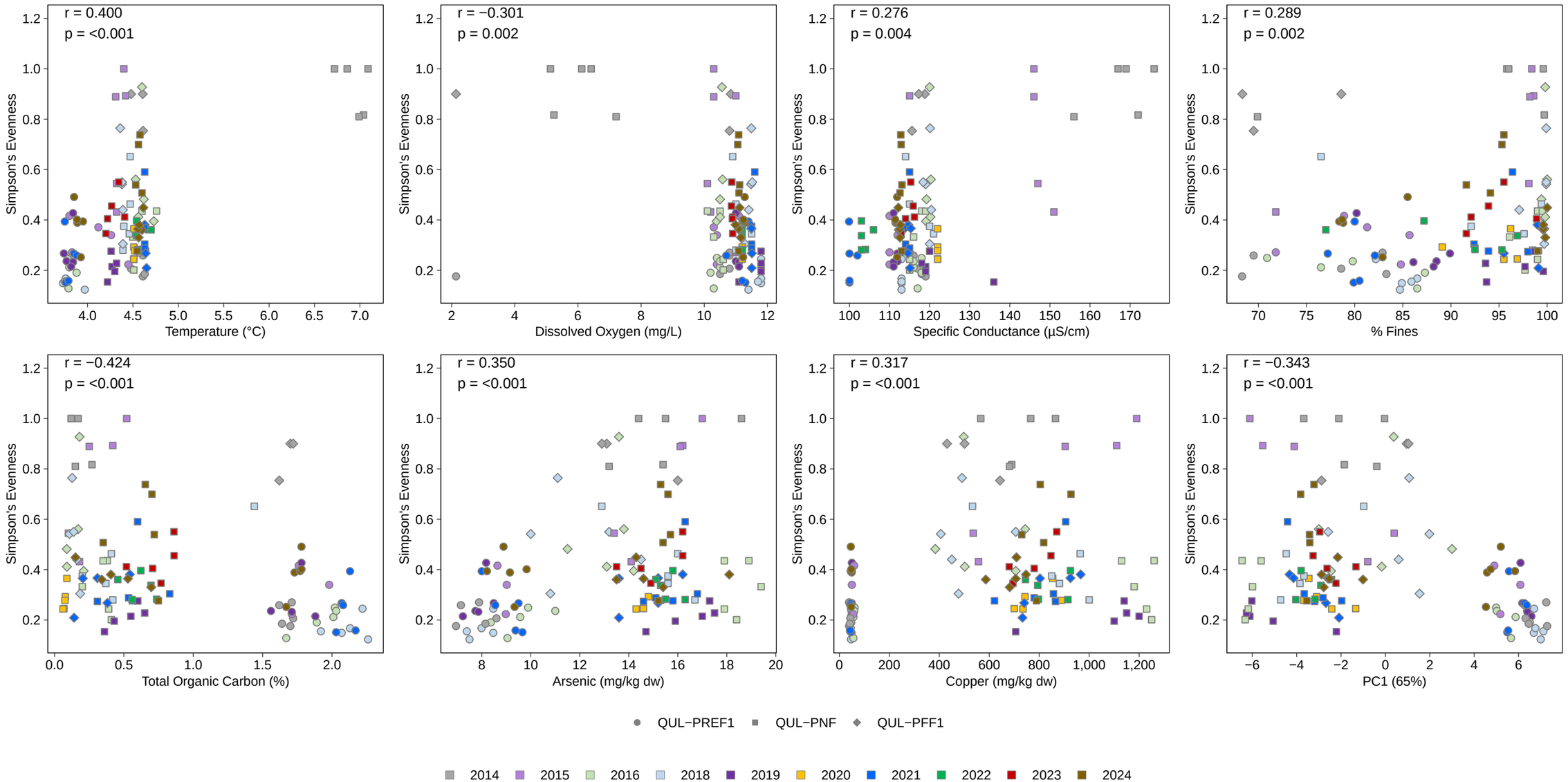

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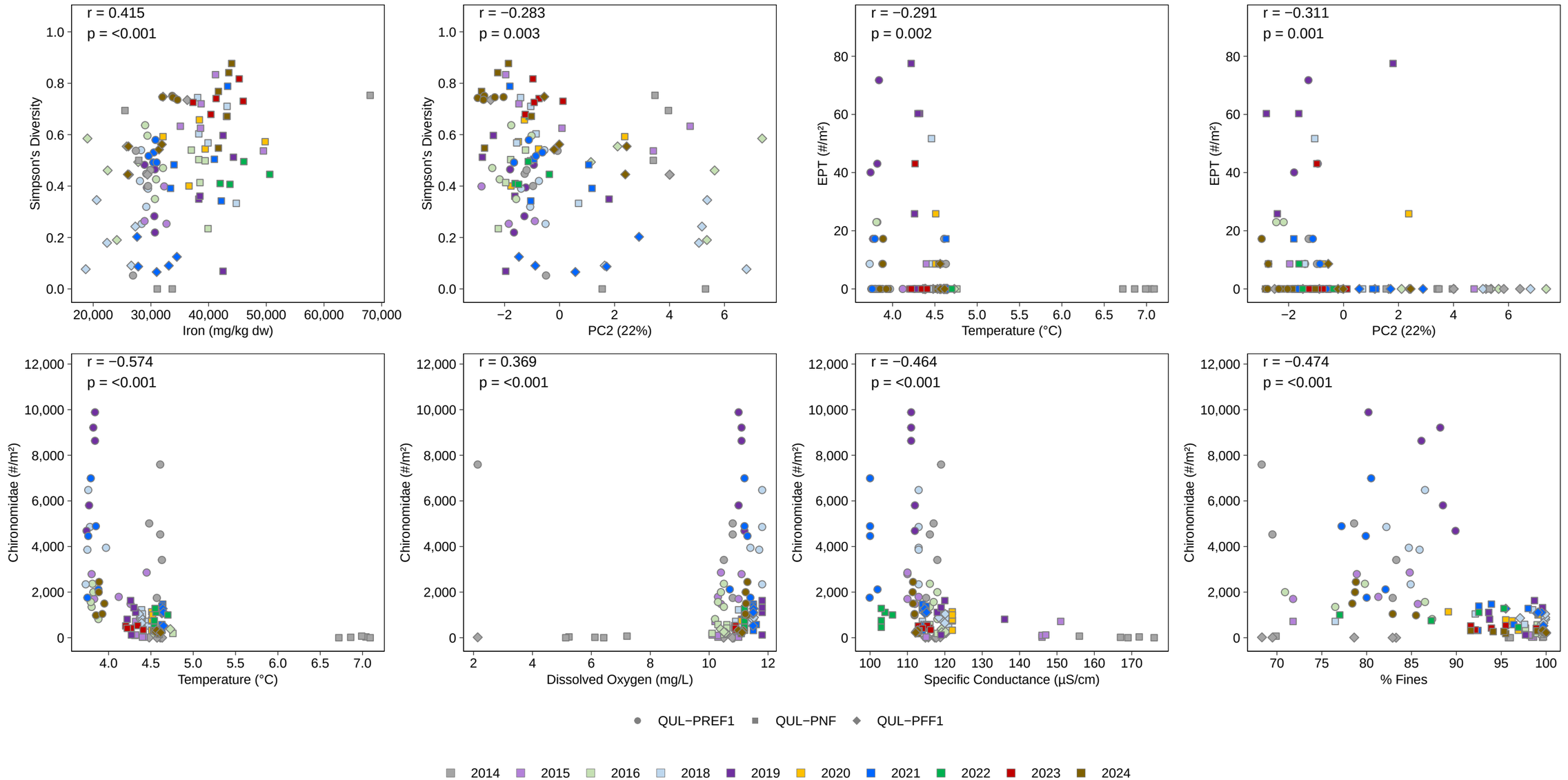

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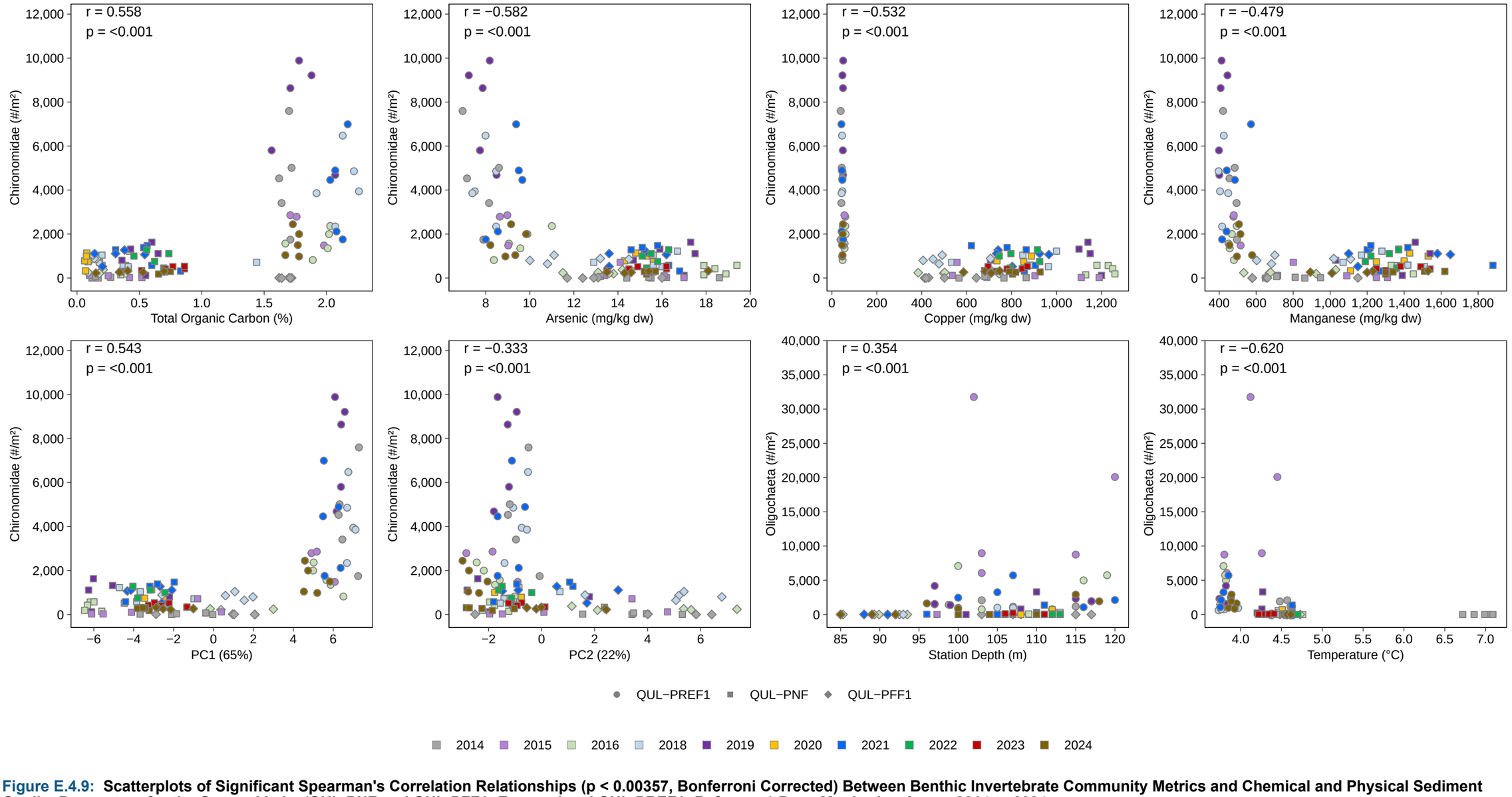

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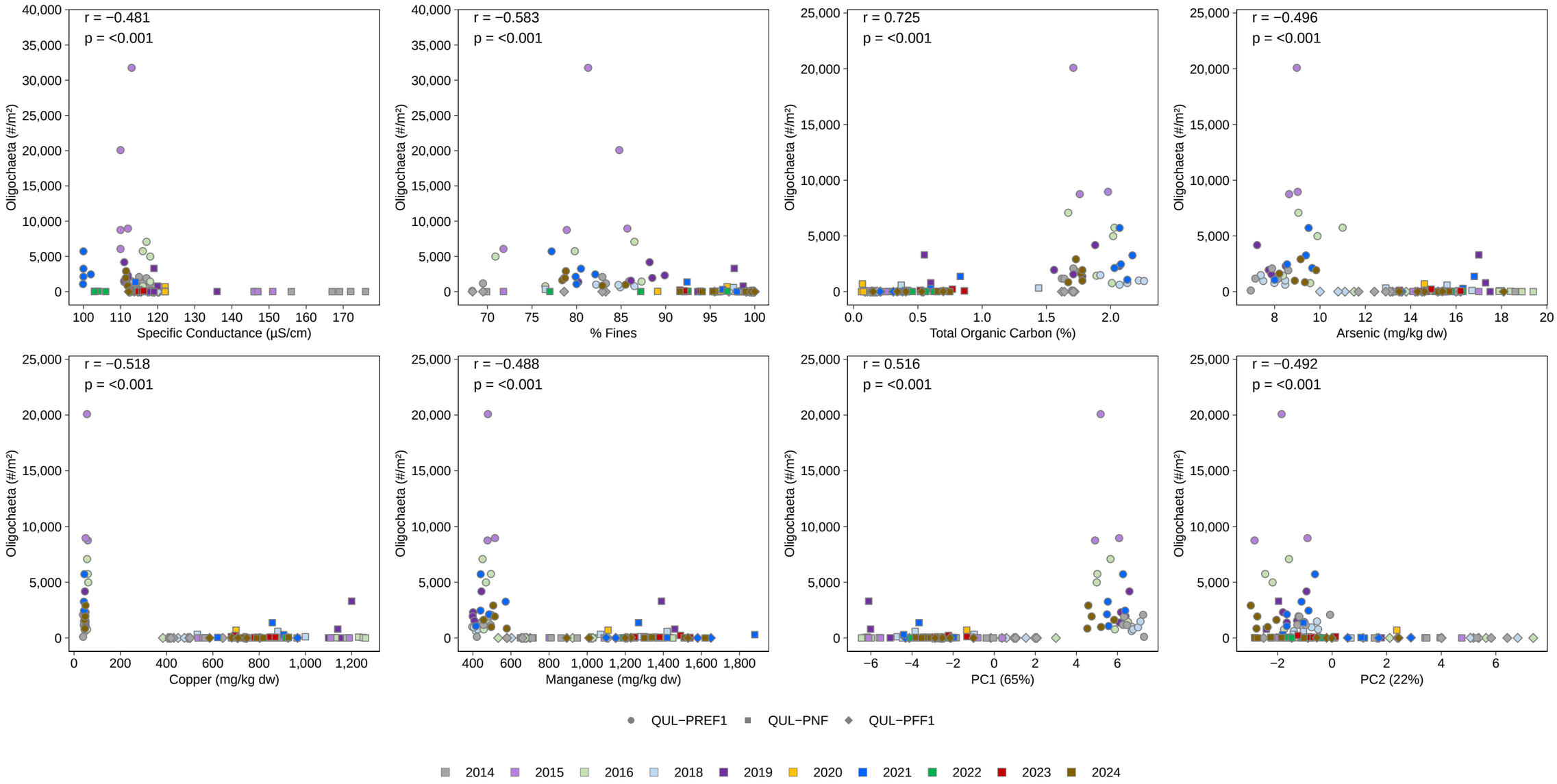

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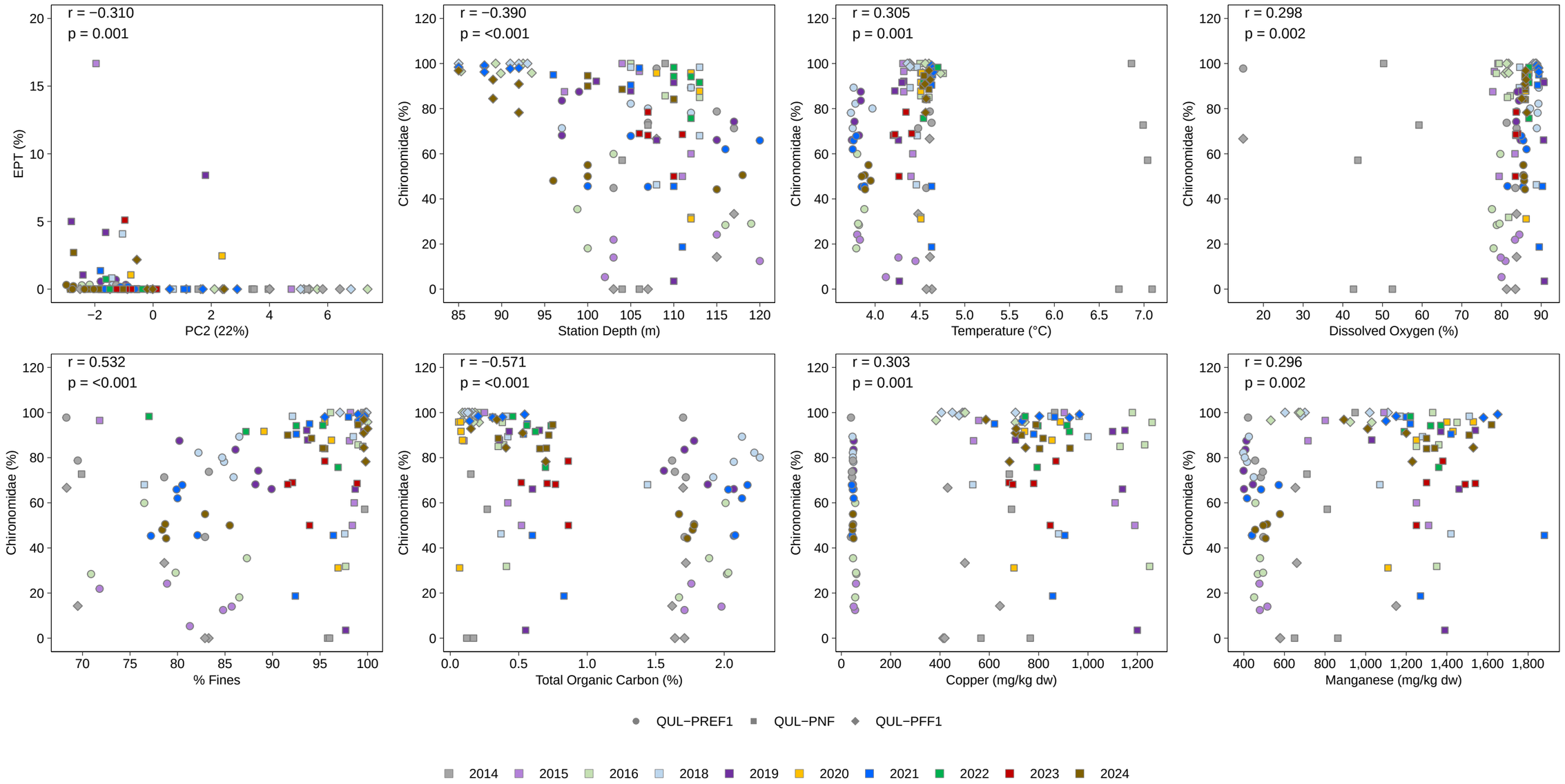

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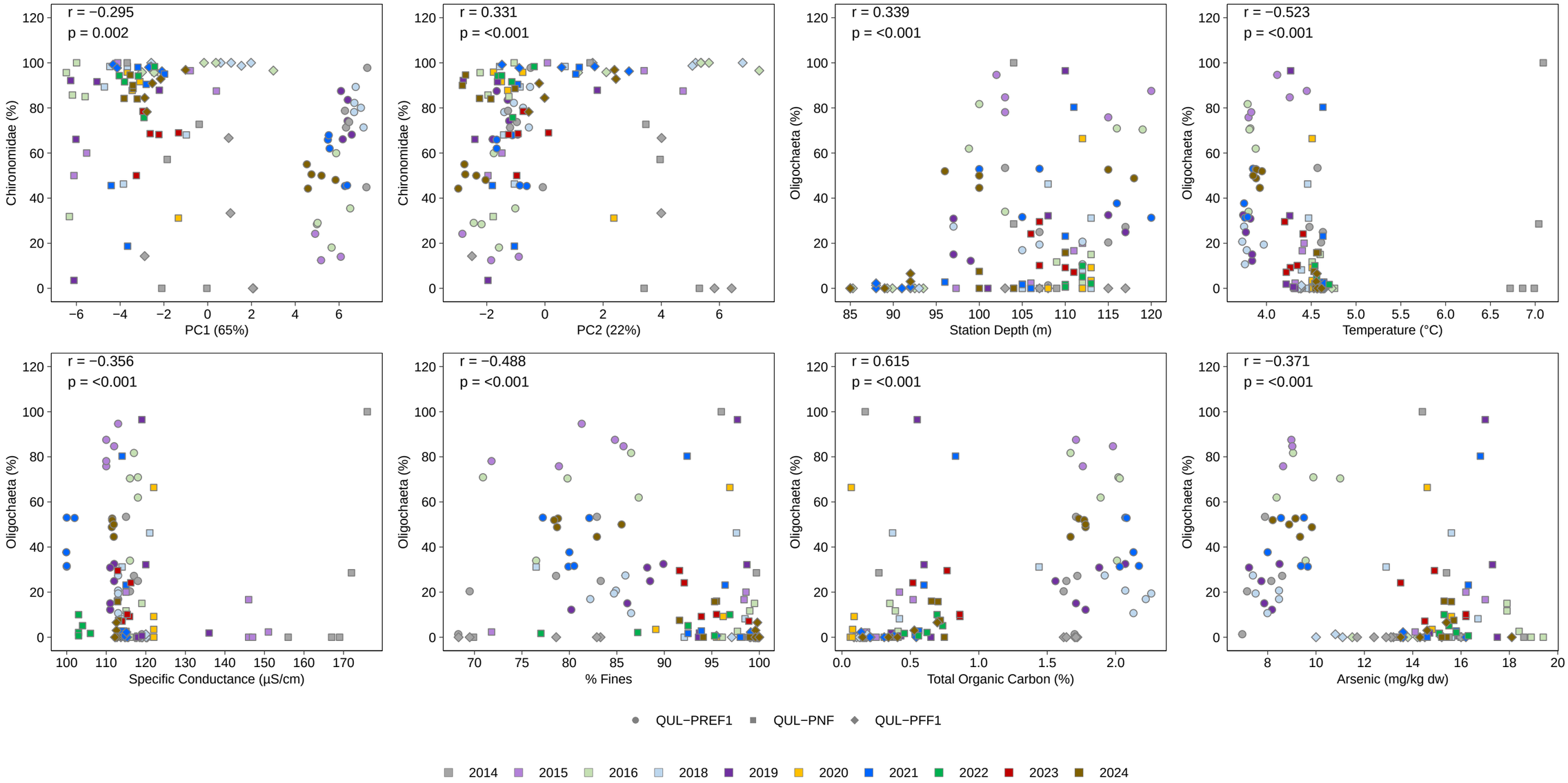

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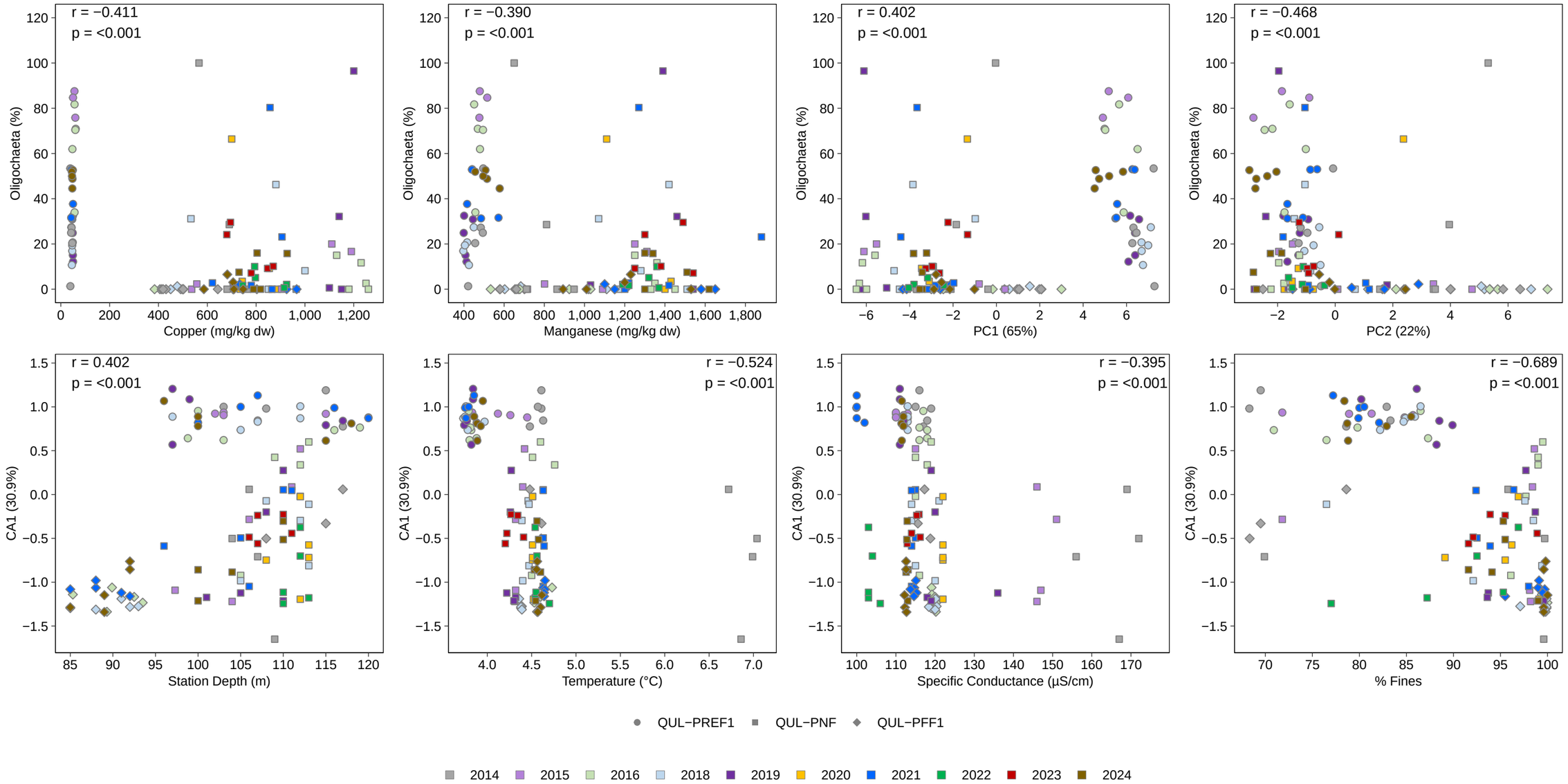

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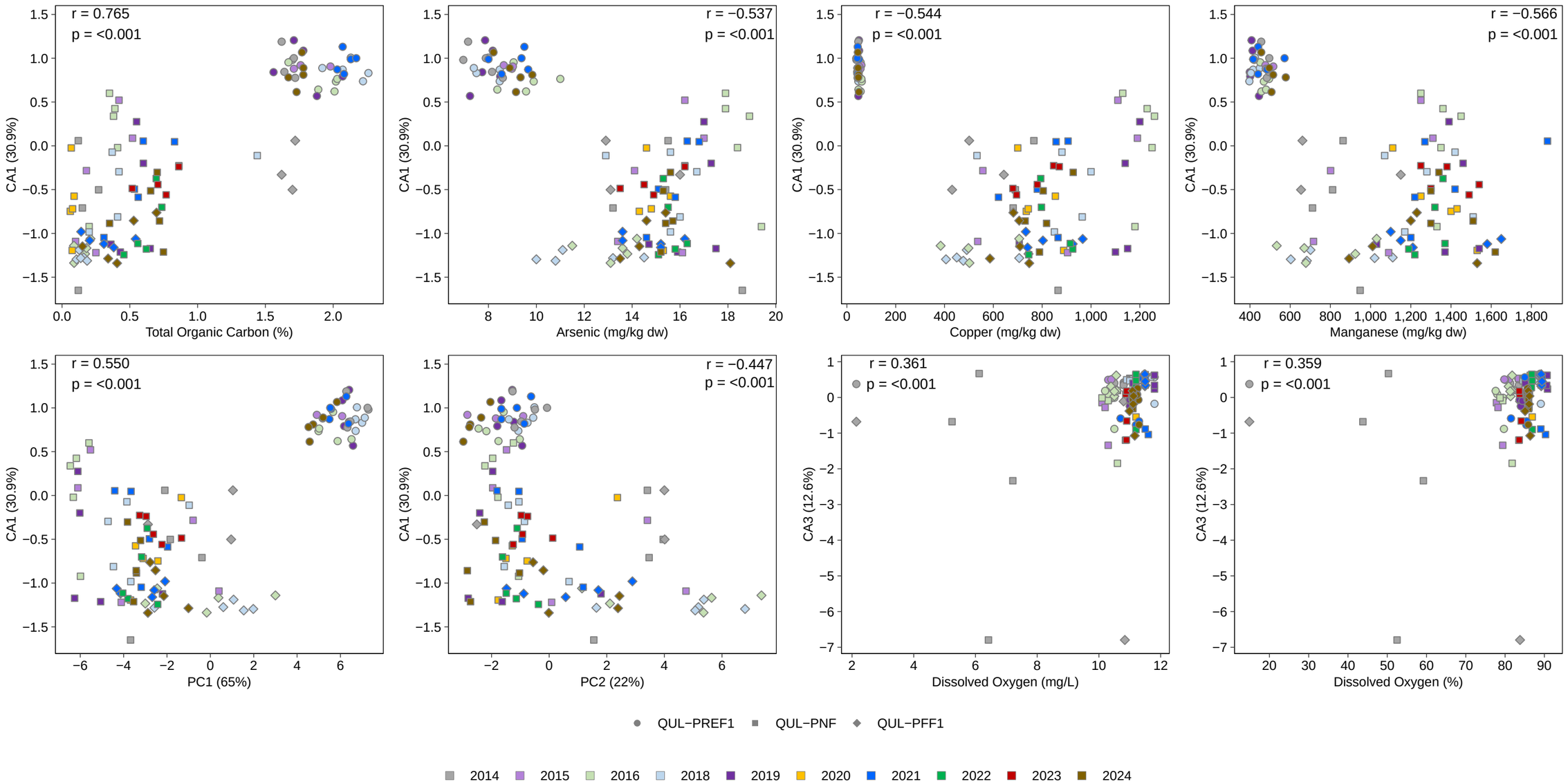

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Table E.4.1: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
EPT (#/m²)	log10(x+1)	-	-	0.006	Reference	BOL-B2	1999	402	A	B	B	B	B	B	B	Baseline	-6.0	-6.0	-5.1	-5.6	-4.9	-4.8	-2.2	-4.5
							2014	0															ns	ns
							2015	0															nc	ns
							2016	1.47															ns	ns
							2018	0.572															ns	ns
							2021	2.04															ns	ns
							2024	2.35															ns	ns
					Exposed	POL-P1	1999	44.7	A	B	nc	B	B	B	B	Baseline	-3.8	nc	-3.8	-3.8	-3.8	-3.3		-2.3
							2014	0																ns
							2016	0																ns
							2018	0																ns
							2021	0																ns
							2024	0.787																ns
						POL-P2	1999	3.43	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns		
							2014	0																
							2015	1.81																
							2016	0																
							2018	0																
							2021	0																
							2024	0.572																
Arachnida (#/m²)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	654	A	B	B	B	B	B	B	Baseline	-3.1	-2.9	-4.5	-3.0	-2.8	-3.2	-2.2	ns
							2014	18.1															-1.8	-2.6
							2015	23.0															nc	-2.2
							2016	2.47															ns	ns
							2018	18.8															ns	ns
							2021	24.9															2.0	2.3
							2024	14.3															ns	ns
					Exposed	POL-P1	1999	53.0	AB	C	nc	BC	AB	A	AB	Baseline	-2.7	nc	ns	ns	ns	ns		ns
							2014	1.49																ns
							2016	6.51																ns
							2018	41.7																ns
							2021	256																ns
							2024	55.1																-1.6
						POL-P2	1999	164	A	B	B	B	A	A	B	Baseline	-4.4	-3.9	-3.1	ns	ns	-2.6		
							2014	0																
							2015	0.787																
							2016	3.79																
							2018	84.8																
							2021	386																
							2024	7.53																

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation).

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.1: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas												Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
Chaoboridae (#/m²)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	424	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	-6.4	-6.4
							2014	2,609															-8.4	-8.4
							2015	924															nc	-7.3
							2016	385															-5.4	-6.3
							2018	1,489															-7.2	-5.0
							2021	459															-5.2	-4.2
							2024	655															-5.2	-5.9
					Exposed	POL-P1	1999	0	A	A	nc	A	A	A	A	Baseline	ns	nc	ns	ns	ns	ns		ns
							2014	0																ns
							2016	1.47																ns
							2018	0.787																2.1
							2021	2.65																ns
							2024	3.77																ns
						POL-P2	1999	0	B	B	B	B	A	A	AB	Baseline	ns	ns	ns	2.8	2.3	ns		
							2014	0																
							2015	0																
							2016	0																
							2018	12.3																
							2021	8.02																
							2024	1.47																
Chironomidae (#/m²)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	846	A	BC	AB	ABC	ABC	C	A	Baseline	-2.7	ns	ns	ns	-3.4	ns	-1.8	ns
							2014	126															-6.9	-6.9
							2015	375															nc	ns
							2016	226															ns	ns
							2018	193															4.6	4.5
							2021	75.2															5.5	5.2
							2024	678															ns	ns
					Exposed	POL-P1	1999	242	B	C	nc	B	A	A	B	Baseline	-7.8	nc	ns	4.3	3.8	ns		ns
							2014	0																ns
							2016	237																ns
							2018	5,009																ns
							2021	3,574																ns
							2024	725																ns
						POL-P2	1999	753	BC	D	C	C	A	AB	C	Baseline	-9.5	ns	ns	2.6	ns	ns		
							2014	0																
							2015	202																
							2016	475																
							2018	4,650																
							2021	2,880																
							2024	618																
Oligochaeta (#/m²)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	406	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	-1.8	-2.7
							2014	233															-2.5	-4.9
							2015	924															nc	-3.2
							2016	494															ns	-2.6
							2018	852															ns	ns
							2021	1,486															ns	ns
							2024	768															ns	-2.6
					Exposed	POL-P1	1999	56.4	BC	C	nc	B	A	AB	AB	Baseline	ns	nc	ns	3.2	ns	ns		ns
							2014	14.3																-2.5
							2016	208																-1.9
							2018	2,005																ns
							2021	384																ns
							2024	517																-2.2
						POL-P2	1999	20.0	B	C	B	B	A	A	B	Baseline	-2.8	ns	ns	3.6	2.8	ns		
							2014	0																
							2015	24.8																
							2016	26.0																
							2018	1,177																
							2021	454																
							2024	42.0																

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation).

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.1: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
EPT (%)	rank	0.061	<0.001	0.112	Reference	BOL-B2	1999	12.8	A	B	B	B	B	B	B	Baseline	nm	nm	nm	nm	nm	nm	ns	nm
							2014	0															ns	nm
							2015	0															nc	nm
							2016	0															ns	nm
							2018	0															ns	nm
							2021	0															ns	nm
							2024	0															ns	nm
					Exposed	POL-P1	1999	11.6	A	B	nc	B	B	B	B	Baseline	nm	nc	nm	nm	nm	nm		ns
							2014	0																ns
							2016	0																ns
							2018	0																ns
							2021	0																ns
							2024	0																ns
						POL-P2	1999	0	A	B	B	B	B	B	B	Baseline	nm	nm	nm	nm	nm	nm		
							2014	0																
							2015	0																
							2016	0																
							2018	0																
							2021	0																
							2024	0																
Arachnida (%)	rank	0.129	<0.001	0.171	Reference	BOL-B2	1999	19.3	A	C	C	C	C	AB	BC	Baseline	-42	-42	-43	-42	ns	-40	ns	ns
							2014	0.602															ns	ns
							2015	0.625															nc	ns
							2016	0															ns	ns
							2018	0.613															ns	ns
							2021	1.08															ns	ns
							2024	1.21															ns	ns
					Exposed	POL-P1	1999	11.6	A	C	nc	C	C	AB	BC	Baseline	-26	nc	-21	-25	ns	-16		ns
							2014	0																ns
							2016	2.04																ns
							2018	0.421																ns
							2021	5.33																ns
							2024	4.29																ns
						POL-P2	1999	14.9	A	C	C	C	C	AB	BC	Baseline	-33	-33	-33	-30	ns	-31		
							2014	0																
							2015	0																
							2016	0																
							2018	1.28																
							2021	9.48																
							2024	0.833																
Chaoboridae (%)	rank	-	-	0.002	Reference	BOL-B2	1999	13.2	B	A	AB	AB	AB	AB	AB	Baseline	nm	ns	ns	ns	ns	ns	nm	nm
							2014	86.8															nm	nm
							2015	36.9															nc	nm
							2016	28.9															nm	nm
							2018	52.8															nm	nm
							2021	20.2															nm	nm
							2024	30.9															nm	nm
					Exposed	POL-P1	1999	0	A	A	nc	A	A	A	A	Baseline	ns	nc	ns	ns	ns	ns		ns
							2014	0																ns
							2016	0																ns
							2018	0																nm
							2021	0																ns
							2024	0.532																ns
						POL-P2	1999	0	AB	AB	B	B	A	A	AB	Baseline	ns	ns	ns	ns	ns	ns		
							2014	0																
							2015	0																
							2016	0																
							2018	0.321																
							2021	0.242																
							2024	0																

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation).

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.1: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
Chironomidae (%)	rank	-	-	<0.001	Reference	BOL-B2	1999	30.1	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns	4.9
							2014	4.73															ns	ns
							2015	16.9															nc	8.1
							2016	21.5															2.3	8.0
							2018	5.22															8.9	9.2
							2021	4.11															10.0	9.5
							2024	37.0															ns	6.3
					Exposed	POL-P1	1999	57.1	AB	C	nc	B	AB	A	B	Baseline	-7.3	nc	ns	ns	ns	ns		ns
							2014	0																ns
							2016	40.0																5.6
							2018	75.4																ns
							2021	82.7																ns
							2024	47.8																4.9
						POL-P2	1999	68.9	A	B	A	A	A	A	A	Baseline	-8.7	ns	ns	ns	ns	ns		
							2014	0																
							2015	80.6																
							2016	84.4																
							2018	77.9																
							2021	79.2																
							2024	86.8																
Oligochaeta (%)	log10(x+1)	-	-	<0.001	Reference	BOL-B2	1999	14.4	CD	D	ABC	AB	BCD	A	BC	Baseline	ns	ns	2.2	ns	4.0	ns	ns	ns
							2014	7.92															5.1	ns
							2015	39.4															nc	-1.8
							2016	43.5															ns	-2.8
							2018	32.4															ns	ns
							2021	71.4															-4.3	-4.1
							2024	35.9															ns	-1.9
					Exposed	POL-P1	1999	14.5	CD	A	nc	B	BCD	D	BC	Baseline	4.6	nc	2.3	ns	ns	ns		ns
							2014	81.7																-5.9
							2016	44.1																-2.9
							2018	29.1																ns
							2021	10.7																ns
							2024	39.8																-2.2
						POL-P2	1999	6.63	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns		
							2014	0																
							2015	16.3																
							2016	7.72																
							2018	20.7																
							2021	12.5																
							2024	12.2																
CA1 (25.7%)	rank	-	-	0.002	Reference	BOL-B2	1999	-51.1	BC	AB	AB	C	BC	BC	A	Baseline	ns	ns	ns	ns	ns	27	ns	ns
							2014	-29.9															nc	nc
							2015	-36.1															nc	-4.2
							2016	-58.1															ns	3.3
							2018	-37.2															ns	ns
							2021	-42.8															ns	1.4
							2024	148															ns	ns
					Exposed	POL-P1	1999	35.2	B	nc	nc	C	BC	B	A	Baseline	nc	nc	-13	ns	ns	15		ns
							2014	-																nc
							2016	-58.7																3.4
							2018	-38.9																ns
							2021	-31.6																ns
							2024	148																ns
						POL-P2	1999	-42.4	BC	nc	C	BC	BC	AB	A	Baseline	nc	ns	ns	ns	ns	26		
							2014	-																
							2015	-67.2																
							2016	-33.8																
							2018	-36.6																
							2021	-32.8																
							2024	147																

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation).

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Table E.4.1: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					1999 (pre-breach)	2014	2015	2016	2018	2021	2024	1999 (pre-breach)	2014	2015	2016	2018	2021	2024	POL-P1	POL-P2
CA2 (16.8%)	rank	-	-	<0.001	Reference	BOL-B2	1999	-65.3	C	A	A	A	AB	AB	B	Baseline	10	10	9.9	9.9	9.8	7.0	ns	ns
							2014	73.0															nc	nc
							2015	70.4															nc	-24
							2016	67.2															-5.4	-12
							2018	67.5															-3.0	-3.3
							2021	66.2															-2.5	ns
							2024	27.7															-3.4	-4.6
					Exposed	POL-P1	1999	-25.6	C	nc	nc	ABC	AB	A	BC	Baseline	nc	nc	ns	3.9	4.4	ns		ns
							2014	-																nc
							2016	-5.44																ns
							2018	27.1																ns
							2021	32.9																ns
							2024	-17.4																ns
						POL-P2	1999	-158	B	nc	B	B	A	A	B	Baseline	nc	ns	ns	14	15	ns		
							2014	-																
							2015	-252																
							2016	-88.0																
							2018	23.5																
							2021	37.2																
							2024	-34.0																
CA3 (13.0%)	rank	-	-	0.036	Reference	BOL-B2	1999	5.24	AB	A	A	B	A	A	AB	Baseline	ns	ns	ns	ns	ns	ns	4.0	13
							2014	25.6															nc	nc
							2015	30.2															nc	ns
							2016	-120															ns	16
							2018	27.6															ns	ns
							2021	27.8															ns	ns
							2024	-1.81															ns	ns
					Exposed	POL-P1	1999	37.0	A	nc	nc	C	AB	A	BC	Baseline	nc	nc	-22	ns	ns	-5.7		ns
							2014	-																nc
							2016	-135																ns
							2018	26.3																ns
							2021	36.4																ns
							2024	-8.24																ns
						POL-P2	1999	105	A	nc	BC	C	AB	AB	C	Baseline	nc	-16	-13	ns	ns	-18		
							2014	-																
							2015	-20.4																
							2016	4.75																
							2018	38.0																
							2021	39.0																
							2024	-34.2																

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation).

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.2: Spearman's Rank Correlations Between Benthic Invertebrate Community Metrics and Supporting Environmental Measures for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Benthic Invertebrate Community Metric	Correlation Parameter	Station Depth (m)	Physical/Chemical Parameter									Sediment Analyte of Interest Concentrations (<63 µm Fraction)	
			Bottom *In Situ* Water Quality					Sediment Parameters					
			Temp (°C)	DO (mg/L)	DO (%)	Specific Conductance (µS/cm)	pH (pH Units)	Fines (%)	Total Organic Carbon (%)	PCA 1 (52%)	PCA 2 (14%)	Arsenic (mg/kg)	Copper (mg/kg)
Density (#/m²)	Correlation Coefficient	-0.259	-0.461	0.244	0.236	-0.261	0.0813	0.269	0.205	-0.315	-0.0745	-0.322	-0.316
	Sig. (2-tailed)	0.023	<0.001	0.033	0.039	0.023	0.482	0.018	0.074	0.005	0.519	0.004	0.005
Richness (# of Taxa)	Correlation Coefficient	0.167	-0.0987	0.134	0.140	-0.0249	0.0342	-0.222	0.0832	-0.135	0.00793	-0.166	-0.240
	Sig. (2-tailed)	0.147	0.393	0.244	0.224	0.831	0.768	0.052	0.472	0.241	0.945	0.148	0.035
Simpson's Evenness	Correlation Coefficient	-0.396	0.414	-0.559	-0.566	-0.227	-0.229	-0.0465	0.162	-0.227	-0.230	-0.143	-0.192
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	0.054	0.050	0.694	0.167	0.052	0.049	0.223	0.102
Simpson's Diversity	Correlation Coefficient	-0.223	0.373	-0.467	-0.473	-0.273	-0.203	-0.290	0.241	-0.378	-0.172	-0.306	-0.433
	Sig. (2-tailed)	0.057	0.001	<0.001	<0.001	0.020	0.083	0.012	0.039	<0.001	0.144	0.008	<0.001
EPT (#/m²)	Correlation Coefficient	-0.207	0.185	-0.177	-0.176	-0.196	-0.102	-0.190	0.160	-0.141	-0.0659	-0.148	-0.195
	Sig. (2-tailed)	0.071	0.107	0.124	0.126	0.090	0.378	0.099	0.165	0.220	0.569	0.198	0.090
Arachnida (#/m²)	Correlation Coefficient	0.0219	-0.505	0.419	0.417	-0.178	0.110	0.290	0.0247	-0.0859	0.0960	-0.129	-0.0859
	Sig. (2-tailed)	0.850	<0.001	<0.001	<0.001	0.123	0.342	0.011	0.831	0.458	0.406	0.262	0.458
Chaoboridae (#/m²)	Correlation Coefficient	-0.726	0.500	-0.313	-0.311	-0.805	-0.477	-0.243	0.721	-0.815	-0.405	-0.811	-0.778
	Sig. (2-tailed)	<0.001	<0.001	0.006	0.006	<0.001	<0.001	0.033	<0.001	<0.001	<0.001	<0.001	<0.001
Chironomidae (#/m²)	Correlation Coefficient	0.179	-0.730	0.380	0.375	0.168	0.379	0.225	-0.210	0.124	0.173	0.137	0.0830
	Sig. (2-tailed)	0.119	<0.001	<0.001	<0.001	0.147	<0.001	0.050	0.066	0.284	0.133	0.234	0.473
Oligochaeta (#/m²)	Correlation Coefficient	-0.343	-0.196	-0.185	-0.197	-0.342	-0.119	0.136	0.368	-0.459	-0.248	-0.472	-0.511
	Sig. (2-tailed)	0.002	0.087	0.108	0.086	0.003	0.301	0.238	<0.001	<0.001	0.030	<0.001	<0.001
EPT (%)	Correlation Coefficient	-0.194	0.178	-0.165	-0.165	-0.179	-0.0919	-0.178	0.139	-0.119	-0.0515	-0.126	-0.171
	Sig. (2-tailed)	0.091	0.122	0.150	0.152	0.122	0.427	0.121	0.226	0.302	0.657	0.274	0.137
Arachnida (%)	Correlation Coefficient	0.198	-0.370	0.405	0.406	-0.109	0.0609	0.188	-0.0772	0.0432	0.166	-0.00553	0.0417
	Sig. (2-tailed)	0.085	<0.001	<0.001	<0.001	0.348	0.599	0.101	0.505	0.709	0.148	0.962	0.719
Chaoboridae (%)	Correlation Coefficient	-0.679	0.535	-0.313	-0.310	-0.804	-0.475	-0.286	0.697	-0.810	-0.371	-0.805	-0.780
	Sig. (2-tailed)	<0.001	<0.001	0.006	0.006	<0.001	<0.001	0.012	<0.001	<0.001	<0.001	<0.001	<0.001
Chironomidae (%)	Correlation Coefficient	0.476	-0.717	0.512	0.514	0.383	0.351	0.220	-0.492	0.505	0.354	0.490	0.472
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.055	<0.001	<0.001	0.002	<0.001	<0.001
Oligochaeta (%)	Correlation Coefficient	-0.275	0.203	-0.505	-0.512	-0.253	-0.299	-0.0307	0.329	-0.355	-0.355	-0.361	-0.395
	Sig. (2-tailed)	0.015	0.076	<0.001	<0.001	0.027	0.008	0.791	0.004	0.002	0.002	0.001	<0.001
CA1 (25.7%)	Correlation Coefficient	0.131	-0.0649	0.338	0.339	-0.162	0.0318	-0.336	0.00958	-0.0430	0.0684	-0.0292	-0.0760
	Sig. (2-tailed)	0.277	0.591	0.004	0.004	0.180	0.793	0.004	0.937	0.722	0.571	0.809	0.529
CA2 (16.8%)	Correlation Coefficient	-0.641	0.391	-0.232	-0.237	-0.714	-0.218	-0.121	0.585	-0.732	-0.375	-0.724	-0.650
	Sig. (2-tailed)	<0.001	<0.001	0.052	0.047	<0.001	0.068	0.316	<0.001	<0.001	0.001	<0.001	<0.001
CA3 (13.0%)	Correlation Coefficient	-0.123	-0.316	0.283	0.280	-0.171	-0.0574	0.385	0.0414	0.0534	-0.0108	0.00996	0.119
	Sig. (2-tailed)	0.306	0.007	0.017	0.018	0.157	0.634	<0.001	0.732	0.659	0.929	0.934	0.322

Significant correlation; p-value <0.00417 (p <0.05, Bonferroni corrected for 12 independent variables).

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. DO = dissolved oxygen. Fines (%) from 1999 data were excluded from the correlation due to suspected inaccuracy of these results (0% fines in all sampling areas (see Appendix Tables C.2.1 and C.2.2).

Table E.4.3: Taxon Scores from Correspondence Analysis (CA) of Benthic Invertebrate Community Results for the Polley Lake (POL-P1, POL-P2; Exposed) and Bootjack Lake (BOL-B2; Reference) Deep Monitoring Areas, 1999 to 2024

Phylum	Class	Order	Family	Taxa	CA1 (25.7%)	CA2 (16.8%)	CA3 (13.0%)
Annelida	Clitellata	Tubificida	Naididae	*Limnodrilus*	2.32	-0.0717	-0.267
				Nais variabilis	-0.909	-2.66	-0.593
				Rhyacodrilus	2.49	-0.204	-0.309
				Tubifex	-1.02	0.362	-3.01
				Tubificinae	-0.635	0.542	0.0448
Arthropoda	Arachnida	-	-	Arachnida	-0.0396	0.0162	0.480
	Insecta	Diptera	Ceratopogonidae	*Bezzia/ Palpomyia*	-0.165	-0.585	0.527
			Chaoboridae	*Chaoborus*	-0.0642	0.735	0.103
			Chironomidae	*Chironomus*	-0.0255	-0.139	0.110
				Phaenopsectra	0.726	0.733	0.144
				Polypedilum	-0.885	-2.74	2.57
				Procladius	-0.305	0.0702	-0.0515
				Protanypus	1.62	-0.492	0.0753
				Tanytarsus	0.0453	-1.38	-1.71

Notes: "-" no applicable data. Correspondence Analysis was conducted using ln(x+1)-transformed relative density benthic invertebrate results at the Lowest Practicable Level (LPL).

Table E.4.4: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																		Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
EPT (#/m²)	log10(x+1)	0.065	<0.001	0.726	Reference	QUL-PREF1	2014	1.81	B	B	B	B	A	nc	B	nc	nc	B	Baseline	ns	ns	ns	1.6	nc	ns	nc	nc	ns	ns	-0.87
							2015	0																					nc
							2016	2.56																					-1.1
							2018	0.572																					-0.38
							2019	17.9																					nc
							2021	1.81																					-0.87
							2024	1.81																					-0.49
					Exposed	QUL-PNF	2014	0	B	B	B	B	A	AB	B	B	B	B	Baseline	ns	ns	ns	2.7	ns	ns	ns	ns	ns		ns
							2015	0.572																					nc
							2016	0																					ns
							2018	2.47																					ns
							2019	23.0																					nc
							2020	2.04																					nc
							2021	0.787																					ns
							2022	0.572																					nc
							2023	1.13																					nc
							2024	0.572																					ns
						QUL-PFF1	2014	0	B	nc	B	B	nc	nc	B	nc	nc	B	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns		
							2016	0																					
							2018	0																					
							2021	0																					
							2024	0.572																					
Arachnida (#/m²)	log10(x+1)	0.346	<0.001	0.252	Reference	QUL-PREF1	2014	13.9	ABC	BC	BC	C	C	nc	AB	nc	nc	BC	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	ns	ns
							2015	0																					nc
							2016	8.56																					ns
							2018	1.47																					ns
							2019	1.04																					nc
							2021	13.5																					ns
							2024	1.61																					ns
					Exposed	QUL-PNF	2014	3.42	ABC	BC	BC	C	C	ABC	AB	ABC	A	BC	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
							2015	3.42																					nc
							2016	2.86																					ns
							2018	0.572																					ns
							2019	0.572																					nc
							2020	12.2																					nc
							2021	55.2																					ns
							2022	10.7																					nc
							2023	63.2																					nc
							2024	2.21																					ns
						QUL-PFF1	2014	4.43	ABC	nc	BC	C	nc	nc	AB	nc	nc	BC	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns		
							2016	0.572																					
							2018	0																					
							2021	4.43																					
							2024	8.42																					

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.4: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																	Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
Chironomidae (#/m²)	log10(x+1)	-	-	<0.001	Reference	QUL-PREF1	2014	4,002	AB	AB	B	AB	A	nc	AB	nc	nc	B	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-8.4	-9.3
							2015	2,047																					-4.2	nc
							2016	1,523																					-2.1	-2.4
							2018	4,073																					-2.3	-2.1
							2019	7,346																					-3.1	nc
							2021	3,555																					-1.9	-1.8
							2024	1,496																					-2.4	-2.3
					Exposed	QUL-PNF	2014	7.53	C	B	AB	A	A	A	A	A	A	AB	Baseline	3.2	5.0	6.1	6.1	6.1	6.3	6.3	5.4	4.7			ns
							2015	90.8																						nc
							2016	329																						ns
							2018	773																						ns
							2019	748																						nc
							2020	736																						nc
							2021	864																						ns
							2022	866																						nc
							2023	440																						nc
							2024	262																						ns
						QUL-PFF1	2014	3.42	C	nc	B	AB	nc	nc	A	nc	nc	B	Baseline	nc	5.5	7.1	nc	nc	7.3	nc	nc	5.6			
							2016	252																						
							2018	837																						
							2021	975																						
							2024	275																						
Oligochaeta (#/m²)	log10(x+1)	<0.001	0.083	0.118	Reference	QUL-PREF1	2014	890	B	AB	AB	AB	AB	nc	AB	nc	nc	AB	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-3.5	-4.1
							2015	12,481																					-4.8	nc
							2016	2,946																					-3.5	-4.8
							2018	926																					-2.1	-3.9
							2019	2,092																					-2.2	nc
							2021	2,528																					-2.3	-4.1
							2024	1,498																					-3.1	-3.8
					Exposed	QUL-PNF	2014	1.81	B	AB	AB	AB	AB	AB	AB	AB	A	AB	Baseline	ns	ns	ns	ns	ns	ns	ns	2.1	ns			-0.63
							2015	3.42																						nc
							2016	8.43																						-1.4
							2018	28.3																						-1.8
							2019	53.0																						nc
							2020	17.9																						nc
							2021	53.4																						-1.8
							2022	25.0																						nc
							2023	91.0																						nc
							2024	7.71																						-0.64
						QUL-PFF1	2014	0	B	nc	AB	AB	nc	nc	AB	nc	nc	AB	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns			
							2016	0																						
							2018	0.572																						
							2021	2.04																						
							2024	2.04																						

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.4: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																		Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
EPT (%)	rank	0.135	0.004	0.728	Reference	QUL-PREF1	2014	0	B	B	B	B	A	nc	B	nc	nc	B	Baseline	ns	ns	ns	nm	nc	ns	nc	nc	ns	ns	ns
							2015	0																					nc
							2016	0																					ns
							2018	0																					ns
							2019	0.318																					nc
							2021	0																					ns
							2024	0																					ns
					Exposed	QUL-PNF	2014	0	B	B	B	B	A	AB	B	AB	AB	B	Baseline	ns	ns	ns	nm	ns	ns	ns	ns	ns		ns
							2015	0																					nc
							2016	0																					ns
							2018	0																					ns
							2019	4.19																					nc
							2020	0																					nc
							2021	0																					ns
							2022	0																					nc
							2023	0																					nc
							2024	0																					ns
						QUL-PFF1	2014	0	B	nc	B	B	nc	nc	B	nc	nc	B	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns		
							2016	0																					
							2018	0																					
							2021	0																					
							2024	0																					
Arachnida (%)	rank	0.198	<0.001	0.206	Reference	QUL-PREF1	2014	0.245	AB	BC	BC	C	BC	nc	ABC	nc	nc	ABC	Baseline	ns	ns	-3.2	ns	nc	ns	nc	nc	ns	ns	ns
							2015	0																					nc
							2016	0.282																					ns
							2018	0																					ns
							2019	0																					ns
							2021	0.557																					ns
							2024	0																					ns
					Exposed	QUL-PNF	2014	14.3	AB	BC	BC	C	BC	ABC	ABC	ABC	A	ABC	Baseline	ns	ns	-185	ns	ns	ns	ns	ns	ns		ns
							2015	1.16																					nc
							2016	0																					ns
							2018	0																					ns
							2019	0																					nc
							2020	2.11																					nc
							2021	1.97																					ns
							2022	4.21																					nc
							2023	11.4																					nc
							2024	0																					ns
						QUL-PFF1	2014	33.3	AB	nc	BC	C	nc	nc	ABC	nc	nc	ABC	Baseline	nc	ns	-432	nc	nc	ns	nc	nc	ns		
							2016	0																					
							2018	0																					
							2021	0.746																					
							2024	3.57																					

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

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Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
Chironomidae (%)	rank	-	-	<0.001	Reference	QUL-PREF1	2014	73.7	A	B	AB	A	A	nc	AB	nc	nc	AB	Baseline	-9.3	ns	ns	ns	nc	ns	nc	nc	ns	ns	-9.3
							2015	14.0																					12	nc
							2016	29.0																					8.8	10
							2018	80.1																					ns	3.1
							2019	74.2																					ns	nc
							2021	62.0																					ns	5.6
							2024	50.0																					6.0	6.4
					Exposed	QUL-PNF	2014	57.1	A	A	A	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
							2015	87.5																						nc
							2016	85.7																						ns
							2018	89.3																						1.7
							2019	87.8																						nc
							2020	91.7																						nc
							2021	90.5																						1.2
							2022	94.2																						nc
							2023	68.6																						nc
							2024	88.6																						ns
						QUL-PFF1	2014	14.3	B	nc	A	A	nc	nc	A	nc	nc	A	Baseline	nc	13	13	nc	nc	13	nc	nc	12		
							2016	96.5																						
							2018	100																						
							2021	98.0																						
							2024	90.9																						
Oligochaeta (%)	rank	<0.001	0.653	0.233	Reference	QUL-PREF1	2014	24.9	ns	ns	ns	ns	ns	nc	ns	nc	nc	ns	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-7.0	-7.0
							2015	84.7																					-23	nc
							2016	70.4																					-19	-20
							2018	19.4																					-3.1	-5.4
							2019	24.9																					-6.4	nc
							2021	37.7																					-9.8	-10
							2024	50.0																					-12	-14
					Exposed	QUL-PNF	2014	0	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns		0
							2015	2.33																						nc
							2016	2.60																						-0.73
							2018	8.18																						-2.3
							2019	1.87																						nc
							2020	3.47																						nc
							2021	2.78																						-0.78
							2022	2.11																						nc
							2023	10.1																						nc
							2024	7.50																						-2.1
						QUL-PFF1	2014	0	ns	nc	ns	ns	nc	nc	ns	nc	nc	ns	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns		
							2016	0																						
							2018	0																						
							2021	0																						
							2024	0																						

Area x Year or Area P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.4: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																		Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
CA1 (30.9%)	rank	-	-	0.006	Reference	QUL-PREF1	2014	98.1	A	A	A	A	A	nc	A	nc	nc	A	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-10	-8.5
							2015	92.1																					-7.8	nc
							2016	73.4																					ns	-12
							2018	87.0																					-7.6	-14
							2019	84.1																					-13	nc
							2021	98.9																					-9.6	-14
							2024	81.1																					-11	-13
					Exposed	QUL-PNF	2014	-60.5	AB	AB	A	AB	AB	AB	AB	B	AB	AB	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns		ns
							2015	-28.3																						nc
							2016	33.8																						-9.8
							2018	-29.6																						-6.4
							2019	-112																						nc
							2020	-71.9																						nc
							2021	-49.5																						-3.8
							2022	-112																						nc
							2023	-44.2																						nc
							2024	-85.8																						ns
						QUL-PFF1	2014	-33.0	A	nc	B	B	nc	nc	B	nc	nc	B	Baseline	nc	-5.4	-6.2	nc	nc	-4.9	nc	nc	-5.3		
							2016	-117																						
							2018	-128																						
							2021	-108																						
							2024	-115																						
CA2 (16.5%)	rank	-	-	<0.001	Reference	QUL-PREF1	2014	-97.6	B	B	A	B	A	nc	B	nc	nc	A	Baseline	ns	18	ns	20	nc	ns	nc	nc	12	6.6	9.8
							2015	-91.2																					2.2	nc
							2016	110																					ns	-8.8
							2018	-73.0																					ns	ns
							2019	144																					-13	nc
							2021	-91.5																					ns	8.5
							2024	45.0																					ns	ns
					Exposed	QUL-PNF	2014	-20.1	C	C	A	C	BC	BC	C	C	BC	AB	Baseline	ns	9.0	ns	ns	ns	ns	ns	ns	5.5		ns
							2015	-65.6																						nc
							2016	86.4																						-6.8
							2018	-36.8																						ns
							2019	-9.59																						nc
							2020	-14.1																						nc
							2021	-25.8																						ns
							2022	-16.8																						nc
							2023	15.3																						nc
							2024	45.3																						ns
						QUL-PFF1	2014	17.6	A	nc	A	A	nc	nc	A	nc	nc	A	Baseline	nc	ns	ns	nc	nc	ns	nc	nc	ns		
							2016	6.49																						
							2018	-15.4																						
							2021	8.78																						
							2024	21.5																						

Area x Year or Area P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.4: Statistical Comparisons of Benthic Invertebrate Community Endpoints for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Area Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas																Spatial Comparison Within Years	
									Pairwise Comparisons Between Years										MOD Relative to Baseline[b]											
		Area	Year	Area x Year					2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	2014	2015	2016	2018	2019	2020	2021	2022	2023	2024	QUL-PNF	QUL-PFF1
CA3 (12.6%)	rank	-	-	<0.001	Reference	QUL-PREF1	2014	37.7	AB	A	B	AB	B	nc	AB	nc	nc	B	Baseline	ns	ns	ns	ns	nc	ns	nc	nc	ns	-9.5	-5.3
							2015	50.5																					-3.3	nc
							2016	-1.04																					ns	ns
							2018	56.8																					ns	ns
							2019	-6.48																					2.3	nc
							2021	-58.8																					ns	5.2
							2024	7.03																					ns	ns
					Exposed	QUL-PNF	2014	-151	BC	BC	ABC	A	AB	ABC	ABC	ABC	C	BC	Baseline	ns	ns	10	ns	ns	ns	ns	ns	ns		ns
							2015	-14.7																						nc
							2016	-1.25																						ns
							2018	49.5																						ns
							2019	39.8																						nc
							2020	17.1																						nc
							2021	34.6																						ns
							2022	47.2																						nc
							2023	-66.0																						nc
							2024	-3.60																						ns
						QUL-PFF1	2014	-68.1	B	nc	AB	A	nc	nc	A	nc	nc	B	Baseline	nc	ns	6.6	nc	nc	5.7	nc	nc	ns		
							2016	18.6																						
							2018	61.8																						
							2021	45.0																						
							2024	-18.6																						

Area x Year or Area P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera, "-" = no data available. "nc" = no comparison. "ns" = no significance.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled Median Absolute Deviation.

Table E.4.5: **Spearman's Rank Correlations Between Benthic Invertebrate Community Metrics and Supporting Environmental Measures for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024**

Benthic Invertebrate Community Metric	Correlation Parameter	Station Depth (m)	Physical/Chemical Parameter									Sediment Concentration of Analytes of Interest (<63 µm Fraction)			
			Bottom *In Situ* Water Quality					Sediment Parameters							
			Temp (°C)	DO (mg/L)	DO (%)	Specific Conductance (µS/cm)	pH (pH Units)	Fines (%)	Total Organic Carbon (%)	PCA 1 (65%)	PCA 2 (22%)	Arsenic (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)
Density (#/m²)	Correlation Coefficient	0.186	-0.615	0.334	0.215	-0.473	-0.186	-0.508	0.621	0.516	-0.425	-0.545	-0.507	-0.0867	-0.469
	Sig. (2-tailed)	0.052	<0.001	<0.001	0.024	<0.001	0.052	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.372	<0.001
Richness (# of Taxa)	Correlation Coefficient	0.245	-0.445	0.229	0.167	-0.295	-0.0768	-0.273	0.434	0.171	-0.484	-0.164	-0.209	0.283	-0.0398
	Sig. (2-tailed)	0.010	<0.001	0.016	0.082	0.002	0.425	0.004	<0.001	0.076	<0.001	0.090	0.030	0.003	0.682
Simpson's Evenness	Correlation Coefficient	-0.0979	0.400	-0.301	-0.248	0.276	0.251	0.289	-0.424	-0.343	0.241	0.350	0.317	0.107	0.263
	Sig. (2-tailed)	0.313	<0.001	0.002	0.010	0.004	0.009	0.002	<0.001	<0.001	0.013	<0.001	<0.001	0.275	0.007
Simpson's Diversity	Correlation Coefficient	0.186	-0.0499	-0.129	-0.132	-0.0719	0.106	-0.0875	0.0874	-0.173	-0.283	0.189	0.0968	0.415	0.245
	Sig. (2-tailed)	0.053	0.608	0.183	0.173	0.460	0.275	0.368	0.373	0.076	0.003	0.052	0.324	<0.001	0.011
EPT (#/m²)	Correlation Coefficient	0.242	-0.291	0.164	0.116	-0.0324	0.0324	-0.124	0.234	0.0651	-0.311	-0.0885	-0.0774	0.144	-0.0539
	Sig. (2-tailed)	0.011	0.002	0.086	0.229	0.737	0.737	0.197	0.015	0.504	0.001	0.362	0.426	0.138	0.580
Arachnida (#/m²)	Correlation Coefficient	0.245	0.131	-0.0334	0.00562	-0.0429	-0.0336	-0.135	0.0380	-0.0317	-0.0244	0.0868	0.0299	0.206	0.158
	Sig. (2-tailed)	0.010	0.172	0.729	0.954	0.656	0.727	0.161	0.696	0.745	0.802	0.372	0.759	0.033	0.102
Chironomidae (#/m²)	Correlation Coefficient	0.139	-0.574	0.369	0.253	-0.464	-0.163	-0.474	0.558	0.543	-0.333	-0.582	-0.532	-0.144	-0.479
	Sig. (2-tailed)	0.148	<0.001	<0.001	0.008	<0.001	0.088	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.136	<0.001
Oligochaeta (#/m²)	Correlation Coefficient	0.354	-0.620	0.0777	-0.0421	-0.481	-0.113	-0.583	0.725	0.516	-0.492	-0.496	-0.518	0.0115	-0.488
	Sig. (2-tailed)	<0.001	<0.001	0.419	0.662	<0.001	0.241	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.906	<0.001
EPT (%)	Correlation Coefficient	0.235	-0.245	0.161	0.129	-0.00357	0.0295	-0.0835	0.192	0.00314	-0.310	-0.0284	-0.0200	0.184	0.0162
	Sig. (2-tailed)	0.013	0.010	0.093	0.179	0.970	0.760	0.386	0.046	0.974	0.001	0.771	0.837	0.056	0.868
Arachnida (%)	Correlation Coefficient	0.157	0.256	-0.146	-0.0815	0.0864	0.0677	-0.0285	-0.106	-0.125	0.0923	0.193	0.133	0.185	0.239
	Sig. (2-tailed)	0.101	0.007	0.127	0.398	0.369	0.482	0.767	0.274	0.198	0.342	0.046	0.169	0.055	0.013
Chironomidae (%)	Correlation Coefficient	-0.390	0.305	0.216	0.298	0.210	0.00525	0.532	-0.571	-0.295	0.331	0.227	0.303	-0.0297	0.296
	Sig. (2-tailed)	<0.001	0.001	0.024	0.002	0.028	0.957	<0.001	<0.001	0.002	<0.001	0.018	0.001	0.761	0.002
Oligochaeta (%)	Correlation Coefficient	0.339	-0.523	0.0191	-0.0933	-0.356	-0.0698	-0.488	0.615	0.402	-0.468	-0.371	-0.411	0.0750	-0.390
	Sig. (2-tailed)	<0.001	<0.001	0.843	0.332	<0.001	0.468	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.440	<0.001
CA1 (30.9%)	Correlation Coefficient	0.402	-0.524	-0.105	-0.244	-0.395	-0.139	-0.689	0.765	0.550	-0.447	-0.537	-0.544	-0.0950	-0.566
	Sig. (2-tailed)	<0.001	<0.001	0.282	0.011	<0.001	0.154	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.335	<0.001
CA2 (16.5%)	Correlation Coefficient	-0.161	-0.0219	-0.0883	-0.0942	0.0234	0.146	0.210	-0.0834	-0.184	-0.231	0.179	0.192	0.0610	0.0874
	Sig. (2-tailed)	0.097	0.823	0.366	0.335	0.811	0.134	0.030	0.397	0.060	0.018	0.068	0.050	0.537	0.375
CA3 (12.6%)	Correlation Coefficient	-0.117	-0.0196	0.361	0.359	-0.00971	-0.103	0.138	-0.0792	-0.0168	0.0768	-0.0468	0.0179	-0.150	-0.0248
	Sig. (2-tailed)	0.231	0.842	<0.001	<0.001	0.921	0.291	0.158	0.422	0.865	0.436	0.636	0.856	0.126	0.801

Significant correlation; p-value <0.00357 (p <0.05, Bonferroni corrected for 14 independent variables).

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. QUL-PREF1 was not sampled in 2020, 2022, or 2023. DO = dissolved oxygen.

Table E.4.6: Taxon Scores from Correspondence Analysis (CA) of Benthic Invertebrate Community Results for the Quesnel Lake (QUL-PNF and QUL-PFF1; Exposed and QUL-PREF1; Reference) Deep Monitoring Areas, 2014 to 2024

Phylum	Class	Order	Family	Taxa	CA1 (30.9%)	CA2 (16.5%)	CA3 (12.6%)
Annelida	Clitellata	Tubificida	Naididae	Tubificinae	0.785	-0.0706	0.121
Arthropoda	Arachnida	Sarcoptiformes	-	Oribatida	0.0415	-0.854	-3.05
		Trombidiformes	Lebertiidae	*Lebertia*	-0.353	0.0906	-0.305
	Insecta	Diptera	Ceratopogonidae	*Probezzia*	-0.0565	0.650	0.321
			Chironomidae	*Chironomus*	1.27	0.502	0.283
				Heterotrissocladius	-1.16	-0.0751	0.300
				Mesocricotopus	-1.06	0.477	-0.674
				Phaenopsectra	0.979	-1.15	0.346
				Procladius	-0.438	-0.0844	0.249
				Protanypus	-1.06	-0.114	-0.0557
				Sergentia	0.748	1.84	-0.292

Notes: "-" no applicable data. Correspondence Analysis was conducted using ln(x+1)-transformed relative density benthic invertebrate results at the Lowest Practicable Level (LPL).

APPENDIX E.5
FISH POPULATION HEALTH

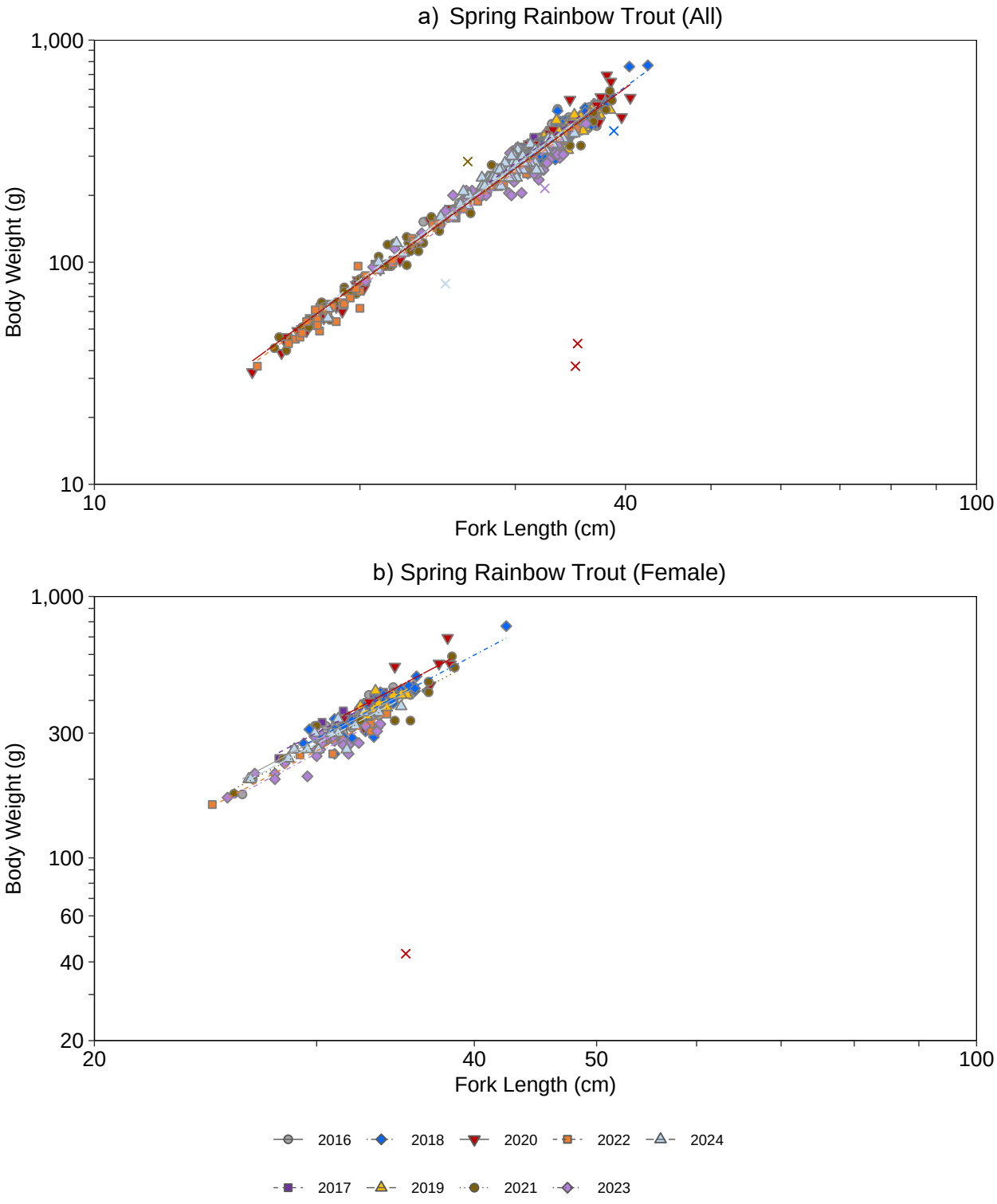


Figure E.5.1: Condition (Weight−at−Length) of a) All Rainbow Trout and b) Female Rainbow Trout for Polley Lake in Spring, 2016 to 2024

Note: Outliers removed from the statistical analyses are plotted with an x through them.

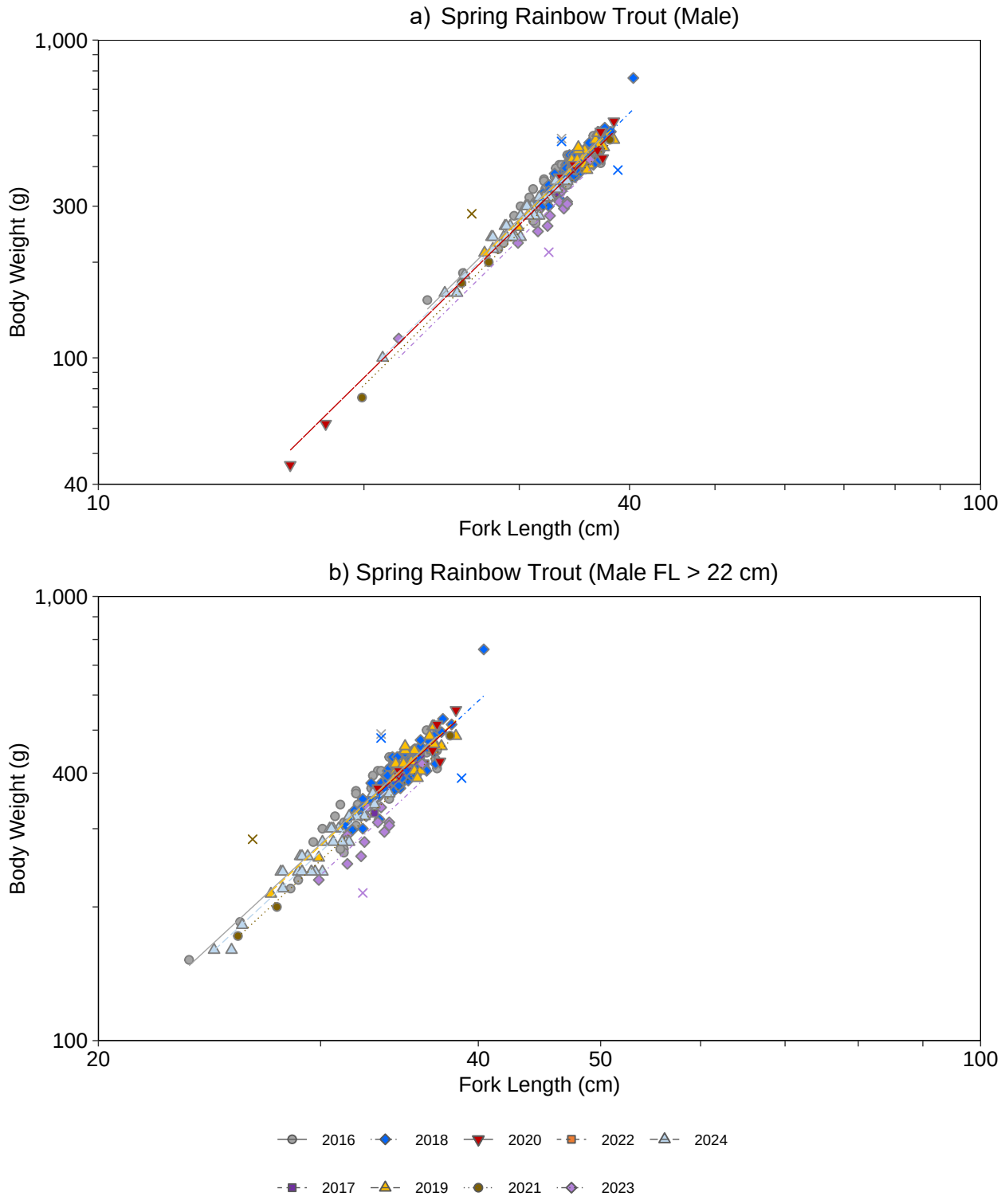


Figure E.5.1: Condition (Weight−at−Length) of a) Male Rainbow Trout and b) Male Rainbow Trout With Fork Length Greater than 22 cm for Polley Lake in Spring, 2016 to 2024

Notes: Outliers removed from the statistical analyses are plotted with an x through them. Only fish with a fork length greater than 22 cm were included in the analysis

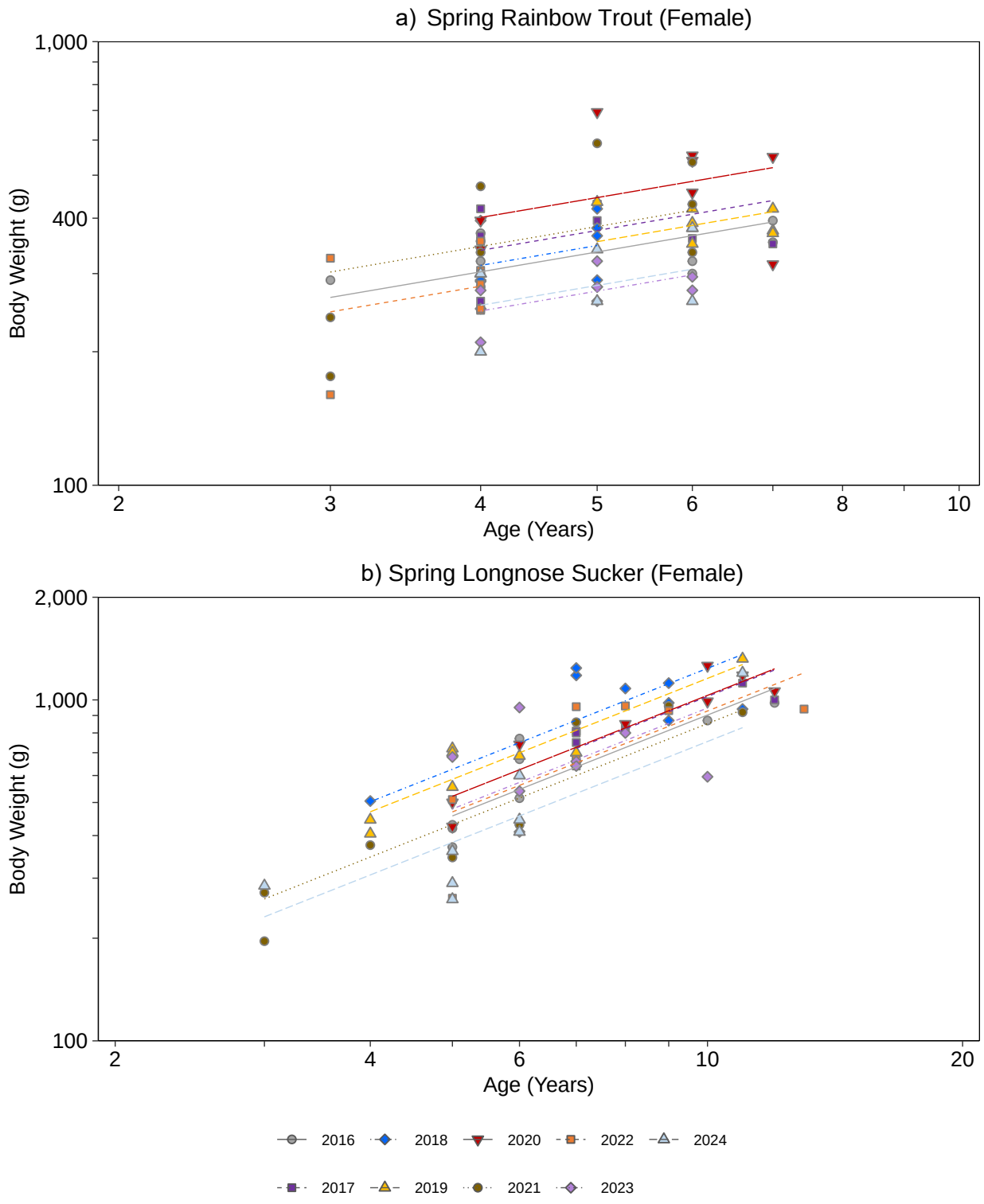


Figure E.5.2: Weight−at−Age of a) Female Rainbow Trout and b) Female Longnose Sucker for Polley Lake in Spring, 2016 to 2024

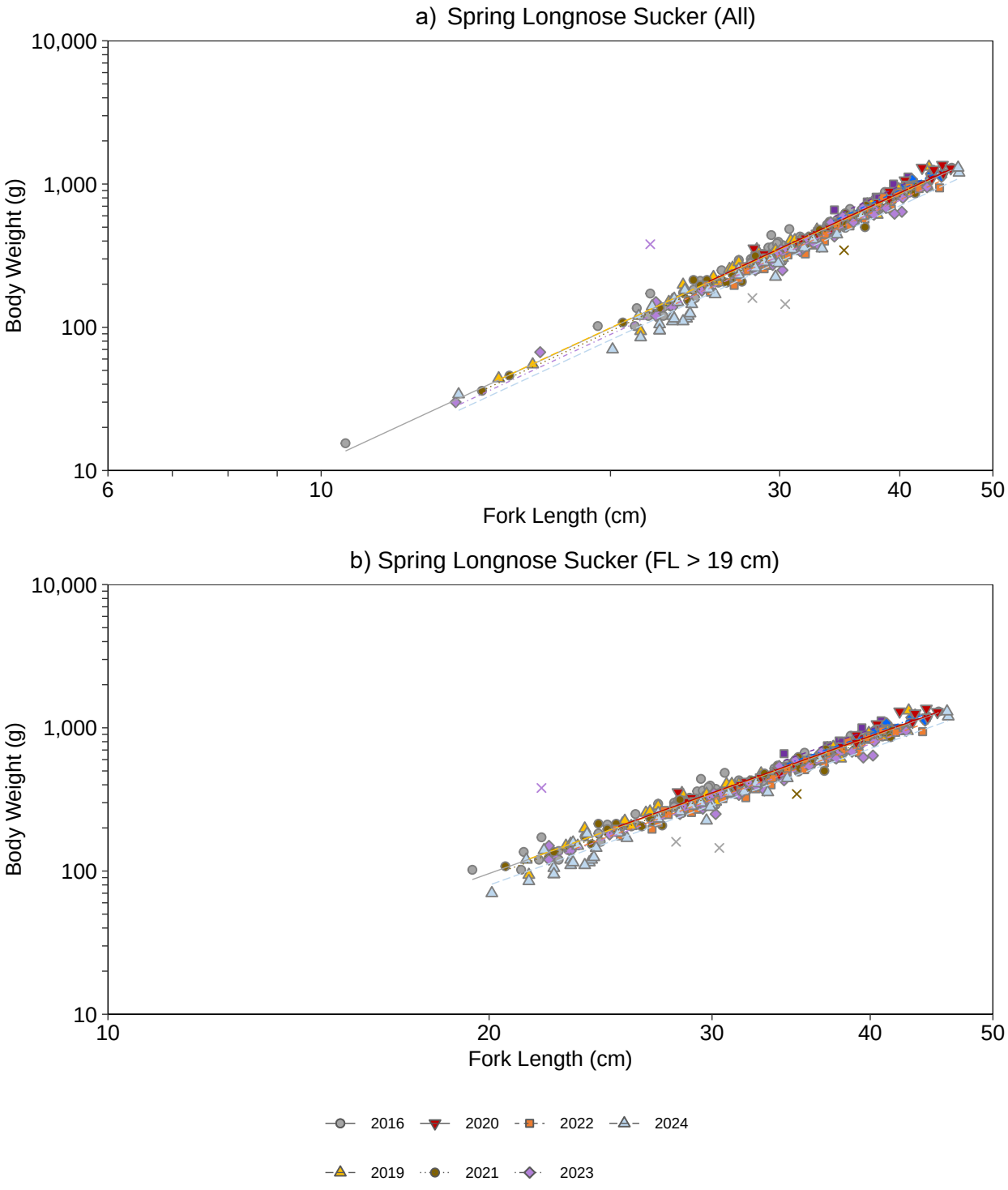


Figure E.5.3: Condition (Weight−at−Length) of a) All Longnose Sucker and b) Longnose Sucker With Fork Length Greater than 19 cm for Polley Lake in Spring, 2016 to 2024

Notes: Outliers removed from the statistical analyses are plotted with an x through them. Only fish with a fork length greater than 19 cm were included in the analysis.

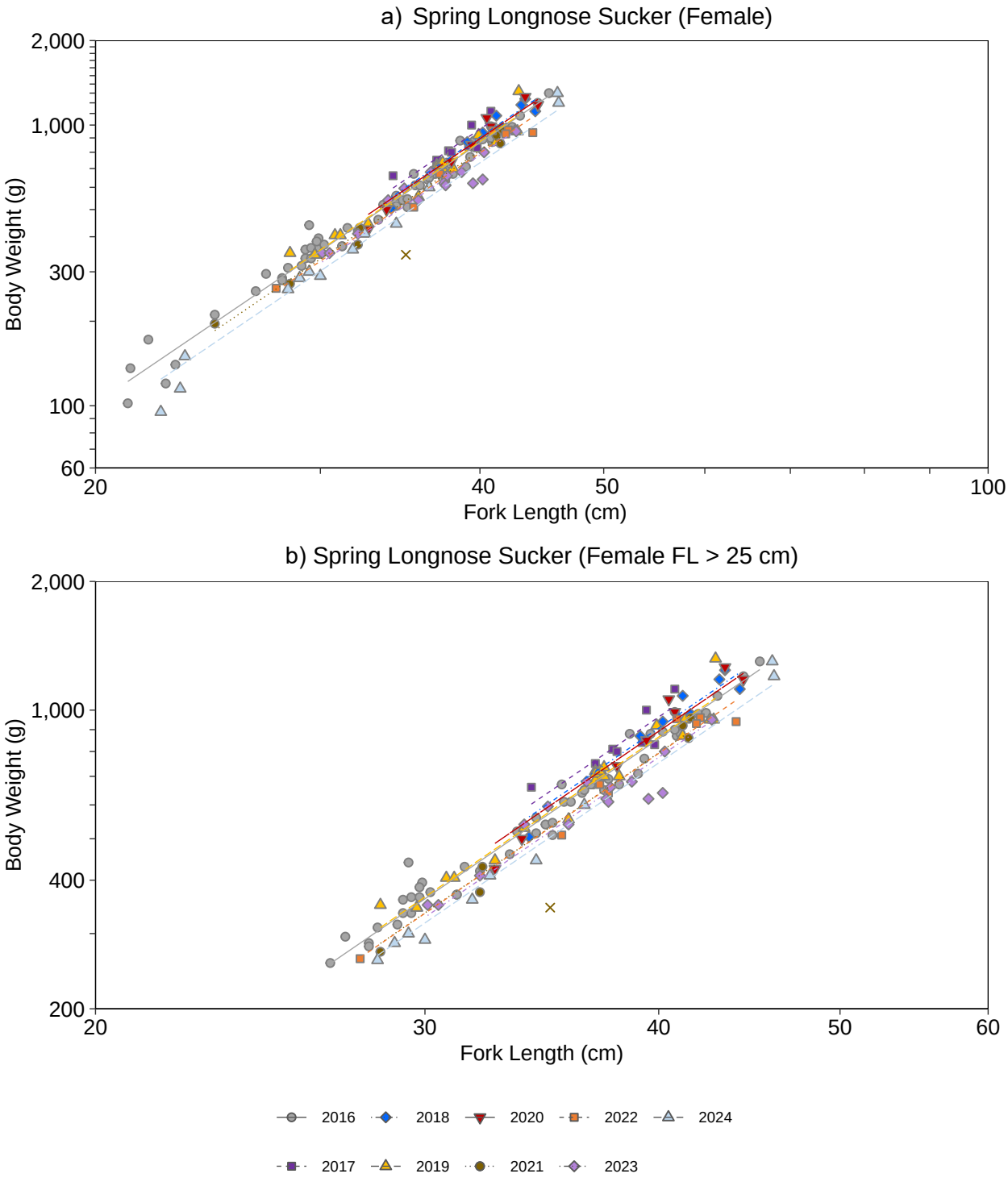


Figure E.5.3: Condition (Weight−at−Length) of a) Female Longnose Sucker and b) Female Longnose Sucker With Fork Length Greater than 25 cm for Polley Lake in Spring, 2016 to 2024

Notes: Outliers removed from the statistical analyses are plotted with an x through them. Only fish with a fork length greater than 25 cm were included in the analysis.

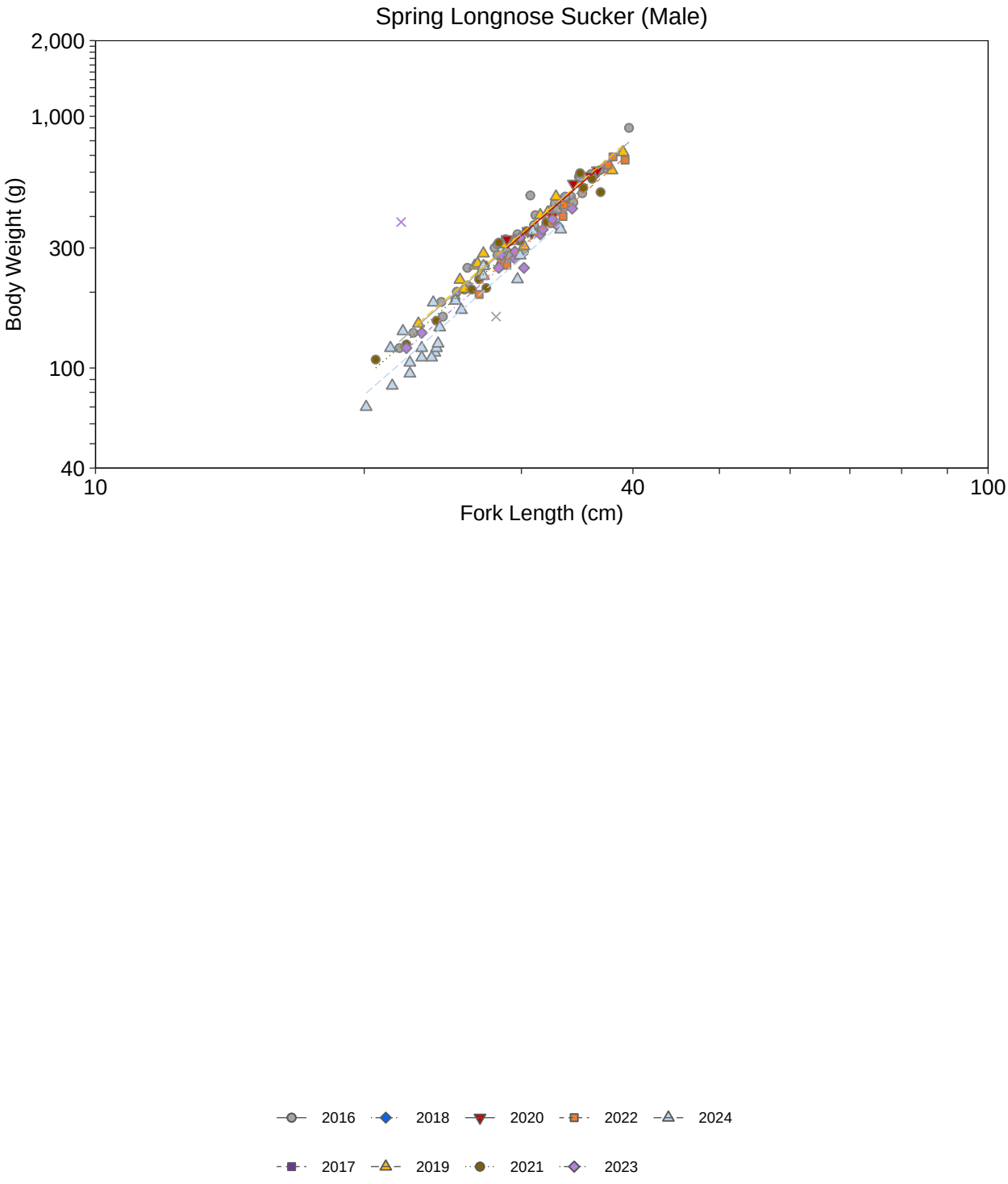


Figure E.5.3: Condition (Weight−at−Length) of Male Longnose Sucker for Polley Lake in Spring, 2016 to 2024

Note: Outliers removed from the statistical analyses are plotted with an x through them.

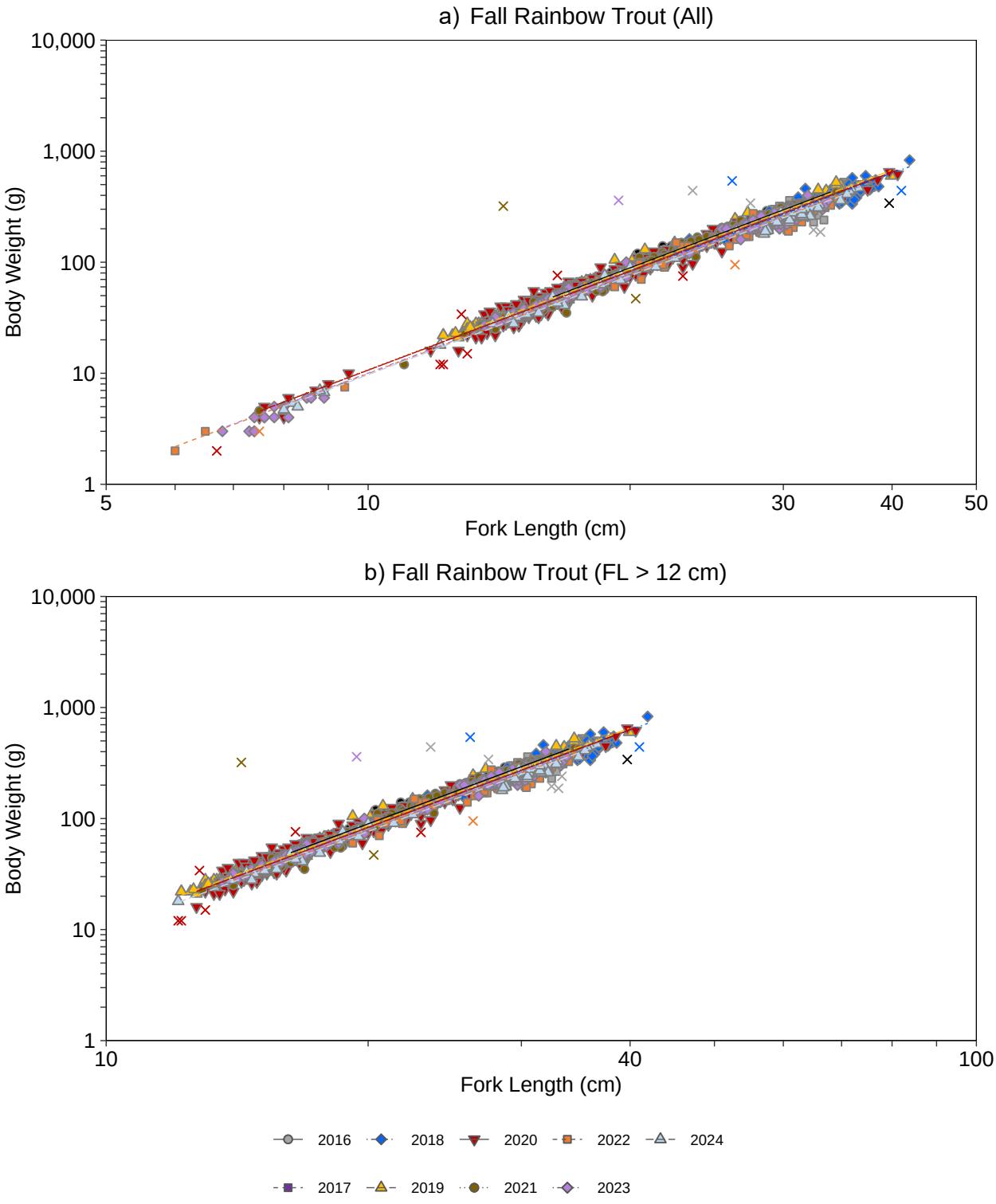


Figure E.5.4: Condition (Weight−at−Length) of a) All Rainbow Trout and b) Rainbow Trout With Fork Length Greater than 12 cm for Polley Lake in Fall, 2014 to 2024

Notes: Outliers removed from the statistical analyses are plotted with an x through them. Only fish with a fork length greater than 12 cm were included in the analysis.

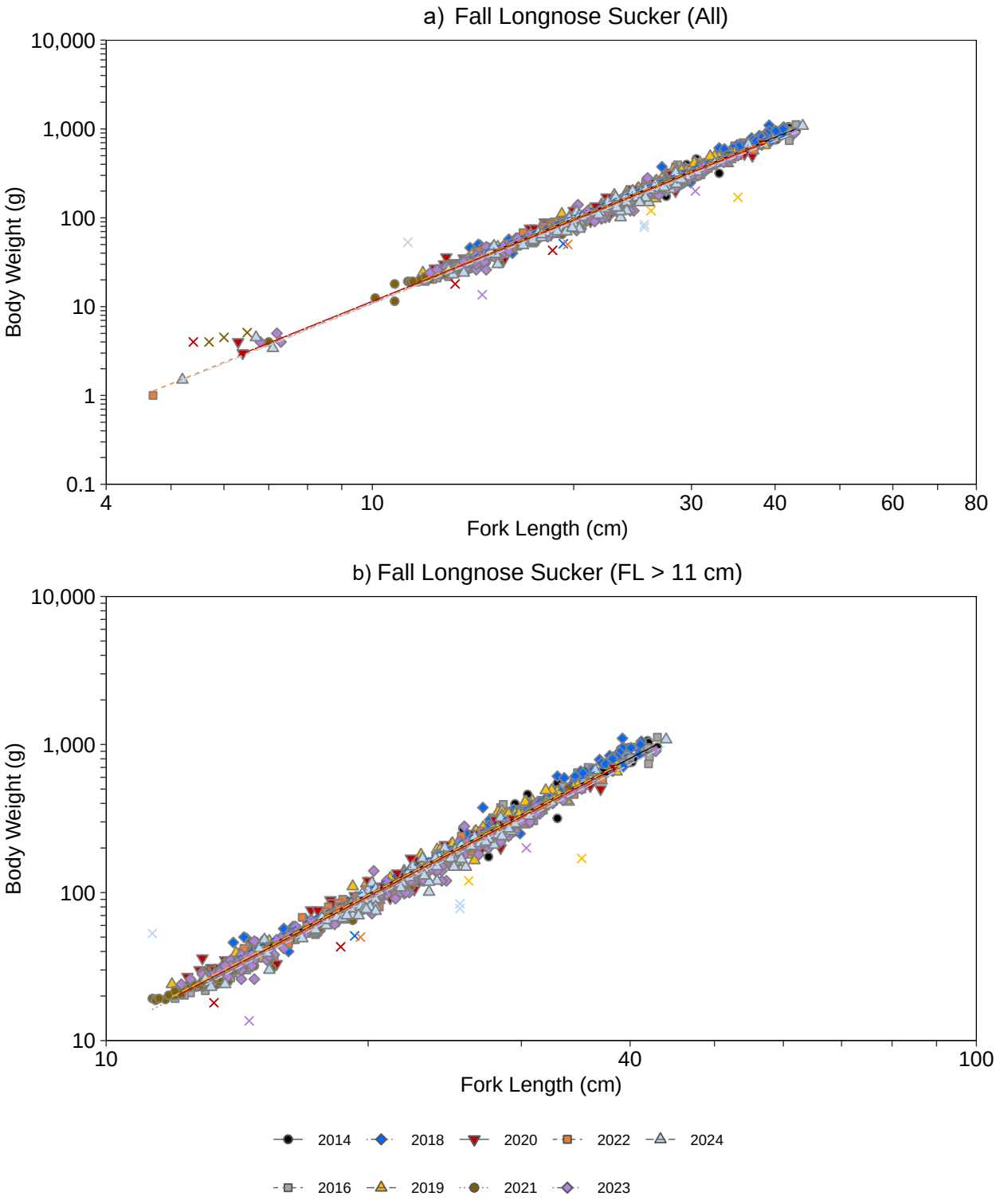


Figure E.5.4: Condition (Weight−at−Length) of a) All Longnose Sucker and b) Longnose Sucker With Fork Length Greater than 11 cm for Polley Lake in Fall, 2014 to 2024

Notes: Outliers removed from the statistical analyses are plotted with an x through them. Only fish with a fork length greater than 11 cm were included in the analysis.

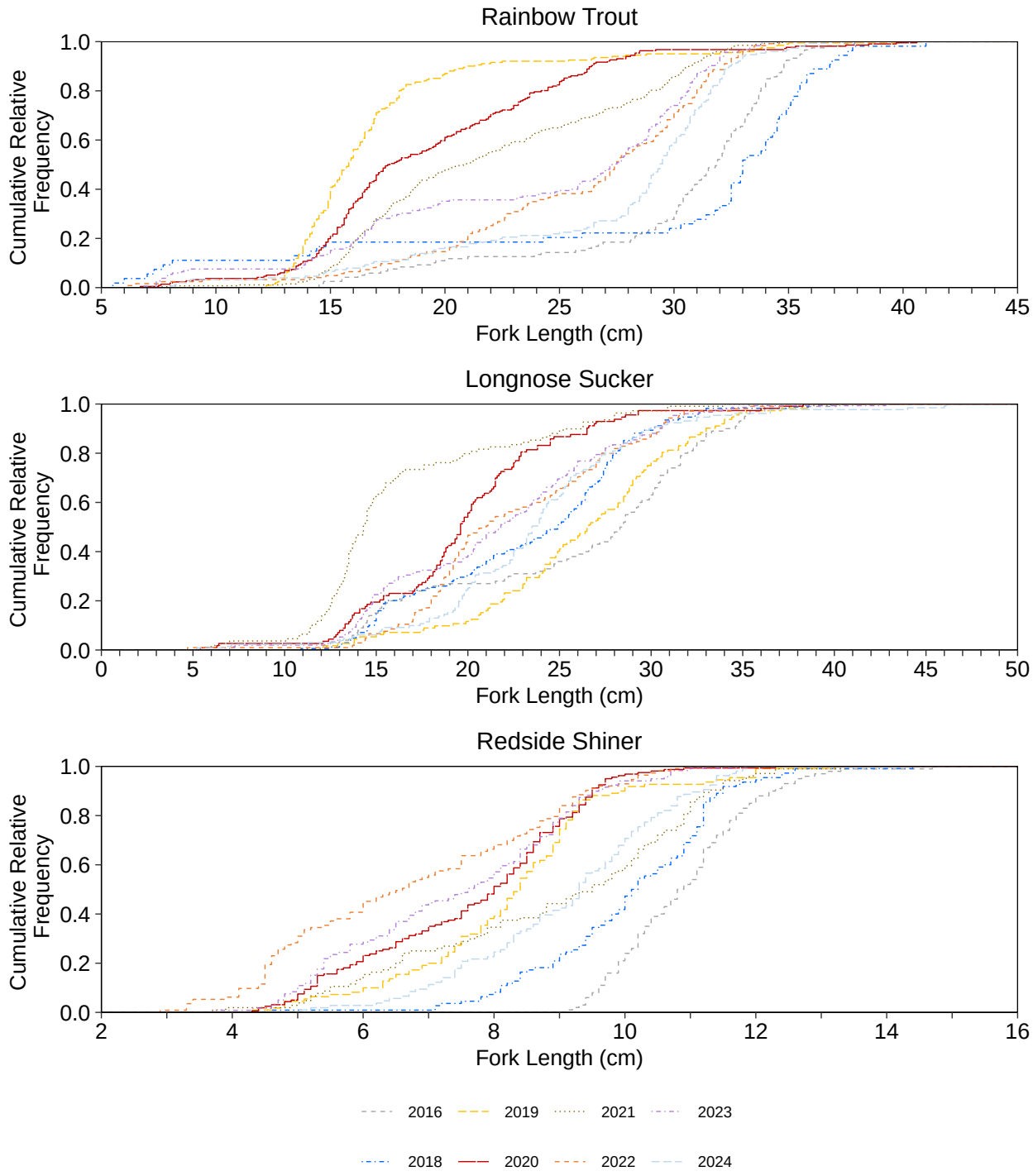


Figure E.5.5: Cumulative Relative Frequency Distributions of Rainbow Trout, Longnose Sucker, and Redside Shiner from Randomized Fall Hoop Netting in Polley Lake, 2016 to 2024

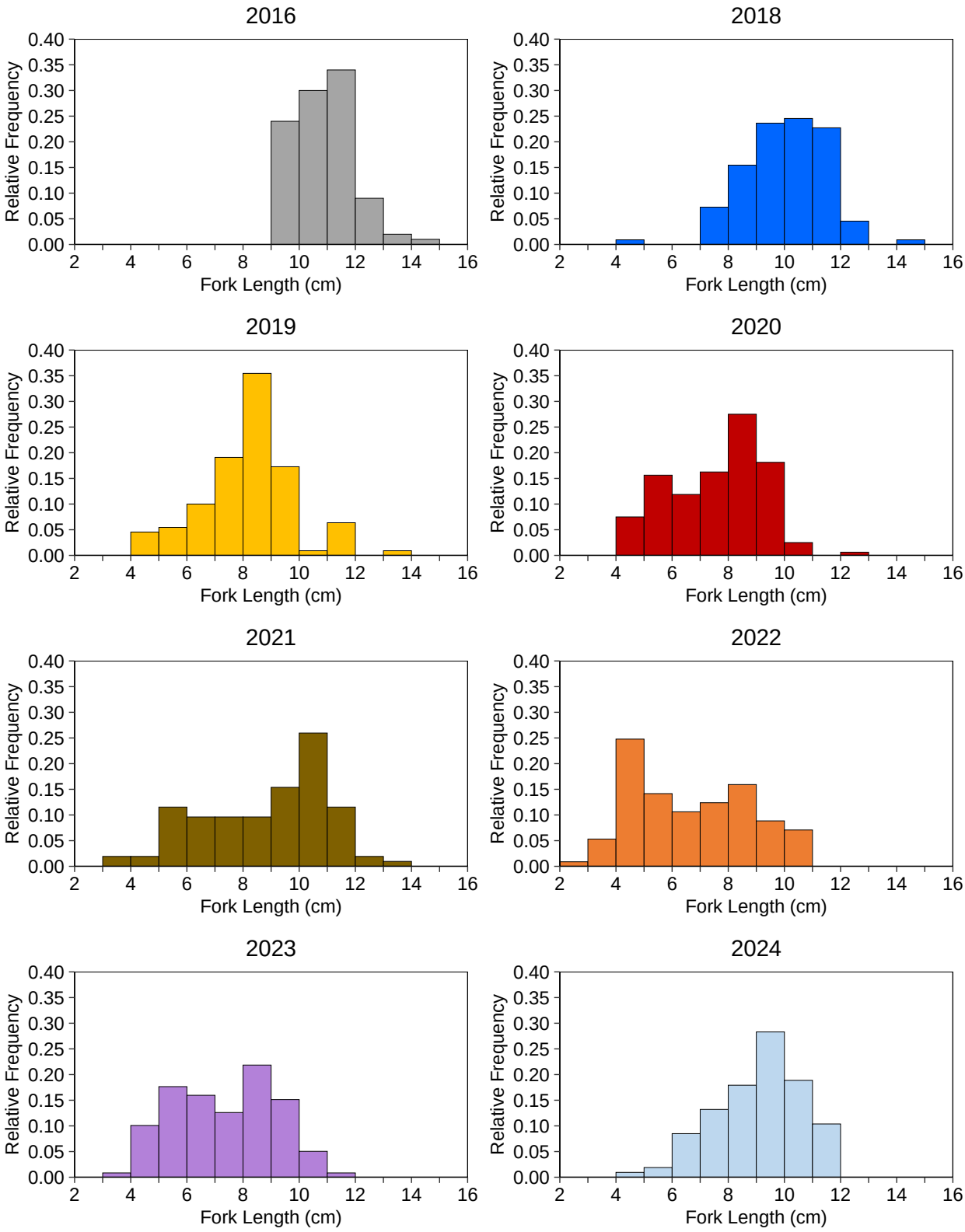


Figure E.5.6: Redside Shiner Length Frequency Distributions for Randomized Fall Hoopnetting in Polley Lake, 2016 to 2024

Table E.5.1: Statistical Comparisons of Condition and Weight-at-Age of Rainbow Trout and Longnose Sucker for Polley Lake in Spring and Fall, 2014 to 2024

Species	Indicator	Endpoint	Sex	Season	Variables		Sample Size										Test	ANCOVA Model Statistics[a]			
																		Interaction Model	Parallel Slope Model	Covariate Value for Comparisons[b]	Test P-value (Year)
					Response	Covariate (Cov)	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024		Cov×Year P-value	Cov P-value		
Rainbow Trout	Energy Storage	Condition	All	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	106	30	143[e]	34	55[e]	77[e]	68	62[e]	84[e]	ANCOVA	0.001[f]	0.001	29.5	0.001
	Energy Storage	Condition	All	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	82[e]	160[e]	-	94[e]	201	209[e]	266[e]	121[e]	183[e]	64	ANCOVA	0.001[f]	0.001	22.4	0.001
	Energy Storage	Condition	All (FL > 12 cm)	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	82[e]	159[e]	-	94[e]	201	201[e]	263[e]	118[e]	169[e]	59	ANCOVA	0.001[f]	0.001	22.9	0.001
	Energy Storage	Condition	Female	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	38	16	55	9	8[e]	10	8	27	15	ANCOVA	0.245	0.001	32.4	0.001
	Energy Usage	Weight-at-age	Female	Spring	log10[Body Weight (g)]	log10[Age (years)]	-	9	8	8	8	8	8	8	8	8	ANCOVA	0.311	0.001	4.81	0.001
	Energy Storage	Condition	Male	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	62[e]	4	87[e]	21	9	4[e]	-	14[e]	33	ANCOVA	0.096[f]	0.001	33.2	0.001
	Energy Storage	Condition	Male (FL > 22 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	62[e]	4	87[e]	21	7	3[e]	-	13[e]	32	ANCOVA	0.983	0.001	33.6	0.001
Longnose Sucker	Energy Storage	Condition	All	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	100[e]	8	8	42	42	38[e]	38	32[e]	37	ANCOVA	0.033[f]	0.001	31.2	0.001
	Energy Storage	Condition	All (FL > 19 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	99[e]	8	8	40	42	36[e]	38	30[e]	36	ANCOVA	0.025[f]	0.001	31.8	0.001
	Energy Storage	Condition	All	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	78	157	-	91[e]	109[e]	110[e]	106[e]	104[e]	149[e]	91[e]	ANCOVA	0.001[f]	0.001	22.2	0.001
	Energy Storage	Condition	All (FL > 11 cm)	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	78	157	-	91[e]	109[e]	108[e]	102[e]	103[e]	146[e]	88[e]	ANCOVA	0.001[f]	0.001	22.5	0.001
	Energy Storage	Condition	Female	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	56	8	8	21	8	7[e]	8	15	13	ANCOVA	0.010[f]	0.001	34.9	0.001
	Energy Storage	Condition	Female (FL > 25 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	50	8	8	21	8	6[e]	8	15	10	ANCOVA	0.027[f]	0.001	36.0	0.001
	Energy Usage	Weight-at-age	Female	Spring	log10[Body Weight (g)]	log10[Age (years)]	-	8	8	8	8	8	8	8	8	8	ANCOVA	0.249	0.001	6.69	0.003
	Energy Storage	Condition	Male	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	-	41[e]	-	-	15	7	16	9	13[e]	22	ANCOVA	0.651	0.001	29.1	0.001

P-value < 0.1.
Mean is significantly greater than baseline year.
Mean is significantly lower than baseline year.
Covariate was not significant therefore an ANOVA was conducted.

Note: "-" = no data; ANCOVA = analysis of covariance; ANOVA = analysis of variance; ns = not significant.

[a] Model: $Y = \beta_0 + \beta_1(Cov) + \beta_2(Year) + \beta_3(Cov \times Year) + \varepsilon$.

[b] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the parallel slope ANCOVA model or the minimum and maximum values of the overlap in covariate values for the interaction ANCOVA model.

[c] The median, mean (geometric mean for log10-transformed variables), and adjusted mean are reported for ANCOVA, and the predicted means of the regression line equations for minimum and maximum values of the covariate (where the data sets overlap) for ANCOVAs where a significant interaction (i.e., different slopes) occurs.

[d] Calculated as the difference in measure of central tendency (MCT) between years (i.e., 2024 minus baseline year), expressed as a percentage of the baseline year MCT.

[e] Outliers removed. See Table Appendix E.5.2 for details.

[f] ANCOVA proceeded under the assumption that the slopes are practically parallel (a difference < 0.02) following Environment Canada (2012).

Table E.5.1: Statistical Comparisons of Condition and Weight-at-Age of Rainbow Trout and Longnose Sucker for Polley Lake in Spring and Fall, 2014 to 2024

Species	Indicator	Endpoint	Sex	Season	Variables		Summary Statistics[c]										Multiple Comparisons Among Years										Magnitude of Difference[d]									
					Response	Covariate (Cov)	Statistic	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024	2014	2016	2017	2018	2019	2020	2021	2022	2023	2024	Baseline Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
Rainbow Trout	Energy Storage	Condition	All	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	260	266	255	252	252	251	244	239	259	-	AB	A	AB	ABC	ABC	BC	CD	D	AB	2016	-	ns	ns	ns	ns	ns	-6.2	-8.2	ns
	Energy Storage	Condition	All	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	124	111	-	113	121	115	117	107	109	105	A	CD	-	BC	A	B	B	DE	CDE	E	2014	-10	-	-8.7	ns	-6.6	-5.7	-13	-12	-15
	Energy Storage	Condition	All (FL > 12 cm)	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	133	120	-	123	128	124	125	116	119	114	A	DE	-	BCDE	AB	CD	BC	F	EF	F	2014	-9.5	-	-7.6	ns	-7.2	-6.0	-13	-11	-15
	Energy Storage	Condition	Female	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	344	366	348	352	375	327	312	305	332	-	AB	A	AB	AB	A	BCD	CD	D	BC	2016	-	ns	ns	ns	ns	ns	-9.5	-12	ns
	Energy Usage	Weight-at-age	Female	Spring	log10[Body Weight (g)]	log10[Age (years)]	Adjusted Mean	-	330	369	341	348	437	376	306	269	-	-	ABCD	ABC	ABCD	ABCD	A	AB	BCD	D	CD	2016	-	ns	ns	ns	ns	ns	ns	ns	ns
	Energy Storage	Condition	Male	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	361	346	354	357	345	327	-	311	351	-	A	AB	AB	AB	AB	BC	-	C	AB	2016	-	ns	ns	ns	ns	-9.5	-	-14	ns
	Energy Storage	Condition	Male (FL > 22 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	373	359	367	370	368	342	-	317	358	-	A	A	A	A	A	AB	-	B	A	2016	-	ns	ns	ns	ns	ns	-	-15	ns
Longnose Sucker	Energy Storage	Condition	All	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	395	450	420	398	402	377	360	357	327	-	B	A	AB	B	B	BC	C	C	D	2016	-	14	ns	ns	ns	ns	-9.1	-9.6	-17
	Energy Storage	Condition	All (FL > 19 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	418	471	439	420	423	400	380	374	347	-	B	A	AB	B	AB	BC	C	C	D	2016	-	13	ns	ns	ns	ns	-9.1	-10	-17
	Energy Storage	Condition	All	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	134	131	-	145	133	130	127	126	122	122	B	B	-	A	B	BC	BCD	CD	D	D	2014	ns	-	8.5	ns	ns	ns	-5.8	-8.8	-8.7
	Energy Storage	Condition	All (FL > 11 cm)	Fall	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	140	137	-	152	139	136	134	132	128	128	B	BC	-	A	B	BC	BCD	CDE	E	DE	2014	ns	-	8.5	ns	ns	ns	-5.5	-8.7	-8.7
	Energy Storage	Condition	Female	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	567	634	594	572	586	531	522	513	481	-	BC	A	AB	ABC	ABC	BCD	CD	D	D	2016	-	12	ns	ns	ns	ns	ns	-9.6	-15
	Energy Storage	Condition	Female (FL > 25 cm)	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	625	703	662	631	651	579	578	566	549	-	BCD	A	AB	BCD	ABC	CDE	DE	E	E	2016	-	12	ns	ns	ns	ns	ns	-9.5	-12
	Energy Usage	Weight-at-age	Female	Spring	log10[Body Weight (g)]	log10[Age (years)]	Adjusted Mean	-	608	689	834	779	695	574	625	638	-	-	ABC	ABC	A	AB	ABC	BC	ABC	ABC	C	2016	-	ns	ns	ns	ns	ns	ns	ns	ns
	Energy Storage	Condition	Male	Spring	log10[Body Weight (g)]	log10[Fork Length (cm)]	Adjusted Mean	-	307	-	-	312	306	291	275	270	249	-	A	-	-	A	AB	AB	BC	BC	C	2016	-	-	-	ns	ns	ns	-10	-12	-19

P-value < 0.1.
Mean is significantly greater than baseline year.
Mean is significantly lower than baseline year.
Covariate was not significant therefore an ANOVA was conducted.

Note: "-" = no data; ANCOVA = analysis of covariance; ANOVA = analysis of variance; ns = not significant.

[a] Model: $Y = \beta_0 + \beta_1(Cov) + \beta_2(Year) + \beta_3(Cov \times Year) + \varepsilon$.

[b] The mean value of the covariate (that corresponds to the adjusted means for the response variable) for the para

[c] The median, mean (geometric mean for log10-transformed variables), and adjusted mean are reported for ANC

[d] Calculated as the difference in measure of central tendency (MCT) between years (i.e., 2024 minus baseline yea

[e] Outliers removed. See Table Appendix E.5.2 for details.

[f] ANCOVA proceeded under the assumption that the slopes are practically parallel (a difference < 0.02) following E

Table E.5.2: Outliers Excluded from Statistical Comparisons of Condition and Weight-at-Age of Rainbow Trout and Longnose Sucker from Polley Lake in Spring and Fall, 2014 to 2024

Species	Sex	Season	Year	Outliers (Student Residual)
Rainbow Trout	All	Spring	2018	POL_RB_105_2018-05-15 (-4.208)
			2020	POL_RB_N41_2020-05-15 (-16.498); POL_RB_N42_2020-05-15 (-19.046)
			2021	POL_RB_33_2021-05-15 (5.133)
			2023	POL_RB-47_2023-05 (-4.252)
			2024	MP_POL_RB-84_2024-04 (-4.407)
	All	Fall	2014	POL_RB_50_2014-09-15 (-4.021)
			2016	POL_RB_11L_2016-09-15 (-4.401); POL_RB_32L_2016-09-15 (8.495); POL_RB_11_2016-09-13 (-4.916); POL_RB_37L_2016-09-15 (4.606)
			2018	POL_RB_30_2018-09-15 (6.768); POL_RB_90_2018-09-15 (-4.116)
			2020	POL_RB_62_2020-10-05 (4.12); POL_RB_112_2020-10-05 (4.513); POL_RB_143_2020-10-06 (-4.145); POL_RB_151_2020-10-06 (-4.205); POL_RB_205_2020-10-07 (-4.757); POL_RB_12_2020-10-03 (-4.245); POL_RB_195_2020-10-07 (-4.145)
			2021	POL_RB_47_2021-09-24 (-4.395); POL_RB_173_2021-09-26 (18.305)
			2022	POL_RB-11_2022-09 (-4.235); POL_RB-6_2022-09 (-4.095)
			2023	POL_RB-179_2023-09 (11.747)
	All (FL > 12 cm)	Fall	2014	POL_RB_50_2014-09-15 (-4.105)
			2016	POL_RB_11L_2016-09-15 (-4.493); POL_RB_32L_2016-09-15 (8.683); POL_RB_11_2016-09-13 (-5.12); POL_RB_37L_2016-09-15 (4.797); POL_RB_71_2016-09-16 (-4.135)
			2018	POL_RB_30_2018-09-15 (6.914); POL_RB_90_2018-09-15 (-4.131)
			2020	POL_RB_12_2020-10-03 (-4.293); POL_RB_62_2020-10-05 (4.121); POL_RB_112_2020-10-05 (4.62); POL_RB_143_2020-10-06 (-4.529); POL_RB_195_2020-10-07 (-4.175); POL_RB_205_2020-10-07 (-4.908)
			2021	POL_RB_47_2021-09-24 (-4.492); POL_RB_173_2021-09-26 (18.828)
			2022	POL_RB-11_2022-09 (-4.347)
			2023	POL_RB-179_2023-09 (11.587)
	Female	Spring	2020	POL_RB_N41_2020-05-15 (-28.179)
	Male	Spring	2016	POL_RB_54_2016-04-15 (4.108)
			2018	POL_RB_105_2018-05-15 (-4.053); POL_RB_85_2018-05-15 (4.079)
			2021	POL_RB_33_2021-05-15 (5.651)
			2023	POL_RB-47_2023-05 (-4.136)
	Male (FL > 22 cm)	Spring	2016	POL_RB_54_2016-04-15 (4.14)
			2018	POL_RB_105_2018-05-15 (-4.111); POL_RB_85_2018-05-15 (4.055)
			2021	POL_RB_33_2021-05-15 (4.79)
			2023	POL_RB-47_2023-05 (-4.098)
Longnose Sucker	All	Spring	2016	POL_LSU_88_2016-04-15 (-7.536); POL_LSU_72_2016-04-15 (-4.472)
			2021	POL_LSU_36_2021-05-13 (-4.363)
			2023	POL_LSU-65_2023-05 (9.059)
	All (FL > 19 cm)	Spring	2016	POL_LSU_88_2016-04-15 (-7.624); POL_LSU_72_2016-04-15 (-4.487)
			2021	POL_LSU_36_2021-05-13 (-4.435)
			2023	POL_LSU-65_2023-05 (8.902)
	All	Fall	2018	POL_LSU_32_2018-09-15 (-4.315)
			2019	POL_LSU_36_2019-09-25 (-4.201); POL_LSU_91_2019-09-26 (-8.436)
			2020	POL_LSU_10_2020-10-05 (4.224); POL_LSU_86_2020-10-05 (-4.151); POL_LSU_110_2020-10-05 (-4.192)
			2021	POL_LSU_45_2021-09-25 (4.406); POL_LSU_105_2021-09-26 (4.116); POL_LSU_106_2021-09-26 (4.159)
			2022	POL_LSU-7_2022-09 (-4.838)
			2023	POL_LSU-151_2023-09 (-7); POL_LSU-143_2023-09 (-4.065)
			2024	MP_POL_LSU-17_2024-09 (-6.221); MP_POL_LSU-39_2024-09 (-5.656); MP_POL_LSU-87_2024-09 (8.799)
	All (FL > 11 cm)	Fall	2018	POL_LSU_32_2018-09-15 (-4.455)
			2019	POL_LSU_36_2019-09-25 (-4.336); POL_LSU_91_2019-09-26 (-8.728)
			2020	POL_LSU_86_2020-10-05 (-4.223); POL_LSU_110_2020-10-05 (-4.406)
			2022	POL_LSU-7_2022-09 (-4.16)
			2023	POL_LSU-151_2023-09 (-7.221); POL_LSU-143_2023-09 (-4.137)
			2024	MP_POL_LSU-17_2024-09 (-6.389); MP_POL_LSU-39_2024-09 (-5.803); MP_POL_LSU-87_2024-09 (9.069)
	Male	Spring	2016	POL_LSU_72_2016-04-15 (-5.205)
			2023	POL_LSU-65_2023-05 (8.369)
	Female	Spring	2021	POL_LSU_36_2021-05-13 (-4.848)
	Female (FL > 25 cm)	Spring	2021	POL_LSU_36_2021-05-13 (-5.307)

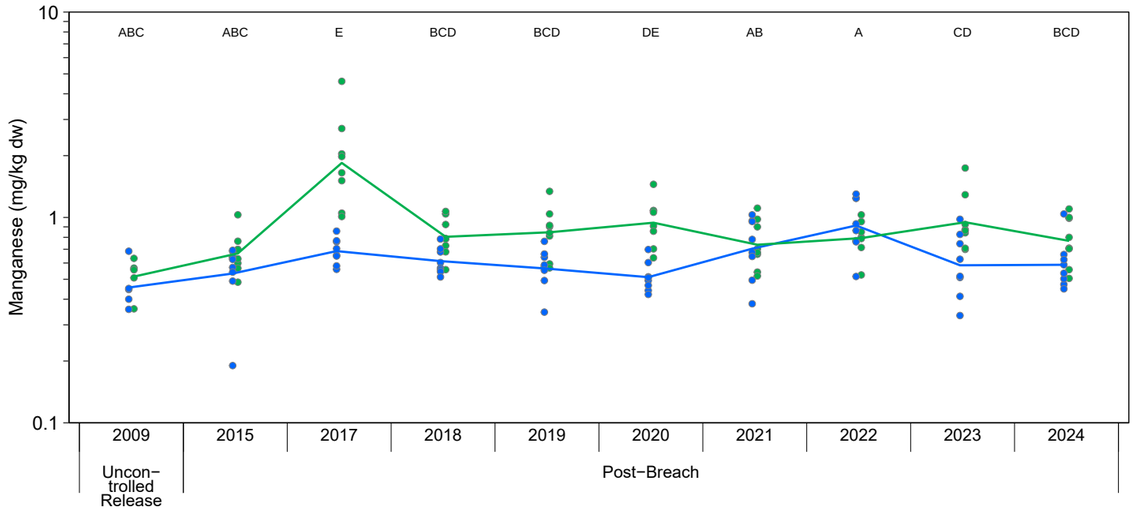
Note: FL = fork length (cm).

Table E.5.3: Two-Sample Kolmogorov-Smirnov Test Results of Rainbow Trout, Longnose Sucker, and Redside Shiner Length Frequency Distributions for Polley Lake in Fall, 2016 to 2024

Species	Sample Size								P-Value							
	2016	2018	2019	2020	2021	2022	2023	2024	Baseline Year	2018	2019	2020	2021	2022	2023	2024
Rainbow Trout	119	54	201	216	268	123	185	151	2016	0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Longnose Sucker	100	169	112	113	109	105	151	131	2016	<0.001	0.088	<0.001	<0.001	<0.001	<0.001	<0.001
Redside Shiner	100	110	110	160	104	113	119	106	2016	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

P-Value < 0.1.

APPENDIX E.6
FISH TISSUE QUALITY



Bootjack Lake Polley Lake

Figure E.6.1: Rainbow Trout Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

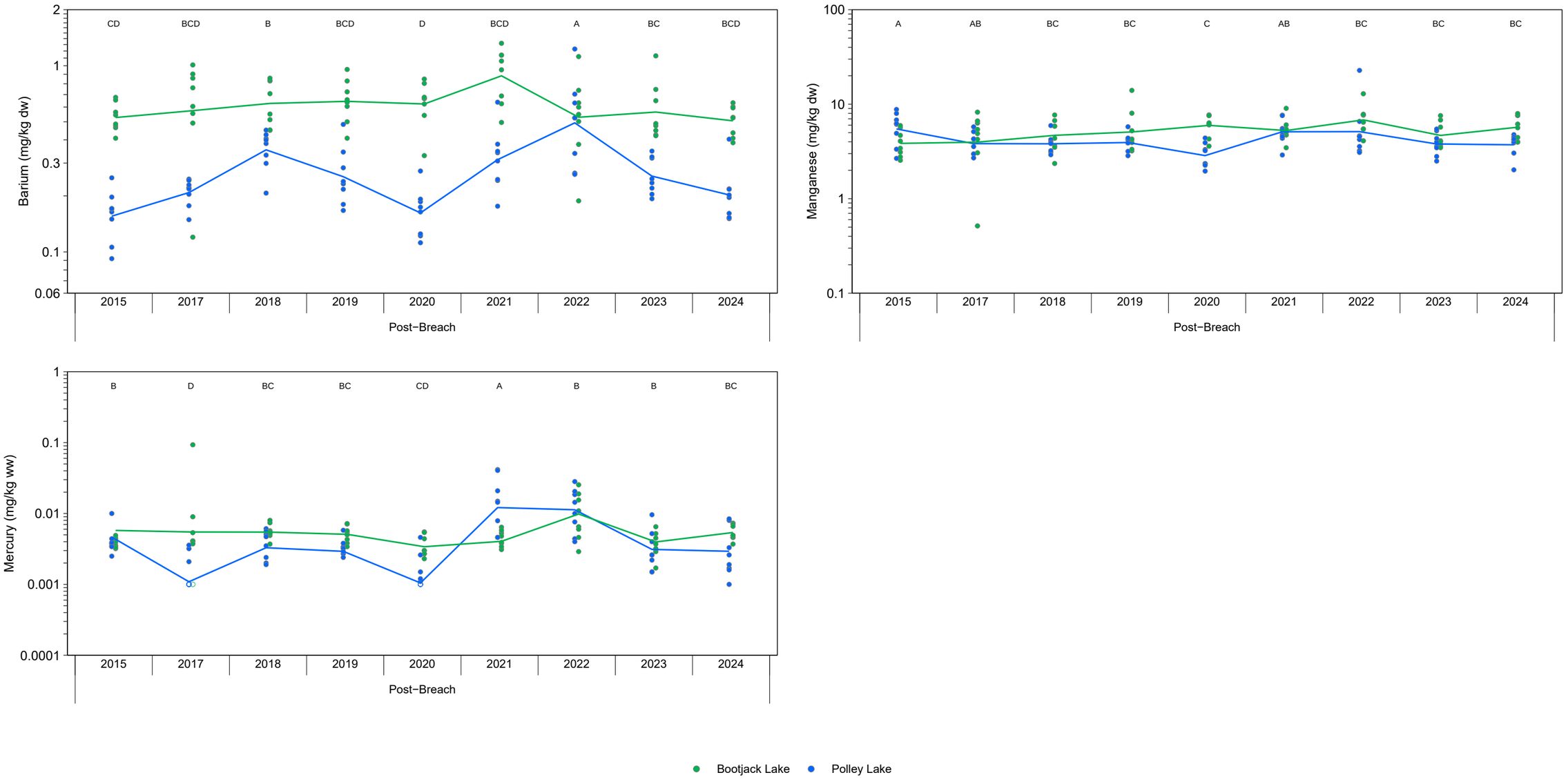


Figure E.6.2: Rainbow Trout Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2012 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

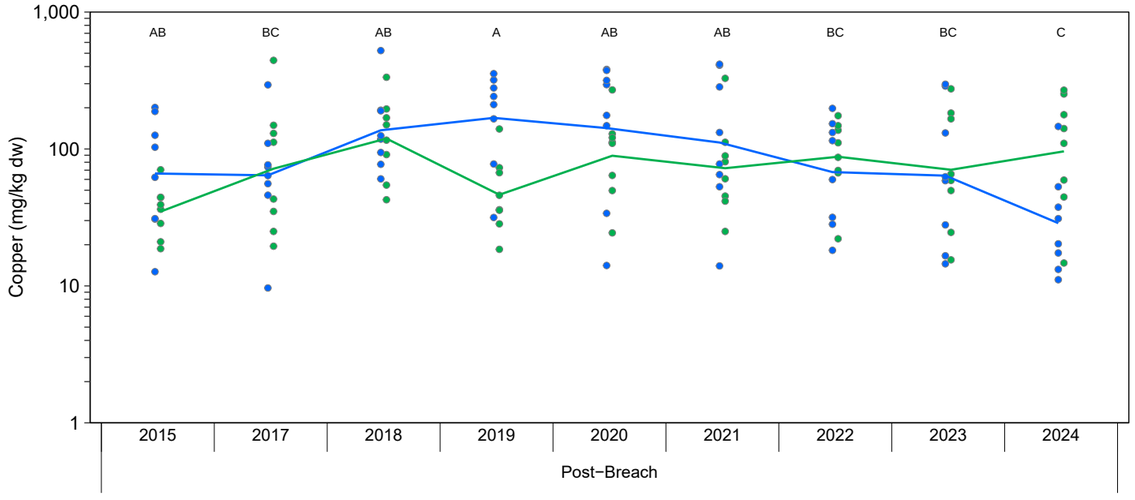


Figure E.6.3: Rainbow Trout Liver Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

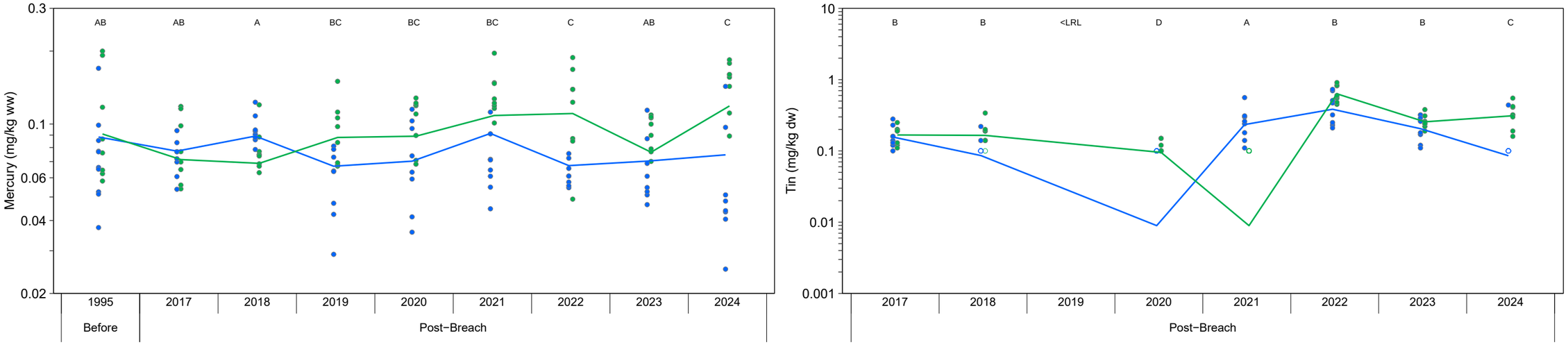


Figure E.6.4: Longnose Sucker Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

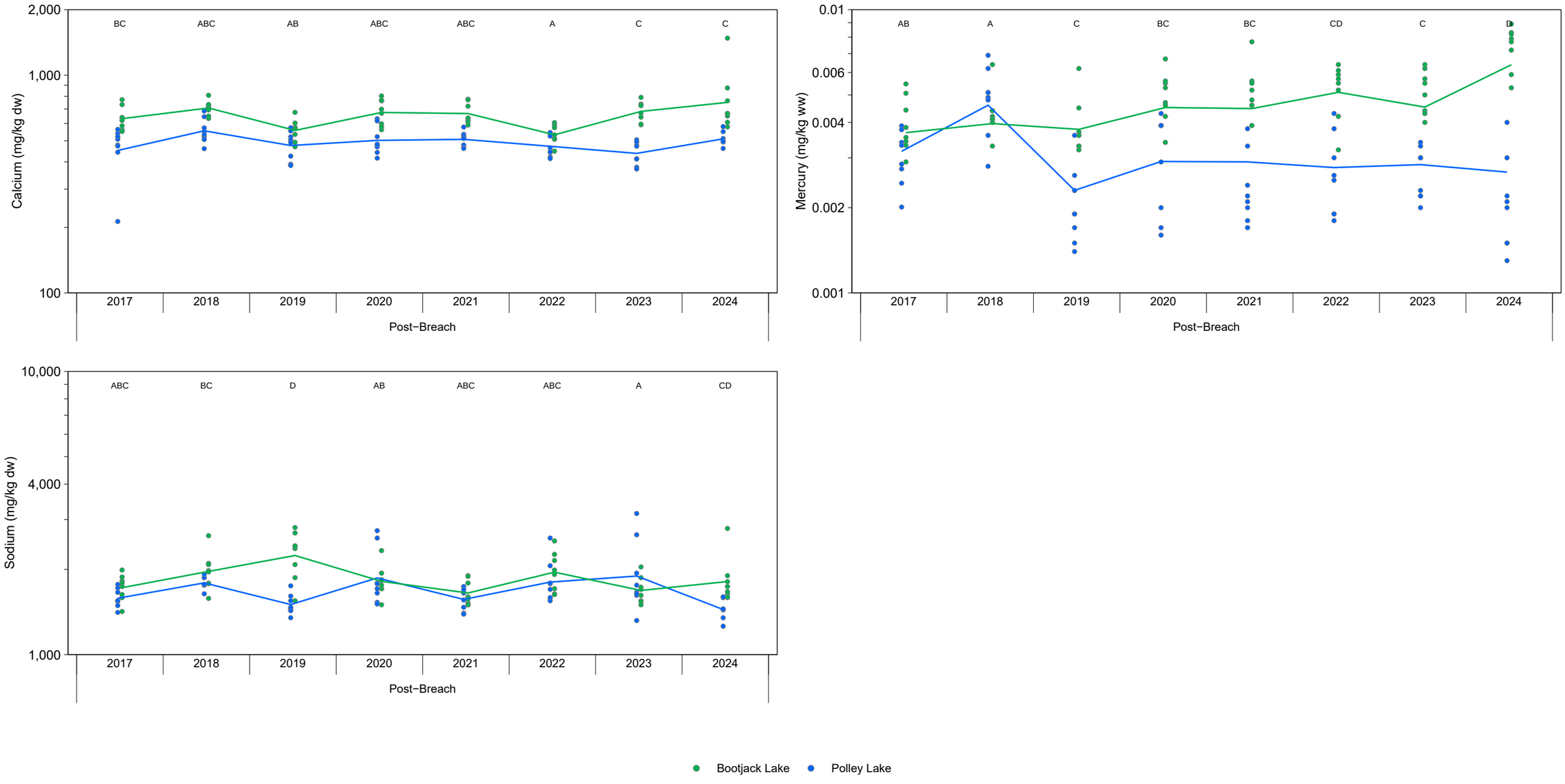
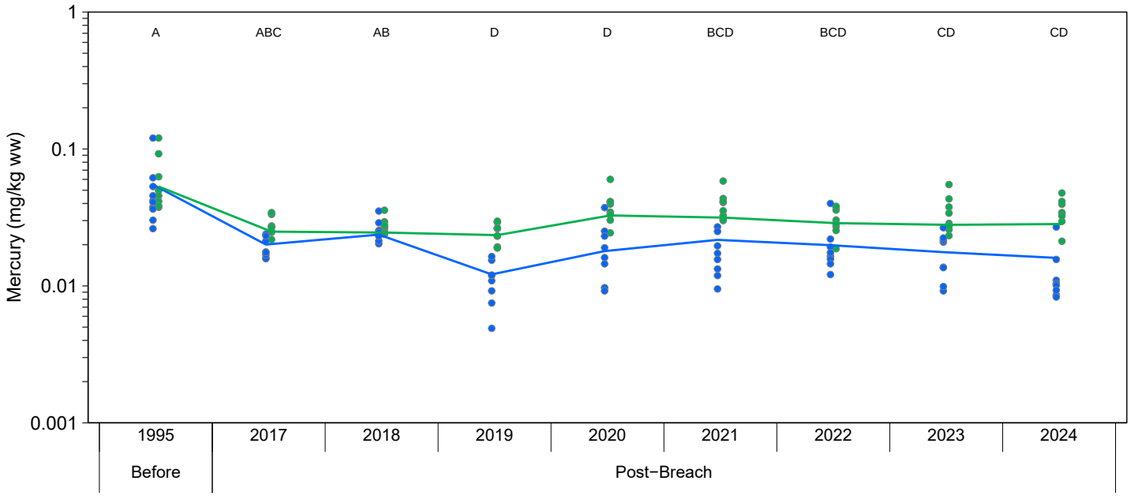


Figure E.6.5: Longnose Sucker Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2012 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.



Bootjack Lake Polley Lake

Figure E.6.6: Longnose Sucker Liver Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Notes: mg/kg = milligrams per kilogram, ww = wet weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

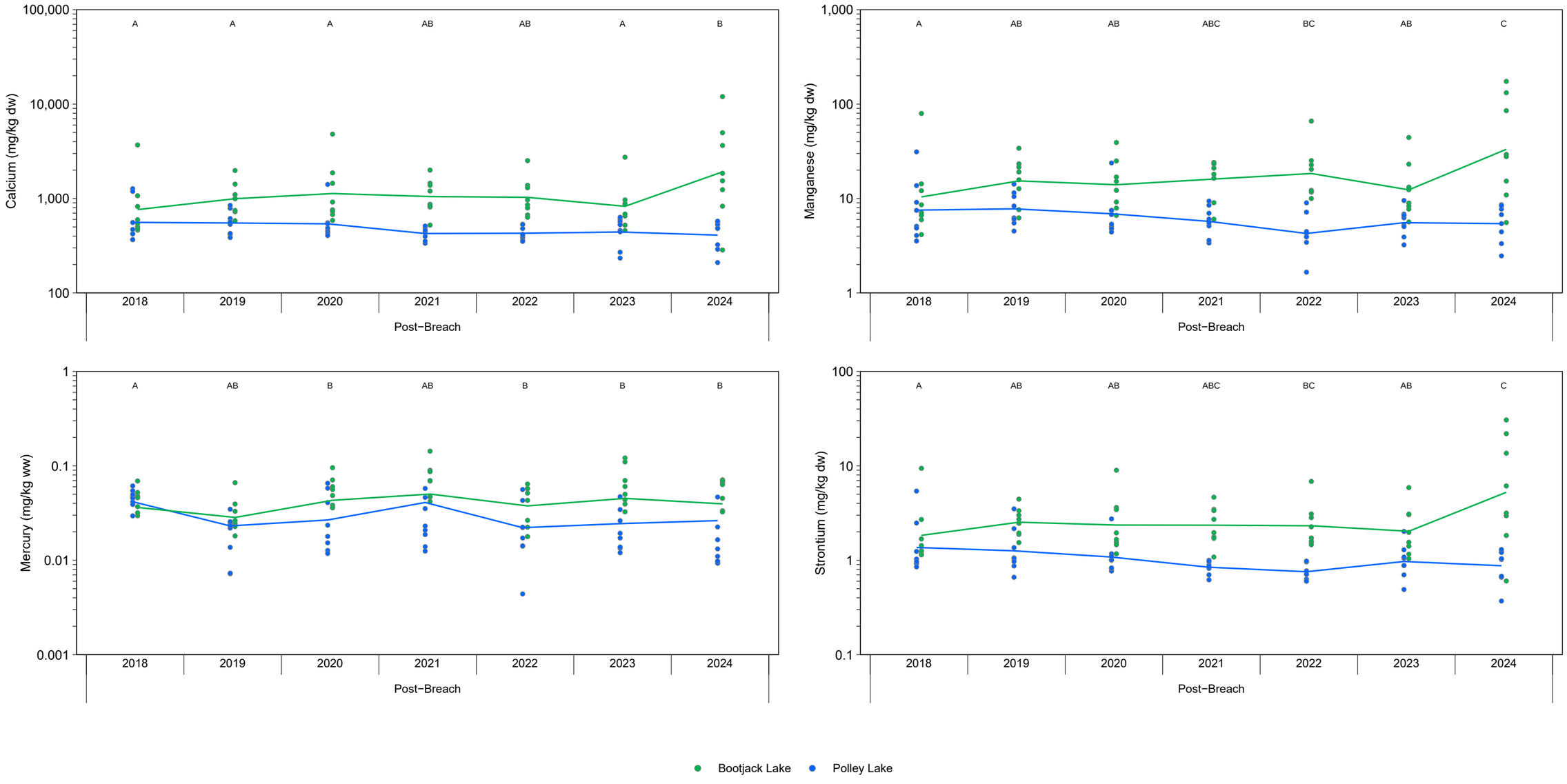


Figure E.6.7: Longnose Sucker Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2018 to 2024

Notes: mg/kg = milligrams per kilogram, dw = dry weight, ww = wet weight, <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified; only years with available data are displayed and these are analyte−dependent. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Polley Lake:Bootjack Lake) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Polley Lake:Bootjack Lake). Only years with samples from both reference and exposed areas are plotted.

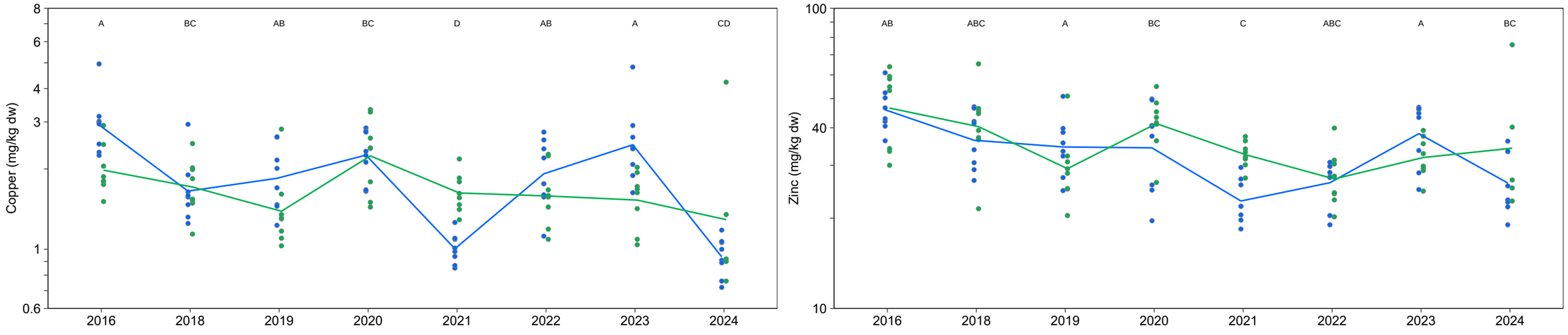


Figure E.6.8: Peamouth Chub Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024

Notes: dw = dry weight. <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

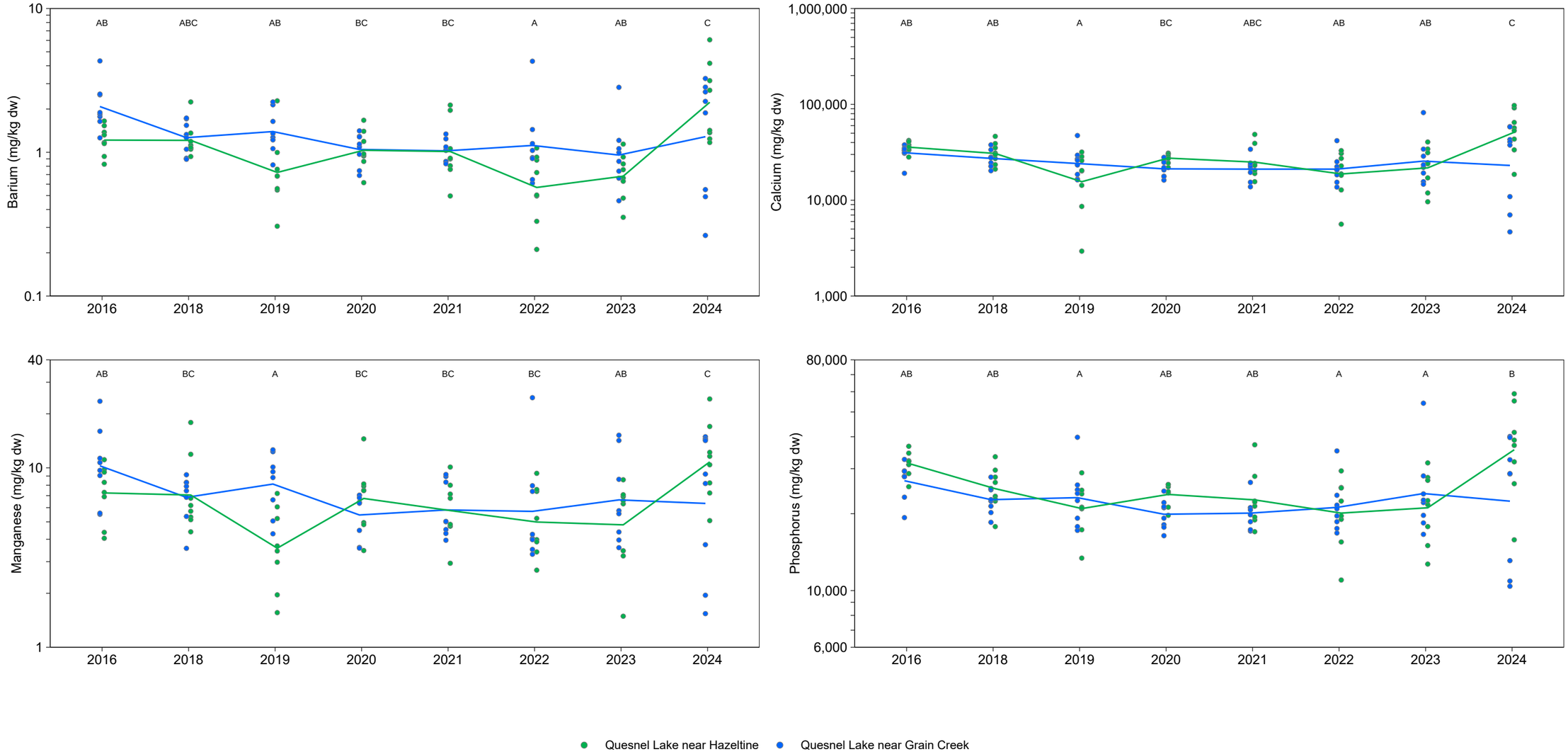


Figure E.6.9: Northern Pikeminnow Whole-body Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024

Notes: dw = dry weight. <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

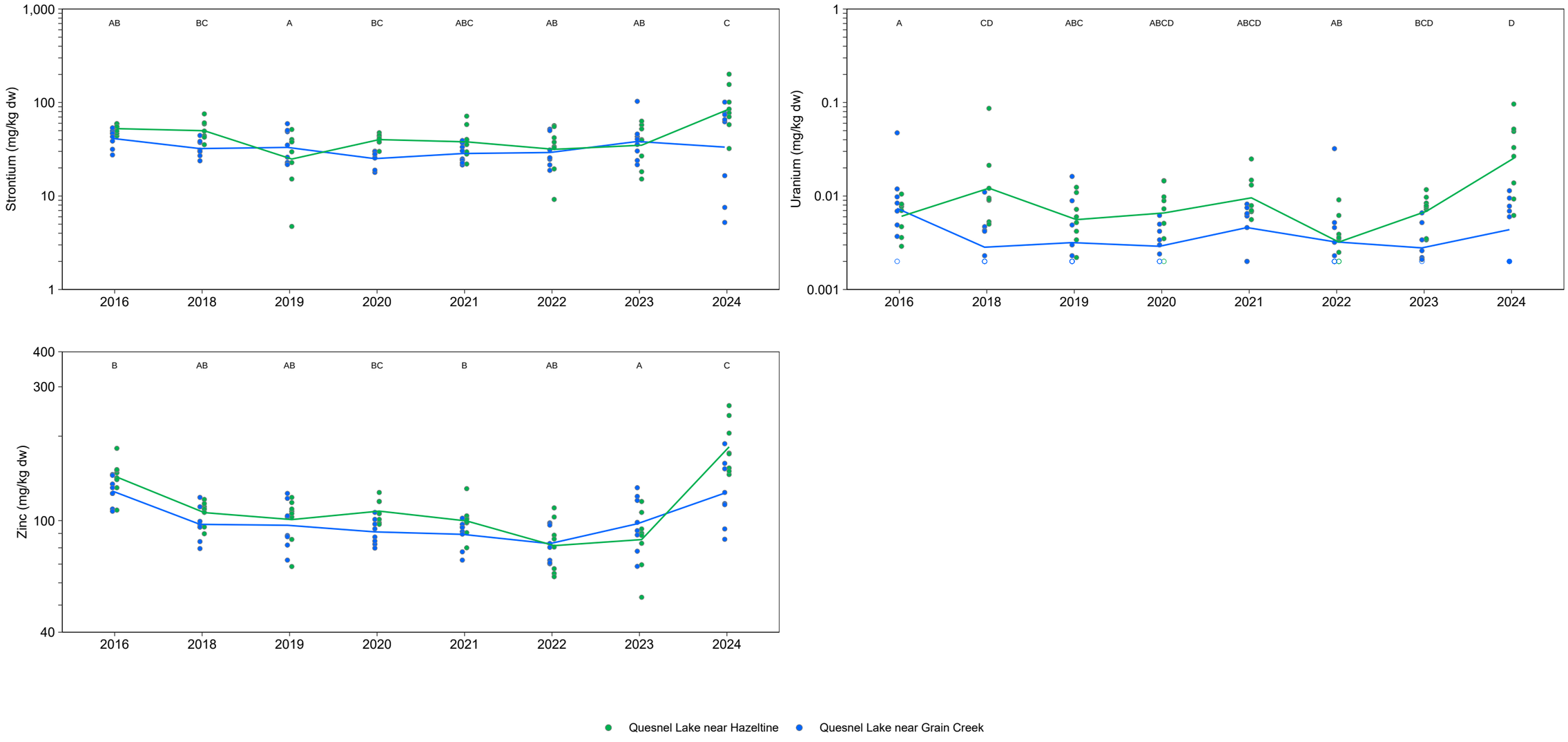


Figure E.6.9: Northern Pikeminnow Whole-body Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024

Notes: dw = dry weight. <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

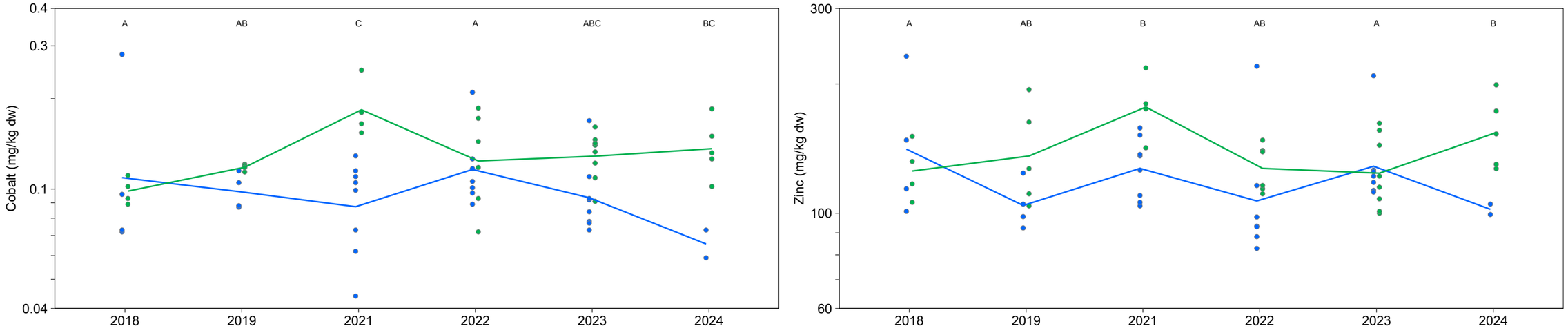


Figure E.6.10: Peamouth Chub Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2018 to 2024

Notes: dw = dry weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

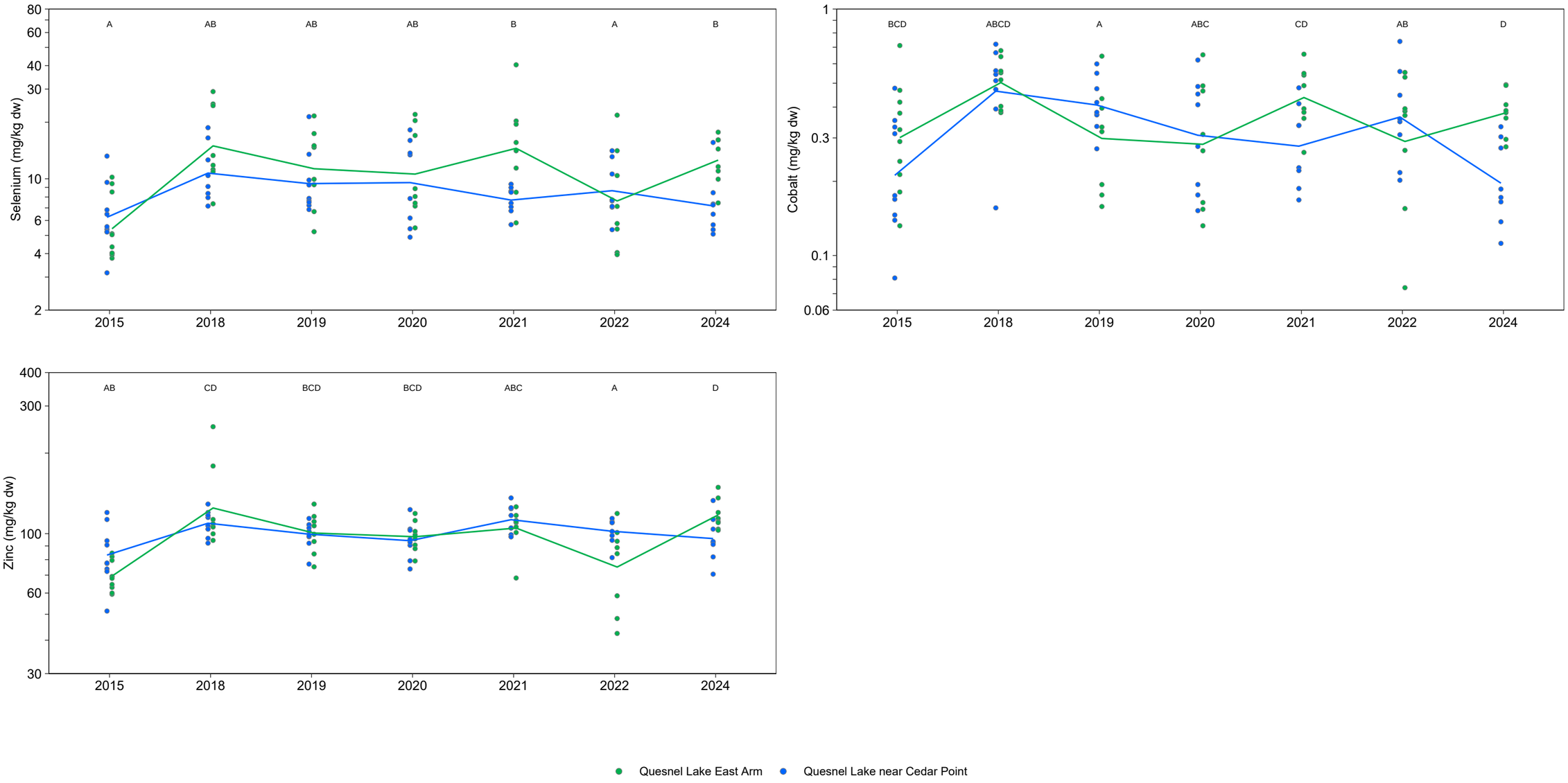


Figure E.6.11: Lake Trout Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, 2015 to 2024

Notes: dw = dry weight. <LRL = lower than the laboratory reporting limit. Green represents reference area and blue represents exposed area. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with samples from both reference and exposed areas are plotted.

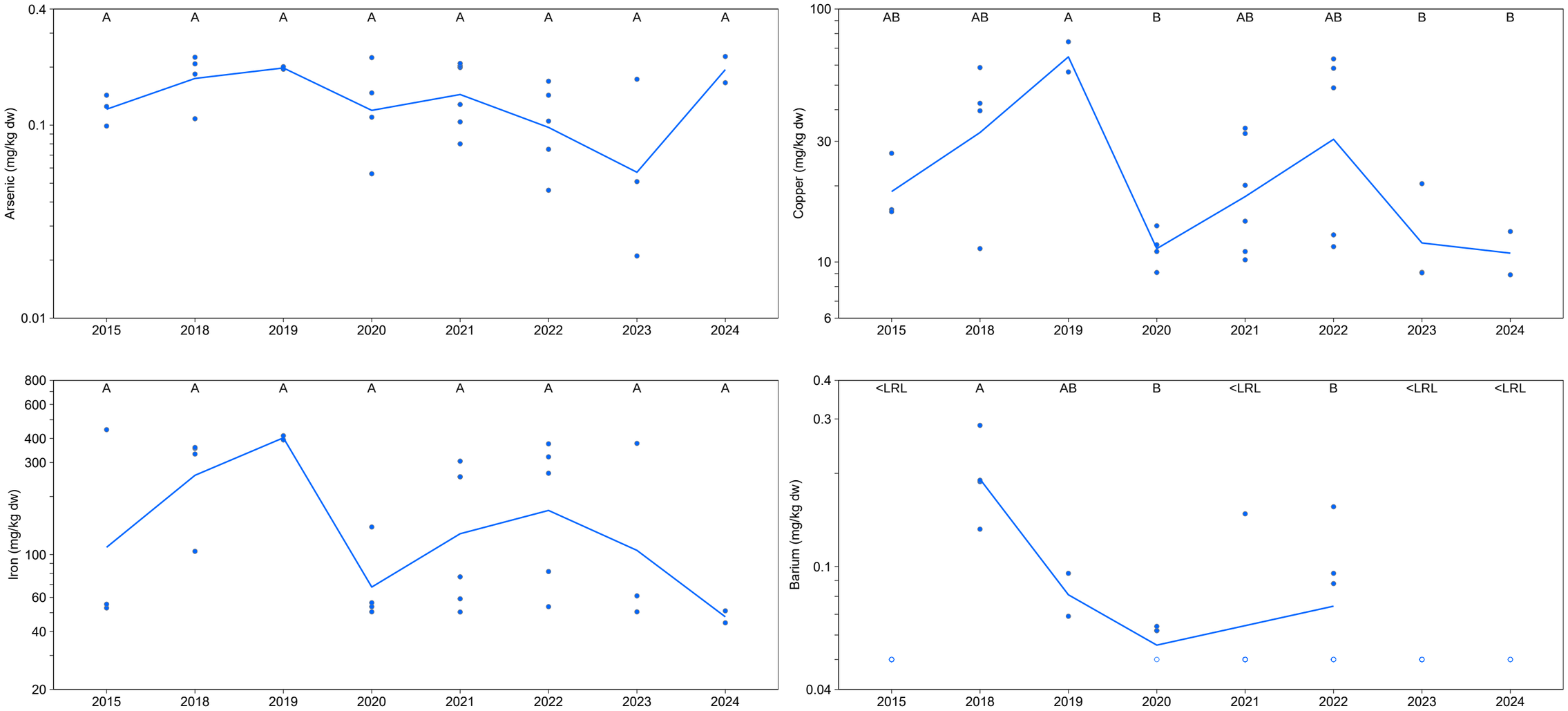


Figure E.6.12: Lake Trout Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area, 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

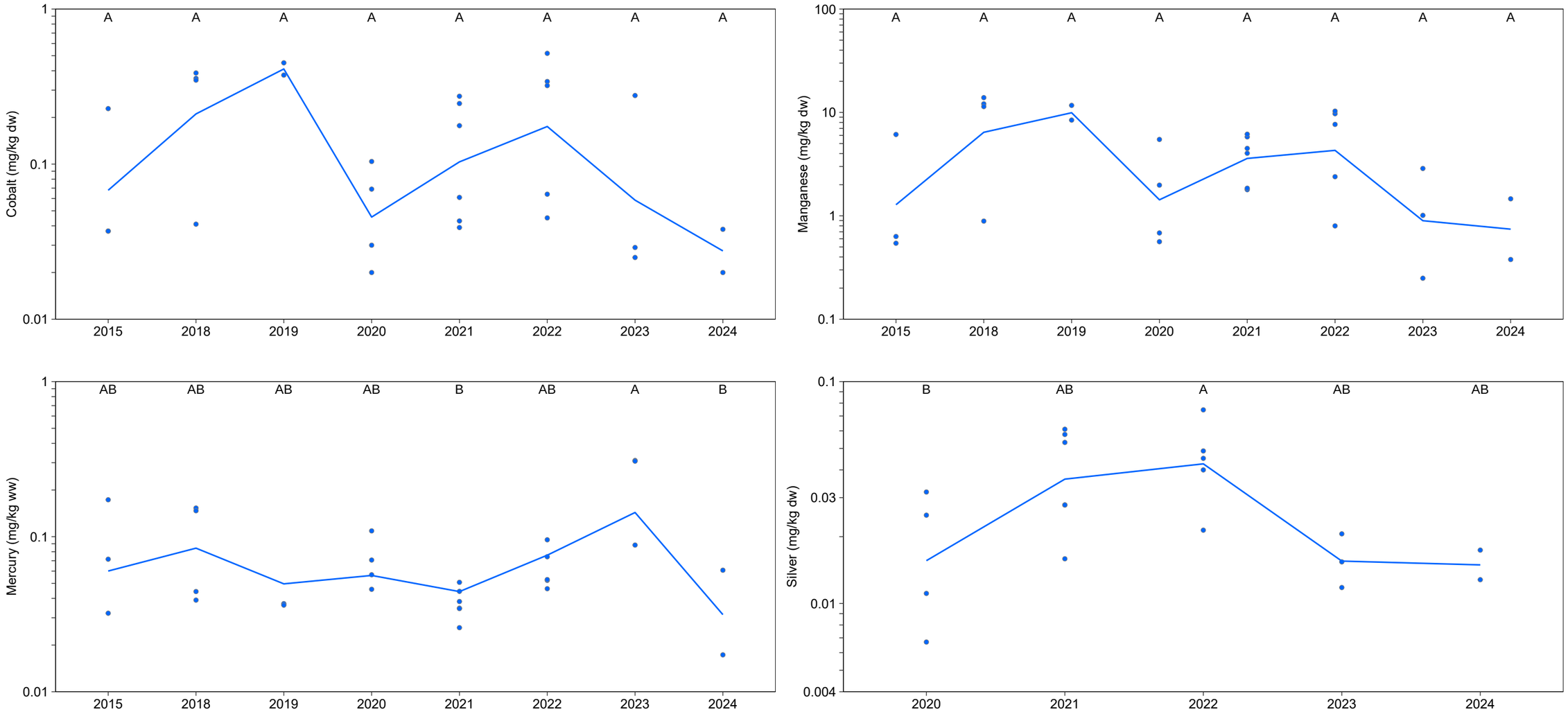


Figure E.6.12: Lake Trout Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area, 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

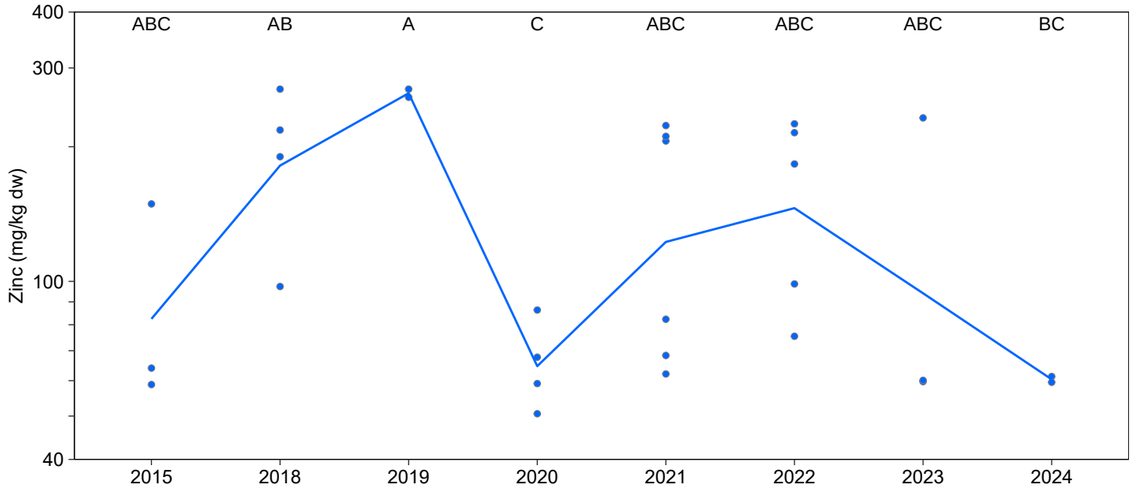


Figure E.6.12: Lake Trout Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) Monitoring Area, 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

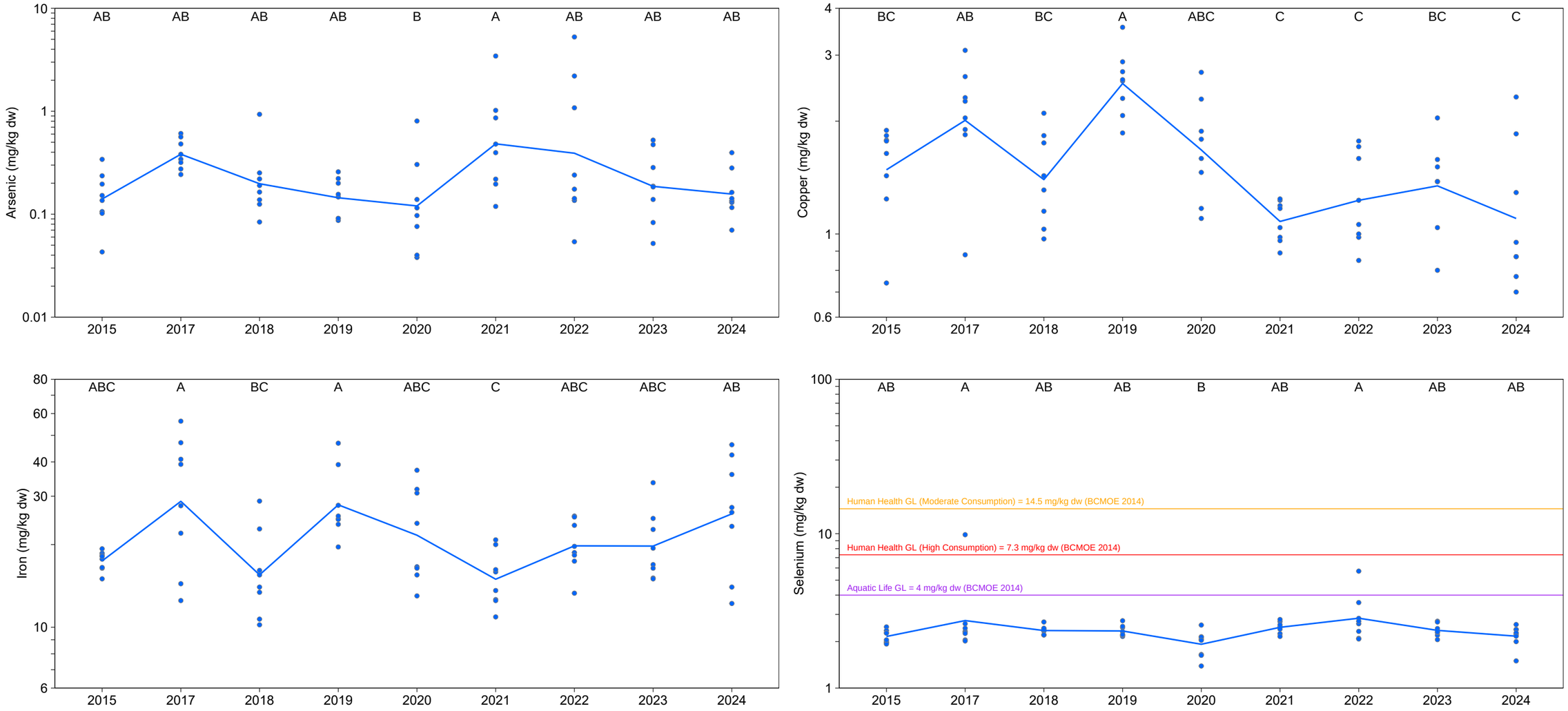


Figure E.6.13: Rainbow Trout Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: GL = Guideline. dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

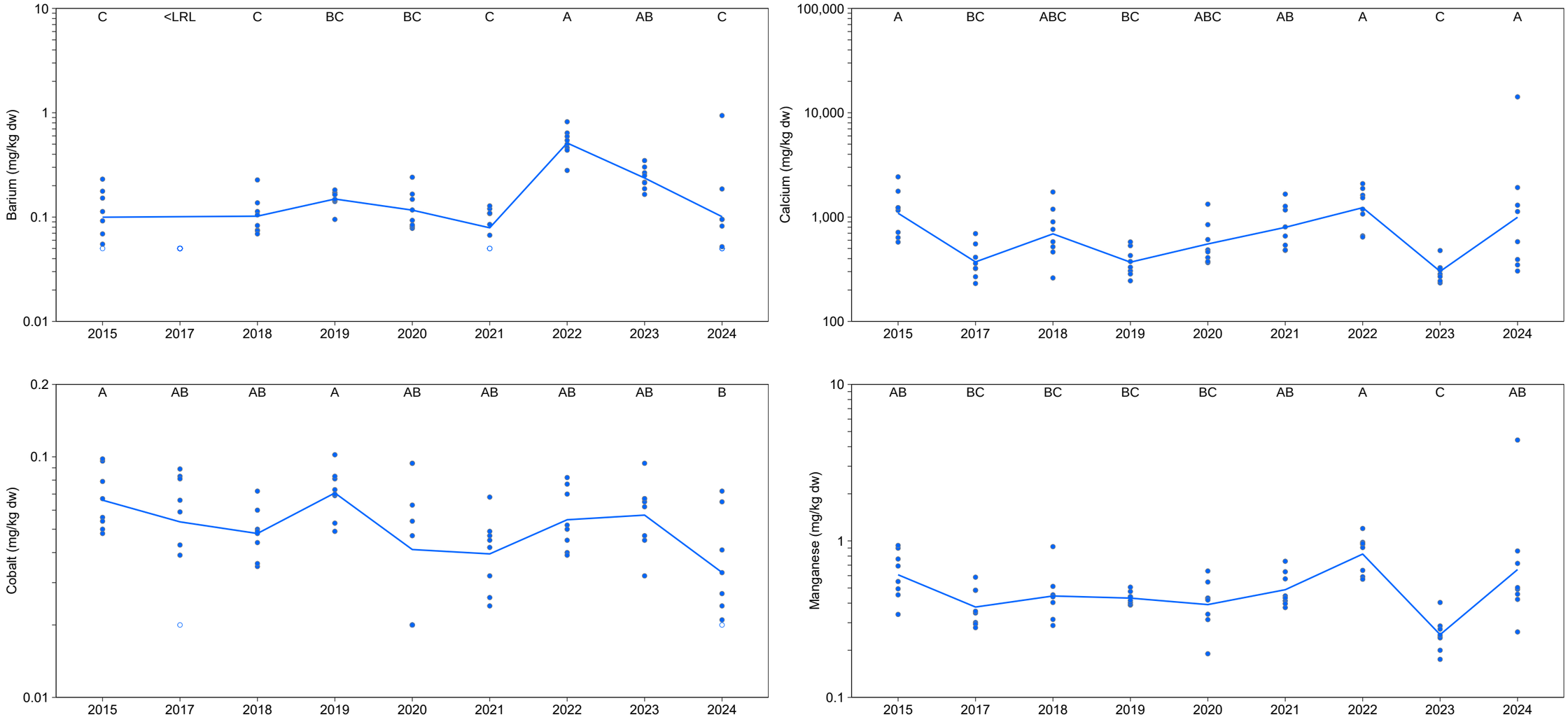


Figure E.6.13: Rainbow Trout Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: GL = Guideline. dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

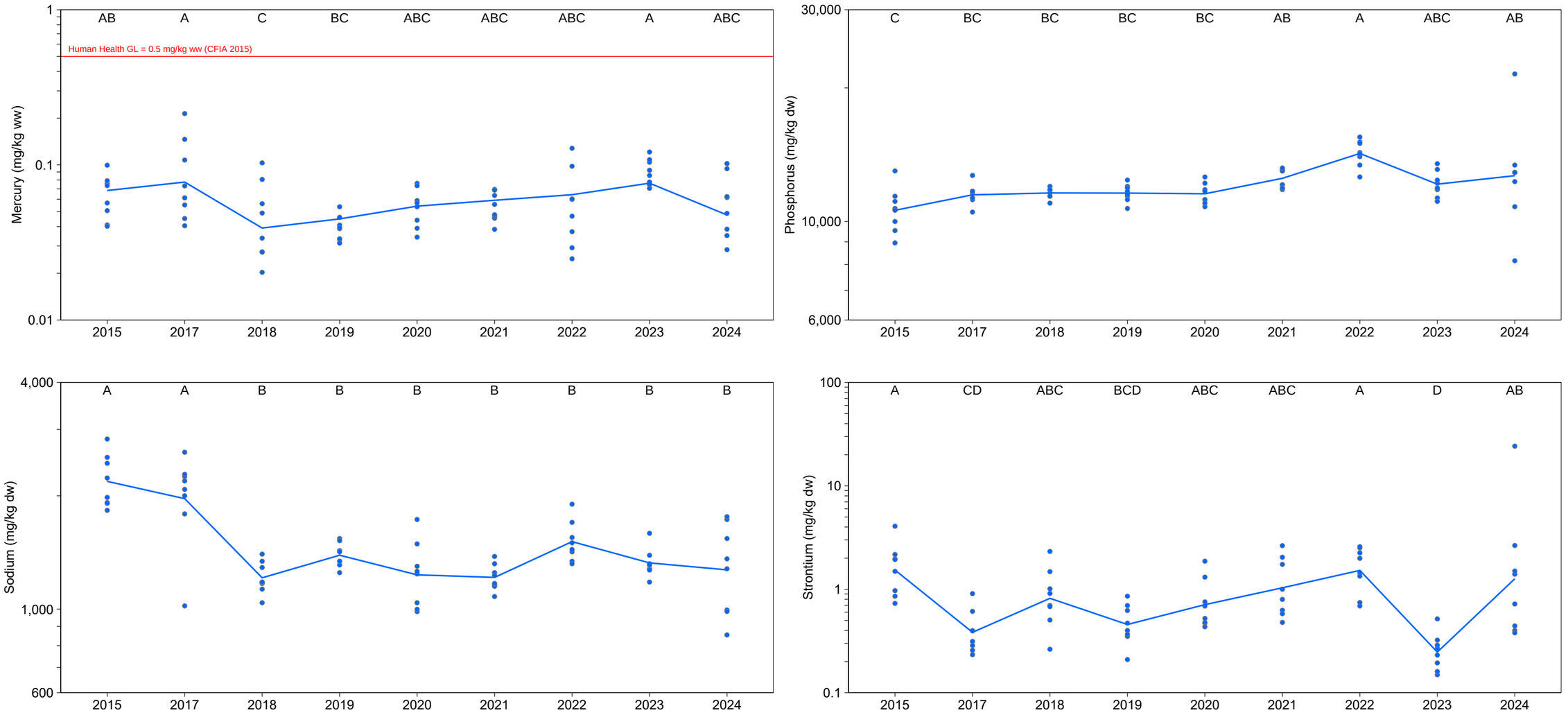


Figure E.6.13: Rainbow Trout Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: GL = Guideline. dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

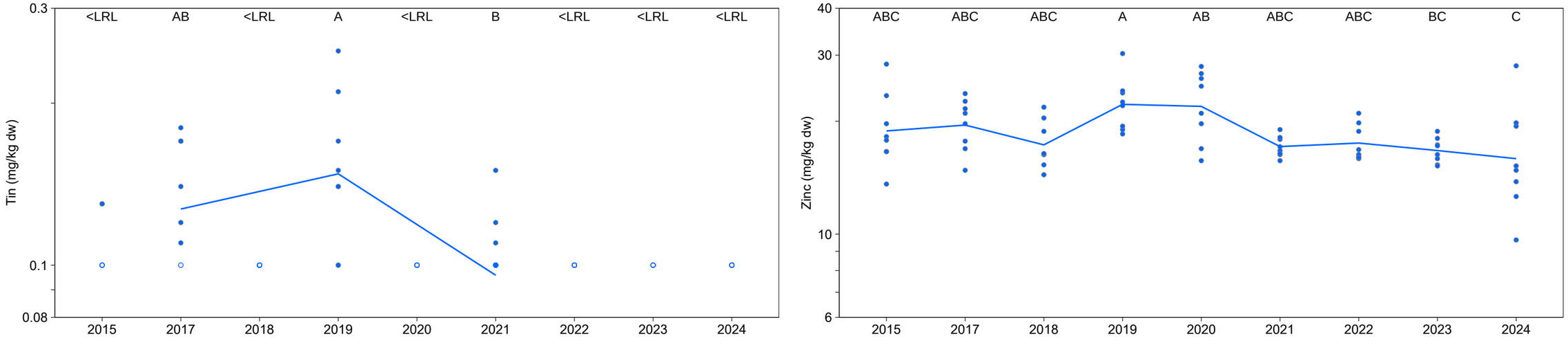
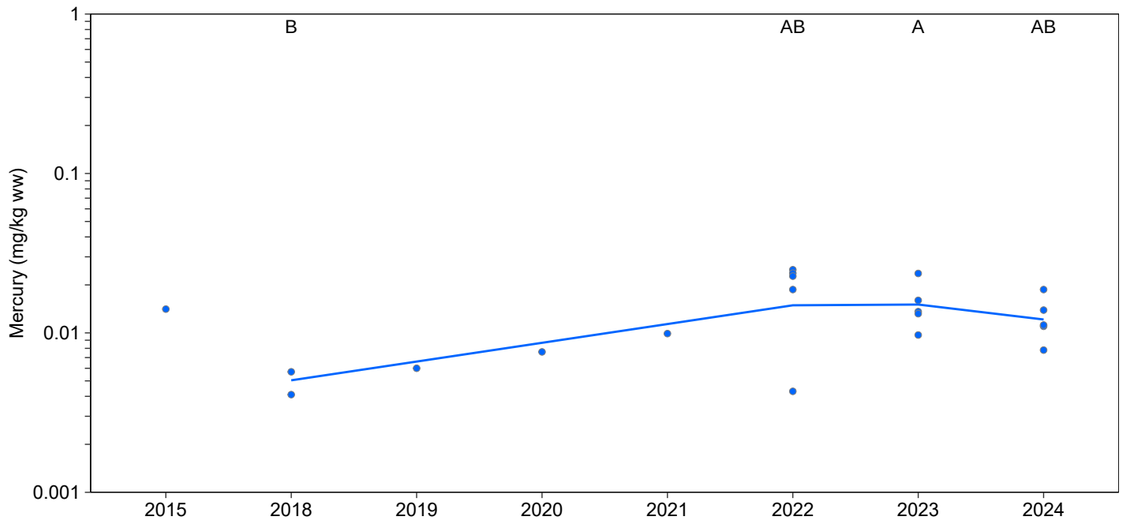
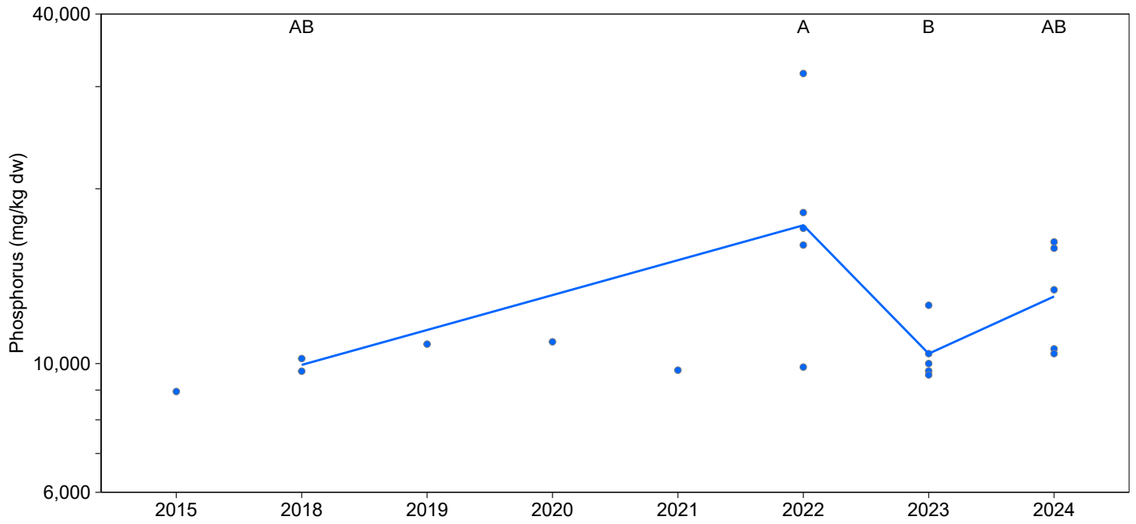


Figure E.6.13: Rainbow Trout Muscle Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: GL = Guideline. dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.





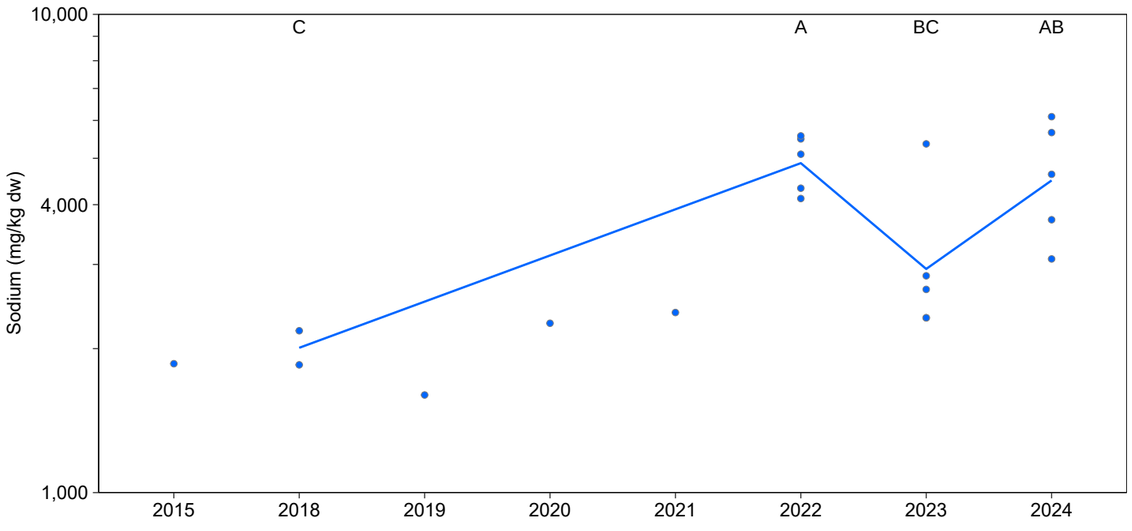


Figure E.6.14: Rainbow Trout Ovary Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

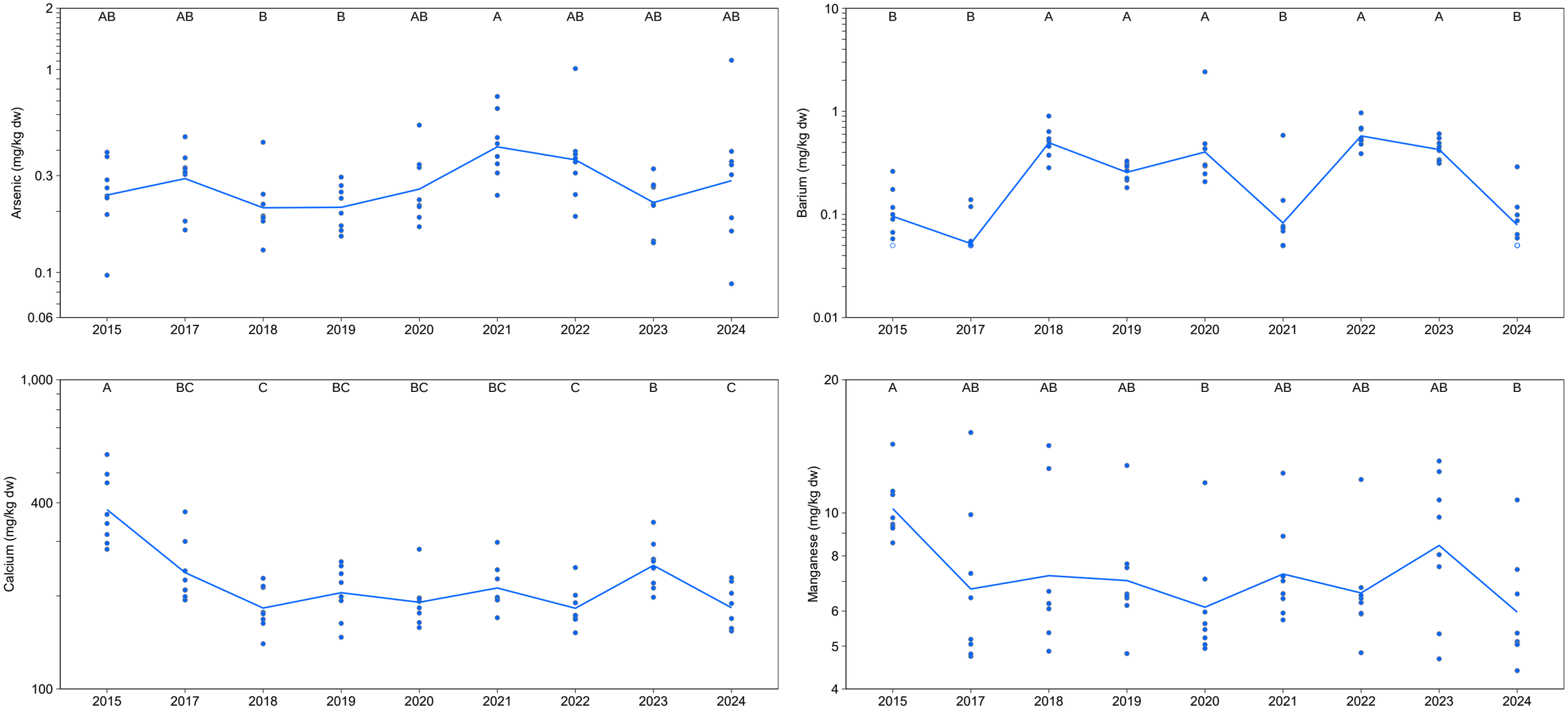


Figure E.6.15: Rainbow Trout Liver Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

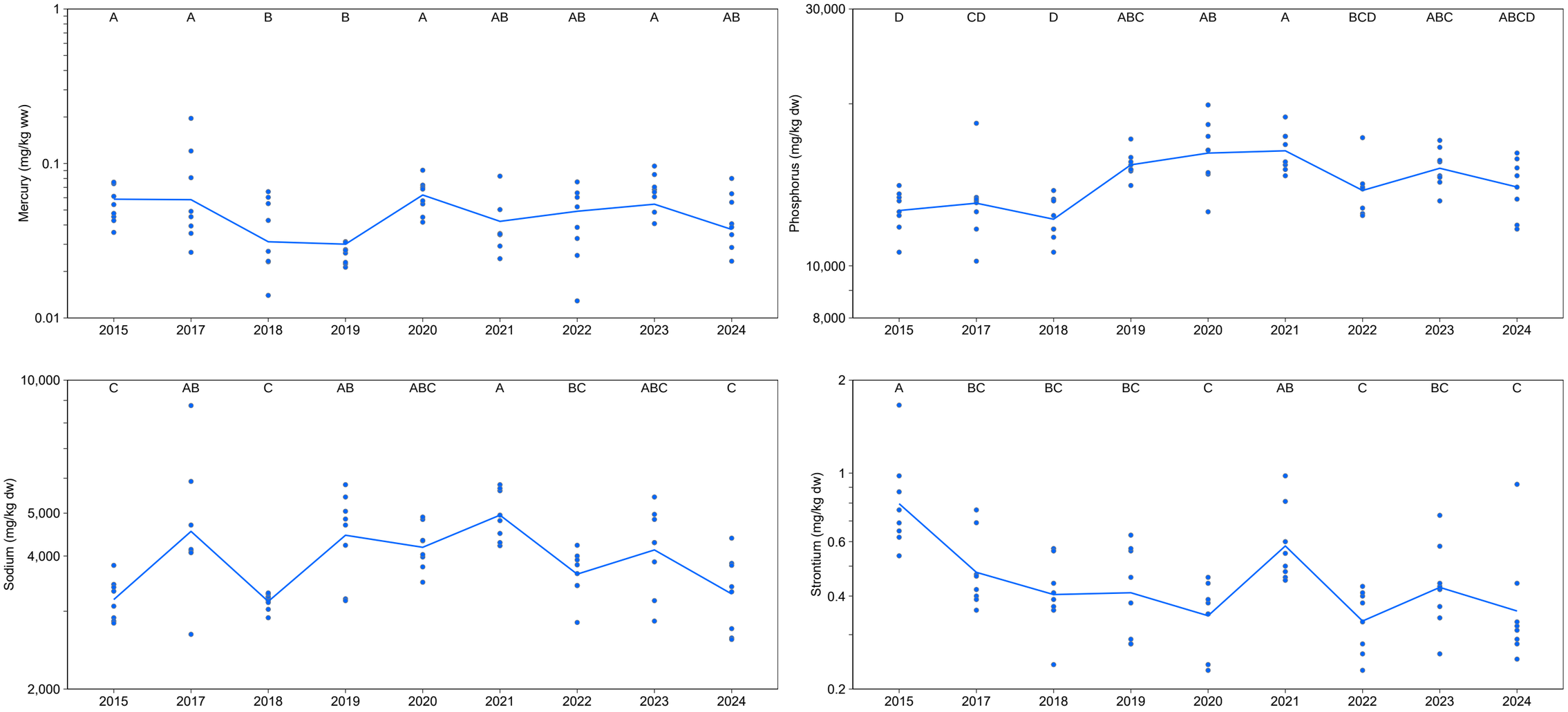


Figure E.6.15: Rainbow Trout Liver Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

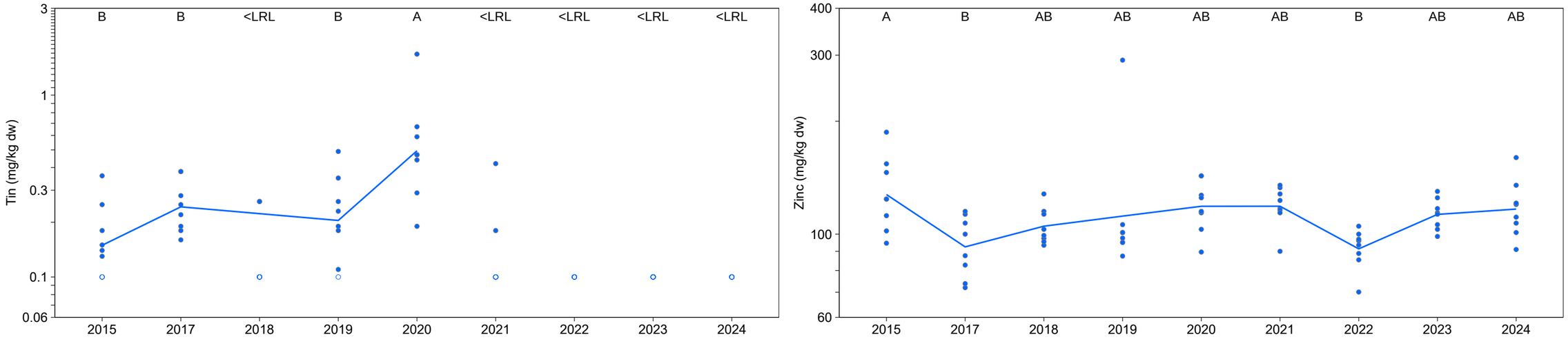


Figure E.6.15: Rainbow Trout Liver Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

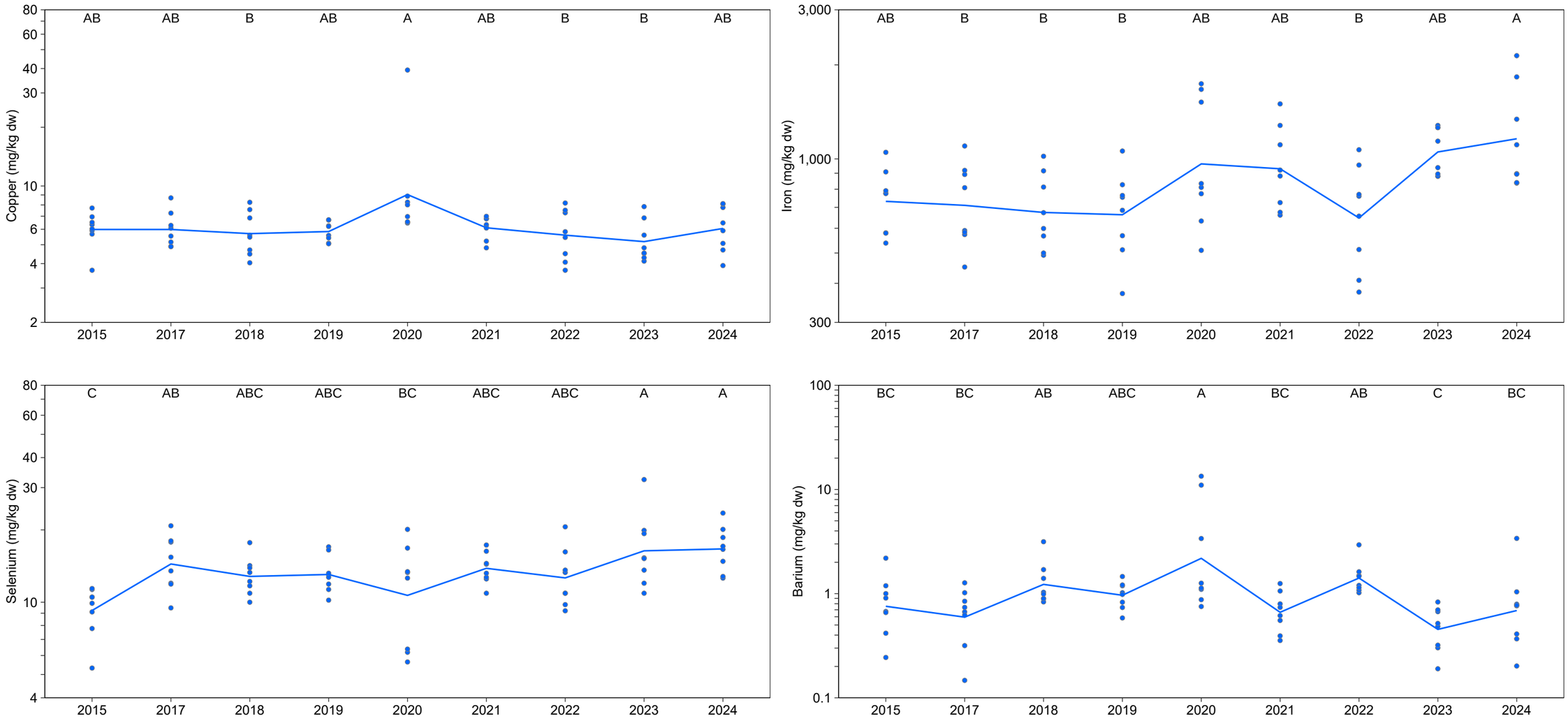


Figure E.6.16: Rainbow Trout Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

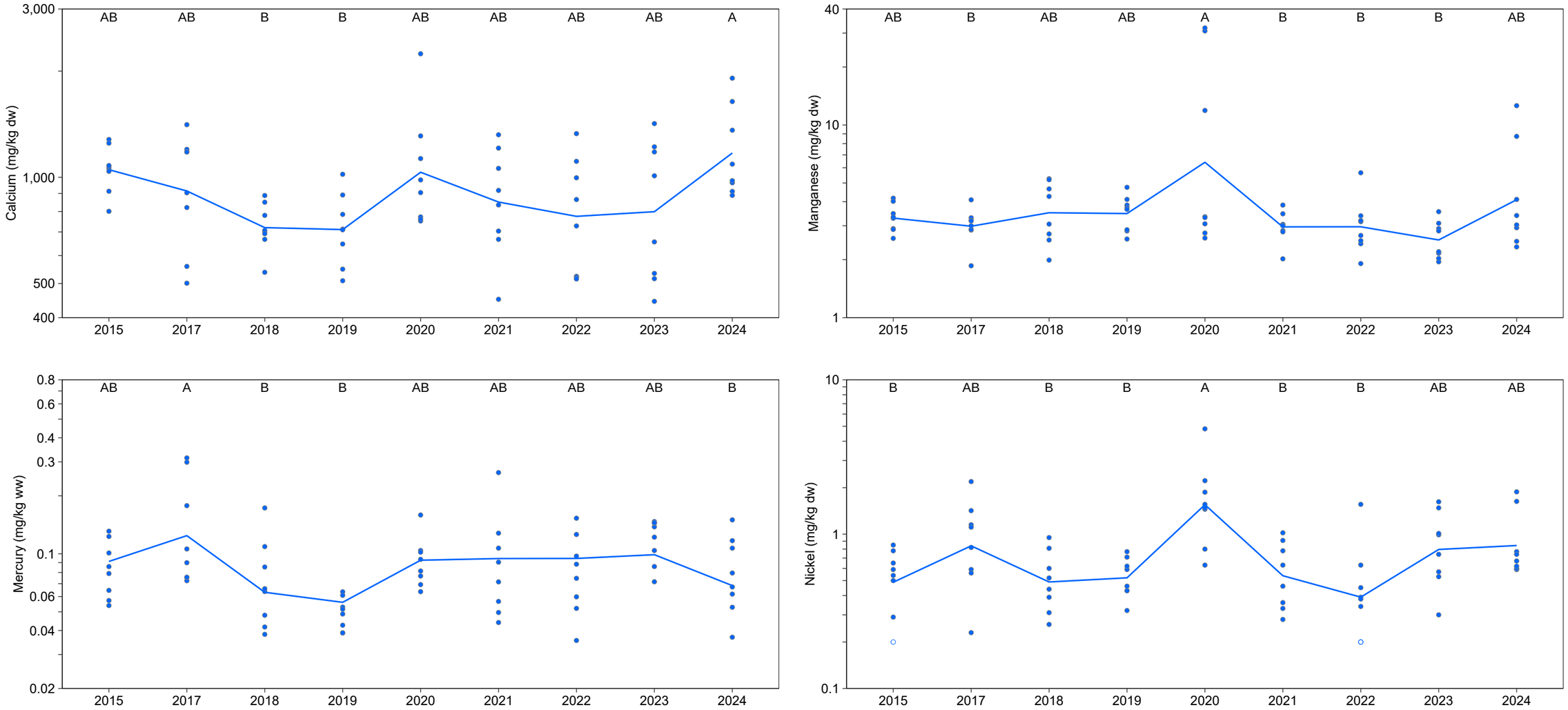


Figure E.6.16: Rainbow Trout Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

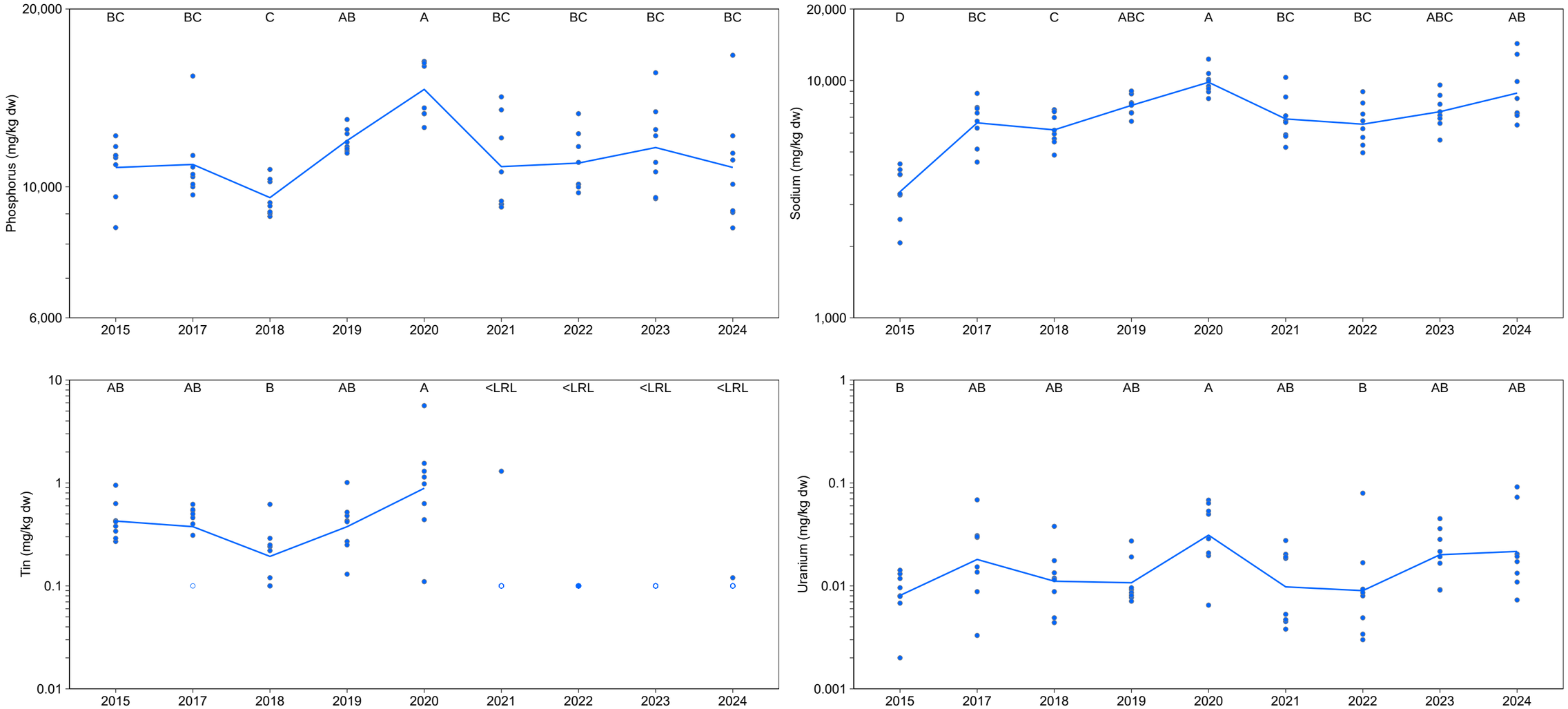


Figure E.6.16: Rainbow Trout Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

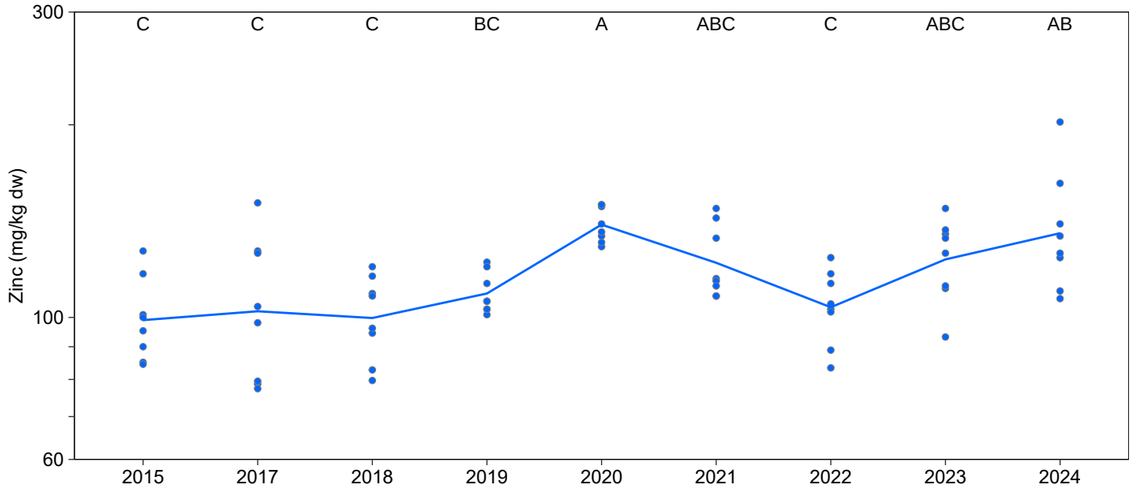


Figure E.6.16: Rainbow Trout Kidney Tissue Primary and Secondary Analyte Concentrations with a Significant Year Effect for Quesnel River (QUR; Exposed), 2015 to 2024

Notes: dw = dry weight. ww = wet weight. <LRL = lower than the laboratory reporting limit. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a one−way ANOVA with factor Year. The model was fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have concentrations that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest concentrations.

Table E.6.1: Statistical Comparisons of Exposed - Reference Relative Differences of Rainbow Trout Muscle Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]											Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]											Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]										
		Area	Year	Area × Year	Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period								Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period								Before Period	Uncontrolled Release Period	Post-Release Period	Post-Breach Period							
					1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2009	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.001	<0.001	0.025	-	<LRL	-	<LRL	B	<LRL	A	<LRL	A	<LRL	AB	A	-	<LRL	-	<LRL	baseline	<LRL	314	<LRL	810	<LRL	ns	387	-	<LRL	-	<LRL	-87	<LRL	ns	<LRL	ns	<LRL	ns	ns
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	<0.001	0.419	A	A	-	A	A	A	A	A	A	A	A	A	baseline	ns	-	ns	ns	ns	ns	ns	ns	ns	ns	ns	71		-	71									
Barium	MLE	<0.001	<0.001	<0.001	-	ABC	-	C	D	A	C	ABC	A	AB	BC	ABC	-	baseline	-	ns	-80	ns	ns	ns	ns	ns	ns	ns	-	ns	-	-53	-87	ns	-57	ns	ns	ns	-50	ns
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	MLE	0.777	<0.001	0.345	-	A	-	A	A	A	A	A	A	A	A	A	-	baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	ns	-	ns	-	ns								
Cesium	MLE	<0.001	0.006	<0.001	-	-	-	C	A	A	AB	BC	BC	BC	C	BC	-	-	-	baseline	79	65	41	ns	ns	ns	ns	ns	-	-	-	ns	78	65	41	ns	ns	ns	ns	ns
Chromium	MLE	0.054	<0.001	0.020	B	<LRL	-	<LRL	B	A	<LRL	AB	A	A	A	A	baseline	<LRL	-	<LRL	ns	192	<LRL	ns	163	273	162	226	-66	<LRL	-	<LRL	-63	ns	<LRL	ns	ns	ns	ns	ns
Cobalt	MLE	0.019	0.008	<0.001	-	<LRL	-	<LRL	D	BC	BC	<LRL	BC	B	CD	A	-	<LRL	-	<LRL	baseline	144	124	<LRL	127	181	ns	**1,307**	-	<LRL	-	<LRL	-40	ns	ns	<LRL	ns	68	ns	**ns**
Copper	MLE	0.690	<0.001	0.246	-	A	-	A	A	A	A	A	A	A	A	A	-	baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	ns	-	ns	-									
Iron	MLE	0.700	<0.001	<0.001	-	-	-	AB	C	A	AB	BC	AB	A	BC	AB	-	-	-	baseline	-46	ns	ns	ns	ns	ns	ns	ns	-	-	-	ns	-45	38	ns	ns	ns	44	ns	ns
Lead	MLE	0.003	0.001	<0.001	A	<LRL	-	<LRL	C	<LRL	B	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	-	<LRL	-94	<LRL	-79	<LRL	<LRL	<LRL	<LRL	<LRL	ns	<LRL	-	<LRL	-88	<LRL	ns	<LRL	<LRL	<LRL	<LRL	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.102	0.114	<0.001	-	BCDEF	-	EF	A	ABC	DEF	F	BCDE	ABCD	CDE	AB	-	baseline	-	ns	22	ns	ns	ns	ns	ns	ns	ns	-	ns	-	-13	16	ns	-11	-18	ns	ns	ns	11
Manganese	MLE	<0.001	<0.001	<0.001	-	ABC	-	ABC	E	BCD	BCD	DE	AB	A	CD	BCD	-	baseline	-	ns	-58	ns	ns	-39	ns	ns	ns	ns	-	ns	-	ns	-63	-24	-33	-46	ns	ns	-38	-24
Mercury[d] (ww)	ANCOVA	0.018	<0.001	<0.001	B	EF	-	DEF	BCDE	CDEF	F	BCD	A	BC	B	B	baseline	-54	-	-42	ns	-35	-53	ns	98	ns	ns	ns	40	-36	-	ns	ns	ns	-34	ns	176	ns	38	33
Molybdenum	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.338	0.004	0.007	-	-	-	CD	A	ABC	ABC	D	ABC	ABC	BCD	AB	-	-	-	baseline	22	ns	ns	ns	ns	ns	ns	20	-	-	-	-11	ns	ns	ns	-16	ns	ns	ns	ns
Potassium	MLE	0.201	0.003	0.006	-	-	-	BCD	ABC	AB	CD	D	AB	A	ABCD	A	-	-	-	baseline	ns	ns	ns	ns	ns	20	ns	22	-	-	-	-11	ns	ns	-12	-14	ns	ns	ns	ns
Rubidium	MLE	<0.001	0.003	0.030	-	-	-	D	ABCD	ABCD	BCD	ABCD	AB	ABC	CD	A	-	-	-	baseline	ns	ns	ns	ns	44	32	ns	53	-	-	-	-27	ns	ns	-19	ns	ns	ns	-23	ns
Selenium	MLE	<0.001	<0.001	<0.001	F	AB	A	CD	AB	AB	AB	BC	BC	CD	E	DE	baseline	268	316	173	271	267	257	224	211	174	110	144	-30	157	190	90	159	156	149	125	117	91	46	70
Silver	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	0.612	0.001	0.007	-	-	-	A	A	ABC	ABCD	BCD	ABC	CD	D	AB	-	-	-	baseline	ns	ns	ns	-37	ns	-38	-42	ns	-	-	-	ns	ns	ns	ns	ns	ns	-23	-28	ns
Strontium	MLE	0.107	<0.001	0.471	-	A	-	A	A	A	A	A	A	A	A	A	-	baseline	-	ns									-	ns	-	ns								
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	<0.001	<0.001	-	<LRL	-	E	CDE	BCD	DE	BCD	DE	AB	BC	A	-	<LRL	-	baseline	ns	54	ns	52	ns	115	85	200	-	<LRL	-	-72	-61	-57	-68	-58	-67	-40	-49	ns
Tin	MLE	0.185	<0.001	0.094	-	<LRL	-	<LRL	A	A	<LRL	<LRL	A	A	A	<LRL	-	<LRL	-	<LRL	baseline	ns	<LRL	<LRL	ns	ns	ns	<LRL	-	<LRL	-	<LRL	ns		<LRL	<LRL	ns		<LRL
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.827	<0.001	0.047	-	ABCD	-	CD	ABC	A	ABCD	D	AB	ABCD	BCD	ABC	-	baseline	-	ns									-	ns	-	ns	ns	ns	ns	-18	ns	ns	ns	ns
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.217	<0.001	0.193	A	A	A	A	A	A	A	A	A	A	A	A	baseline	ns											ns											
Fork Length[e]	ANOVAlog	0.492	<0.001	0.969	A	A	A	A	A	A	A	A	A	A	A	A	baseline	ns											ns											
Body Weight[e]	ANOVAlog	0.684	<0.001	0.980	A	A	A	A	A	A	A	A	A	A	A	A	baseline	ns											ns											

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.2: **Statistical Comparisons of Exposed - Reference Relative Differences of Longnose Sucker Muscle Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]										Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]										Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]									
		Area	Year	Area × Year	Before Period	Post-Release Period	Post-Breach Period								Before Period	Post-Release Period	Post-Breach Period								Before Period	Post-Release Period	Post-Breach Period							
					1995	2012	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024	1995	2012	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.772	<0.001	0.013	-	-	D	<LRL	CD	D	ABC	BCD	AB	A	-	-	baseline	<LRL	ns	ns	235	ns	326	437	-	-	ns	<LRL	ns	ns	ns	ns	130	189
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	0.004	0.018	ABC	-	A	BC	C	BC	AB	BC	AB	ABC	baseline	-	ns	ns	ns	ns	ns	ns	ns	ns	70	-	231	ns	ns	ns	81	ns	97	71
Barium	MLE	0.313	<0.001	0.002	-	-	C	ABC	C	BC	C	C	AB	A	-	-	baseline	ns	ns	ns	ns	ns	116	179	-	-	ns	ns	ns	ns	ns	ns	59	106
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	MLE	0.003	<0.001	<0.001	-	-	B	B	B	A	B	B	B	A	-	-	baseline	ns	ns	167	ns	ns	ns	192	-	-	ns	ns	ns	106	ns	ns	ns	126
Cesium	MLE	0.372	0.011	0.235	-	-	A	A	A	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	ns							
Chromium	MLE	0.009	<0.001	<0.001	C	-	<LRL	<LRL	<LRL	<LRL	BC	C	B	A	baseline	-	<LRL	<LRL	<LRL	<LRL	ns	ns	226	**3,779**	ns	-	<LRL	<LRL	<LRL	<LRL	ns	ns	197	**ns**
Cobalt	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	MLE	0.052	<0.001	0.140	-	-	A	A	A	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	ns							
Iron	MLE	0.361	<0.001	0.332	-	-	A	A	A	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	ns							
Lead	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	<0.001	<0.001	0.046	-	-	B	B	B	AB	B	B	A	AB	-	-	baseline	ns	ns	ns	ns	ns	32	ns	-	-	ns	ns	ns	16	ns	ns	33	18
Manganese	MLE	0.150	0.005	0.007	-	-	C	ABC	ABC	AB	AB	C	BC	A	-	-	baseline	ns	ns	82	81	ns	ns	124	-	-	ns	ns	ns	ns	ns	ns	ns	71
Mercury[d] (ww)	ANCOVA	0.017	0.011	<0.001	AB	-	AB	A	BC	BC	BC	C	AB	C	baseline	-	ns	ns	ns	ns	ns	-37	ns	-35	ns	-	ns	30	-24	ns	ns	-39	ns	-37
Molybdenum	MLE	<0.001	<0.001	0.671	-	-	A	<LRL	<LRL	A	A	A	A	A	-	-	**baseline**	<LRL	<LRL	ns	**ns**	ns	ns	ns	-	-	94	<LRL	<LRL			94			
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.034	<0.001	0.016	-	-	BC	BC	BC	ABC	C	ABC	A	AB	-	-	baseline	ns	ns	ns	ns	ns	26	ns	-	-	ns	ns	ns	ns	ns	ns	21	13
Potassium	MLE	0.035	<0.001	0.007	-	-	BC	BC	BC	BC	C	AB	A	AB	-	-	baseline	ns	ns	ns	ns	ns	31	ns	-	-	ns	ns	ns	ns	ns	ns	31	ns
Rubidium	MLE	<0.001	<0.001	0.061	-	-	A	A	A	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-	24							
Selenium	MLE	<0.001	<0.001	<0.001	D	A	B	BC	BC	B	BC	BC	BC	C	baseline	440	261	240	230	263	221	229	218	191	ns	389	227	208	198	229	190	198	188	163
Silver	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	0.103	0.005	0.003	-	-	BC	ABC	C	ABC	C	AB	A	A	-	-	baseline	ns	ns	ns	ns	ns	29	30	-	-	ns	ns	ns	ns	ns	21	24	24
Strontium	MLE	0.905	<0.001	<0.001	-	-	C	BC	B	A	BC	BC	BC	A	-	-	baseline	ns	118	366	ns	ns	ns	422	-	-	-52	ns	ns	125	ns	-43	ns	152
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.001	0.549	0.021	-	-	<LRL	C	B	<LRL	AB	<LRL	<LRL	A	-	-	<LRL	**baseline**	898	<LRL	1,117	<LRL	<LRL	2,169	-	-	<LRL	ns	-51	<LRL	ns	<LRL	<LRL	ns
Tin	MLE	0.007	<0.001	<0.001	-	-	B	B	<LRL	D	A	B	B	C	-	-	baseline	ns	<LRL	-90	**2,698**	ns	ns	-71	-	-	ns	-48	<LRL	ns	**ns**	-39	ns	-73
Titanium	MLE	0.235	0.004	0.006	-	-	-	-	-	<LRL	<LRL	B	A	A	-	-	-	-	-	<LRL	<LRL	baseline	727	936	-	-	-	-	-	<LRL	<LRL	ns	ns	201
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	<0.001	<0.001	0.006	-	-	A	ABC	BC	BC	AB	A	C	A	-	-	baseline	ns	-30	-33	ns	ns	-35	ns	-	-	119	81	55	48	104	118	44	136
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.028	-	BC	AB	A	ABC	AB	BC	ABC	BC	C	-	baseline	ns	79	ns	ns	ns	ns	ns	ns	-	ns	ns	ns	ns	ns	-32	ns	-25	-38
Fork Length[e]	ANOVAlog	<0.001	<0.001	0.059	A	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns					-19				
Body Weight[e]	ANOVAlog	<0.001	<0.001	0.012	A	A	A	A	AB	A	AB	A	AB	B	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-55	ns	ns	ns	ns	ns	ns	-59	ns	ns	-69

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.3: **Statistical Comparisons of Exposed - Reference Relative Differences of Rainbow Trout Ovary Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2012 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]										Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]										Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]									
		Area	Year	Area × Year	Post-Release Period	Post-Breach Period									Post-Release Period	Post-Breach Period									Post-Release Period	Post-Breach Period								
					2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024	2012	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	<0.001	0.003	-	B	B	AB	B	A	AB	A	A	A	-	baseline	ns	ns	ns	88	ns	82	128	106	-	ns	ns	ns	ns	76	ns	70	113	93
Barium	MLE	<0.001	<0.001	<0.001	-	CD	BCD	B	BCD	D	BCD	A	BC	BCD	-	baseline	ns	91	ns	ns	ns	216	ns	ns	-	-70	-64	-44	-61	-74	-65	ns	-55	-60
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	MLE	0.611	0.116	0.190	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Cesium	MLE	<0.001	<0.001	0.048	-	ABC	AB	A	BC	ABC	BC	BC	C	BC	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	33	61	100	ns	38	ns	ns	ns	ns
Chromium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	MLE	<0.001	0.006	0.358	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	30								
Copper	MLE	0.039	0.632	0.354	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	9.0								
Iron	MLE	0.709	<0.001	0.496	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Lead	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.455	0.008	0.141	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Manganese	MLE	0.002	0.122	0.013	-	A	AB	BC	BC	C	AB	BC	BC	BC	-	baseline	ns	-43	-46	-66	ns	-47	-43	-54	-	ns	ns	ns	ns	-52	ns	ns	ns	-35
Mercury[d] (ww)	ANCOVA	0.001	<0.001	<0.001	-	B	D	BC	BC	CD	A	B	B	BC	-	baseline	-75	ns	ns	-62	271	ns	ns	ns	-	ns	-80	ns	ns	-69	199	ns	ns	-46
Molybdenum	MLE	0.098	0.159	<0.001	-	A	A	AB	AB	C	BC	A	AB	A	-	baseline	ns	ns	ns	-62	-45	ns	ns	ns	-	ns	68	ns	ns	-47	ns	43	ns	ns
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.415	0.109	<0.001	-	B	A	AB	B	C	AB	B	B	AB	-	baseline	19	ns	ns	-15	ns	ns	ns	ns	-	ns	17	ns	ns	-17	ns	ns	ns	ns
Potassium	MLE	0.590	<0.001	0.046	-	C	AB	A	BC	BC	AB	AB	AB	AB	-	baseline	48	53	ns	ns	40	31	32	31	-	-24	ns	ns	ns	ns	ns	ns	ns	ns
Rubidium	MLE	0.110	<0.001	0.114	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Selenium	MLE	<0.001	<0.001	<0.001	BCDE	A	BC	BC	B	CDE	BCD	E	E	DE	baseline	201	ns	ns	ns	ns	ns	ns	ns	ns	121	564	146	133	180	93	121	70	67	80
Silver	MLE	<0.001	0.237	0.438	-	-	-	-	-	A	A	A	A	A	-	-	-	-	-	baseline	ns	ns	ns	ns	-	-	-	-	-	-61				
Sodium	MLE	0.823	<0.001	0.140	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Strontium	MLE	0.017	0.158	0.051	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	-11								
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.063	<0.001	0.329	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.217	<0.001	0.193	A	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								
Fork Length[e]	ANOVAlog	0.492	<0.001	0.969	A	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								
Body Weight[e]	ANOVAlog	0.684	<0.001	0.980	A	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.4: **Statistical Comparisons of Exposed - Reference Relative Differences of Rainbow Trout Liver Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]										Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]										Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]									
		Area	Year	Area × Year	Before Period	Post-Breach Period									Before Period	Post-Breach Period									Before Period	Post-Breach Period								
					1995	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2015	2017	2018	2019	2020	2021	2022	2023	2024	1995	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.200	0.013	0.020	-	<LRL	B	<LRL	A	<LRL	A	A	A	A	-	<LRL	baseline	<LRL	218	<LRL	178	250	275	485	-	<LRL	-61	<LRL	ns	<LRL	ns	ns	ns	129
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	<0.001	0.003	A	ABC	C	ABC	BC	C	A	AB	A	A	baseline	ns	-52	ns	-48	-53	ns	ns	ns	ns	116	66	ns	ns	ns	ns	99	78	129	105
Barium	MLE	0.039	<0.001	0.002	-	BC	C	AB	A	AB	AB	A	AB	A	-	baseline	ns	ns	141	ns	ns	238	ns	156	-	-56	-73	ns	ns	ns	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.365	<0.001	0.025	C	A	BC	AB	AB	AB	AB	AB	A	AB	baseline	306	ns	168	160	142	168	202	303	251	-65	ns	-40	ns	ns	ns	ns	ns	ns	ns
Calcium	MLE	0.492	<0.001	0.705	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Cesium	MLE	<0.001	<0.001	0.214	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	44								
Chromium	MLE	0.771	<0.001	0.013	C	<LRL	<LRL	<LRL	BC	<LRL	AB	AB	<LRL	A	baseline	<LRL	<LRL	<LRL	ns	<LRL	345	346	<LRL	464	-71	<LRL	<LRL	<LRL	ns	<LRL	ns	ns	<LRL	ns
Cobalt	MLE	<0.001	<0.001	0.243	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	29								
Copper	MLE	0.341	0.047	0.009	-	AB	BC	AB	A	AB	AB	BC	BC	C	-	baseline	ns	ns	ns	ns	ns	ns	ns	-84	-	ns	ns	ns	264	ns	ns	ns	ns	-70
Iron	MLE	<0.001	0.103	0.057	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	40								
Lead	MLE	0.982	<0.001	0.014	A	<LRL	B	<LRL	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	-99	<LRL	ns	<LRL	<LRL	<LRL	<LRL	<LRL	ns	<LRL	ns	<LRL	ns	<LRL	<LRL	<LRL	<LRL	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.899	<0.001	<0.001	-	DE	E	CDE	DE	BC	AB	CD	A	CD	-	baseline	ns	ns	ns	24	45	ns	58	ns	-	-15	-20	ns	-13	ns	23	ns	33	ns
Manganese	MLE	<0.001	0.010	<0.001	-	BC	D	BCD	BC	CD	AB	A	CD	BC	-	baseline	-32	ns	ns	ns	ns	53	ns	ns	-	ns	-39	ns	ns	-25	ns	36	-28	ns
Mercury[d] (ww)	ANCOVA	0.364	<0.001	<0.001	AB	D	D	CD	E	D	A	BC	D	BCD	baseline	-56	-57	-46	-76	-57	ns	ns	-48	ns	ns	ns	-33	ns	-62	-33	158	ns	ns	ns
Molybdenum	MLE	<0.001	<0.001	<0.001	-	A	C	B	B	BC	BC	BC	BC	C	-	baseline	-63	-41	-41	-57	-49	-51	-49	-64	-	168	ns	58	59	ns	36	ns	35	ns
Nickel	MLE	<0.001	0.094	0.573	A	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	A	baseline	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	ns	161	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	161
Phosphorus	MLE	0.782	<0.001	<0.001	-	CD	D	C	C	BC	AB	CD	A	C	-	baseline	ns	ns	ns	ns	26	ns	39	ns	-	ns	-19	ns	ns	ns	16	ns	28	ns
Potassium	MLE	0.774	<0.001	<0.001	-	C	C	C	C	BC	AB	C	A	C	-	baseline	ns	ns	ns	ns	28	ns	37	ns	-	ns	ns	ns	ns	ns	19	ns	28	ns
Rubidium	MLE	0.150	<0.001	0.001	-	C	BC	AB	AB	A	A	AB	A	AB	-	baseline	ns	40	40	66	82	61	79	60	-	-36	-23	ns	ns	ns	ns	ns	ns	ns
Selenium	MLE	<0.001	<0.001	<0.001	D	A	BC	AB	A	AB	AB	BC	B	CD	baseline	755	148	314	690	394	306	186	243	ns	ns	478	ns	180	434	234	174	93	132	ns
Silver	MLE	<0.001	0.893	0.134	-	-	-	-	-	A	A	A	A	A	-	-	-	-	-	baseline	ns	ns	ns	ns	-	-	-	-	-	-73				
Sodium	MLE	0.015	<0.001	<0.001	-	AB	A	BCD	BCD	CD	CD	D	ABC	CD	-	baseline	ns	ns	ns	-38	-45	-52	ns	-39	-	62	74	ns	ns	ns	ns	ns	ns	ns
Strontium	MLE	0.060	<0.001	0.024	-	BC	AB	A	BC	C	BC	BC	ABC	ABC	-	baseline	ns	90	ns	ns	ns	ns	ns	ns	-	ns	ns	44	ns	-33	ns	ns	ns	ns
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	<0.001	<0.001	-	CD	D	B	BC	B	B	B	A	A	-	baseline	ns	87	ns	97	129	89	299	279	-	-78	-84	-59	-68	-57	-49	-58	ns	ns
Tin	MLE	0.631	<0.001	0.082	-	<LRL	A	A	A	A	A	A	<LRL	<LRL	-	<LRL	baseline	ns	ns	ns	ns	ns	<LRL	<LRL	-	<LRL	ns						<LRL	<LRL
Titanium	MLE	0.469	0.893	0.123	-	-	-	-	-	<LRL	A	<LRL	<LRL	A	-	-	-	-	-	<LRL	baseline	<LRL	<LRL	ns	-	-	-	-	-	ns	<LRL	<LRL	<LRL	ns
Uranium	MLE	0.505	<0.001	0.687	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	ns								
Vanadium	MLE	<0.001	0.104	0.222	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	168								
Zinc	MLE	0.010	<0.001	0.187	-	A	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-	10								
Zirconium	MLE	0.001	0.345	0.077	-	<LRL	<LRL	<LRL	<LRL	<LRL	A	A	<LRL	<LRL	-	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	-	<LRL	<LRL	<LRL	<LRL	<LRL	75	<LRL	<LRL
Age[e]	ANOVA	0.217	<0.001	0.193	A	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								
Fork Length[e]	ANOVAlog	0.492	<0.001	0.969	A	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								
Body Weight[e]	ANOVAlog	0.684	<0.001	0.980	A	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns								

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.5: Statistical Comparisons of Exposed - Reference Relative Differences of Longnose Sucker Ovary Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2012 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]									Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]									Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]								
		Area	Year	Area × Year	Post-Release Period	Post-Breach Period								Post-Release Period	Post-Breach Period								Post-Release Period	Post-Breach Period							
					2012	2017	2018	2019	2020	2021	2022	2023	2024	2012	2017	2018	2019	2020	2021	2022	2023	2024	2012	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.030	0.018	0.009	-	C	<LRL	B	<LRL	<LRL	<LRL	A	<LRL	-	baseline	<LRL	1,253	<LRL	<LRL	<LRL	4,720	<LRL	-	ns	<LRL	-65	<LRL	<LRL	<LRL	ns	<LRL
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.060	<0.001	0.032	-	A	AB	B	B	B	B	B	B	-	baseline	ns	-63	-57	-51	-50	-46	-46	-	113	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	0.227	<0.001	-	D	AB	BC	A	C	BC	AB	AB	-	baseline	153	76	177	51	72	151	138	-	-66	ns	-39	ns	-48	-41	ns	ns
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.093	0.677	0.284	-	<LRL	<LRL	A	<LRL	<LRL	<LRL	<LRL	A	-	<LRL	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	ns	-	<LRL	<LRL	ns	<LRL	<LRL	<LRL	<LRL	ns
Calcium	MLE	<0.001	<0.001	0.035	-	BC	ABC	AB	ABC	ABC	A	C	C	-	baseline	ns	ns	ns	ns	24	ns	ns	-	-29	-21	-15	-26	-24	ns	-36	-32
Cesium	MLE	<0.001	0.591	0.070	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-28							
Chromium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	MLE	<0.001	0.035	0.016	-	AB	ABCD	CD	D	BCD	ABC	CD	A	-	baseline	ns	-32	-43	ns	ns	-32	ns	-	56	ns	ns	ns	ns	33	ns	64
Copper	MLE	0.666	0.123	0.487	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	ns							
Iron	MLE	<0.001	0.374	0.389	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-22							
Lead	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	<0.001	0.002	0.498	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-11							
Manganese	MLE	0.062	0.447	0.016	-	BCD	CD	ABC	ABCD	ABC	AB	D	A	-	baseline	ns	ns	ns	ns	ns	ns	60	-	ns	ns	ns	ns	ns	36	ns	57
Mercury[d] (ww)	ANCOVA	<0.001	0.005	<0.001	-	AB	A	C	BC	BC	CD	C	D	-	baseline	ns	-29	ns	ns	-37	-27	-51	-	ns	ns	-39	-36	-35	-46	-37	-58
Molybdenum	MLE	<0.001	0.036	<0.001	-	ABC	AB	D	A	ABC	BC	BCD	CD	-	baseline	ns	-26	ns	ns	ns	ns	ns	-	36	50	ns	64	34	27	20	ns
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	<0.001	<0.001	0.070	-	A	A	A	A	A	A	A	A	-	baseline	ns		ns	ns	ns	ns	ns	-	5.0							
Potassium	MLE	<0.001	0.001	0.011	-	BC	ABC	C	ABC	AB	ABC	A	C	-	baseline	ns	ns	ns	ns	ns	15	ns	-	-14	-7.9	-17	-9.3	ns	-7.5	ns	-17
Rubidium	MLE	0.040	0.009	<0.001	-	A	A	A	A	A	A	A	B	-	baseline	ns	ns	ns	ns	ns	ns	-37	-	ns	ns	ns	ns	22	ns	ns	-32
Selenium	MLE	<0.001	<0.001	<0.001	A	B	B	B	BC	CD	D	D	CD	baseline	-19	-16	-17	-24	-31	-37	-40	-32	197	140	148	146	126	103	88	77	102
Silver	MLE	<0.001	0.805	1.000	-	-	-	-	<LRL	A	A	A	<LRL	-	-	-	-	<LRL	baseline	ns	**ns**	<LRL	-	-	-	-	<LRL		ns		<LRL
Sodium	MLE	<0.001	0.009	<0.001	-	ABC	BC	D	AB	ABC	ABC	A	CD	-	baseline	ns	-27	ns	ns	ns	ns	ns	-	ns	ns	-33	ns	ns	ns	ns	-20
Strontium	MLE	<0.001	0.028	0.199	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	-33							
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	<0.001	0.029	0.400	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	8.2							
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.028	BC	AB	A	ABC	AB	BC	ABC	BC	C	baseline	ns	79	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-32	ns	-25	-38
Fork Length[e]	ANOVAlog	<0.001	<0.001	0.059	A	A	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-19							
Body Weight[e]	ANOVAlog	<0.001	<0.001	0.012	A	A	A	AB	A	AB	A	AB	B	ns	ns	ns	ns	ns	ns	ns	ns	-55	ns	ns	ns	ns	ns	-59	ns	ns	-69

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.6: Statistical Comparisons of Exposed - Reference Relative Differences of Longnose Sucker Liver Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 1995 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]									Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]									Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]								
		Area	Year	Area × Year	Before Period	Post-Breach Period								Before Period	Post-Breach Period								Before Period	Post-Breach Period							
					1995	2017	2018	2019	2020	2021	2022	2023	2024	1995	2017	2018	2019	2020	2021	2022	2023	2024	1995	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.109	0.014	0.022	-	C	AB	BC	BC	C	BC	ABC	A	-	baseline	436	ns	ns	ns	ns	ns	826	-	ns	194	ns	ns	ns	ns	ns	407
Antimony	MLE	0.010	0.010	0.042	<LRL	B	A	B	AB	B	A	AB	B	<LRL	baseline	156	ns	ns	ns	ns	148	ns	ns	<LRL	-44	ns	-42	ns	-37	ns	ns	ns
Arsenic	MLE	<0.001	<0.001	0.002	AB	A	A	B	AB	B	A	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	57	119	91	ns	50	ns	88	57	112
Barium	MLE	0.071	<0.001	0.058	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	ns							
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	0.008	<0.001	A	C	C	C	C	C	AB	BC	BC	baseline	-78	-76	-81	-77	-86	ns	-69	-69	89	-59	-55	-65	-56	-73	ns	ns	ns
Calcium	MLE	0.046	0.004	<0.001	-	ABC	AB	BCD	CD	BCD	D	D	A	-	baseline	ns	ns	ns	ns	-42	-35	ns	-	ns	ns	ns	-28	ns	-38	-30	46
Cesium	MLE	0.087	0.809	0.011	-	A	AB	AB	BC	BC	BC	C	AB	-	baseline	ns	ns	-42	-38	-40	-60	ns	-	ns	ns	ns	ns	ns	ns	-45	ns
Chromium	MLE	0.044	<0.001	<0.001	C	<LRL	<LRL	AB	BC	AB	AB	A	A	baseline	<LRL	<LRL	249	ns	237	309	769	836	-59	<LRL	<LRL	ns	ns	ns	ns	260	288
Cobalt	MLE	0.285	0.041	<0.001	-	BC	BC	C	BC	C	B	C	A	-	baseline	ns	ns	ns	ns	ns	ns	105	-	ns	ns	-26	-22	-24	ns	-25	100
Copper	MLE	<0.001	0.001	0.006	-	BCD	D	CD	CD	ABCD	A	ABC	AB	-	baseline	ns	ns	ns	ns	104	ns	ns	-	ns	ns	ns	ns	69	204	94	124
Iron	MLE	0.283	0.045	<0.001	-	BC	BC	BC	BC	C	B	BC	A	-	baseline	ns	ns	ns	ns	ns	ns	235	-	ns	ns	ns	ns	-44	ns	ns	139
Lead	MLE	0.244	<0.001	0.017	A	BC	AB	C	<LRL	<LRL	<LRL	ABC	<LRL	baseline	-67	ns	-74	<LRL	<LRL	<LRL	ns	<LRL	133	ns	ns	ns	<LRL	<LRL	<LRL	ns	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.030	<0.001	0.007	-	A	AB	AB	AB	BC	AB	C	AB	-	baseline	ns	ns	ns	-19	ns	-31	ns	-	ns	ns	ns	ns	-12	ns	-25	ns
Manganese	MLE	0.179	0.159	0.009	-	AB	AB	ABC	AB	AB	BC	C	A	-	baseline	ns	ns	ns	ns	ns	-42	ns	-	ns	ns	ns	ns	ns	ns	-37	ns
Mercury[d] (ww)	ANCOVA	<0.001	<0.001	<0.001	A	ABC	AB	D	D	BCD	BCD	CD	CD	baseline	ns	ns	-50	-47	-33	-33	-39	-45	ns	ns	ns	-48	-45	-31	-31	-37	-43
Molybdenum	MLE	0.004	<0.001	0.003	-	ABC	AB	BC	ABC	C	A	BC	C	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	ns	27	ns	21	ns	50	ns	ns
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.301	<0.001	<0.001	-	A	AB	AB	A	BC	A	C	AB	-	baseline	ns	ns	ns	-18	ns	-30	ns	-	ns	ns	ns	ns	-12	ns	-25	ns
Potassium	MLE	0.003	<0.001	0.035	-	A	A	AB	A	AB	A	B	AB	-	baseline	ns	ns	ns	ns	ns	-17	ns	-	ns	ns	ns	ns	ns	ns	-21	ns
Rubidium	MLE	0.002	<0.001	0.001	-	A	A	A	A	A	A	A	B	-	baseline	ns	ns	ns	ns	ns	ns	-40	-	ns	ns	33	35	ns	29	ns	-27
Selenium	MLE	<0.001	<0.001	<0.001	F	A	AB	AB	AB	DE	BC	EF	CD	baseline	102	87	75	69	23	62	ns	34	17	135	118	104	97	43	88	26	56
Silver	MLE	0.030	0.945	0.104	-	-	-	-	A	A	A	A	A	-	-	-	-	baseline	ns	ns	ns	ns	-	-	-	-	-27				
Sodium	MLE	0.002	<0.001	<0.001	-	A	B	B	CD	BC	D	BC	A	-	baseline	-34	-31	-51	-41	-54	-41	ns	-	36	ns	ns	-34	-20	-38	-20	27
Strontium	MLE	0.208	0.003	<0.001	-	ABC	AB	BC	BC	CD	D	CD	A	-	baseline	ns	ns	ns	ns	-64	ns	ns	-	ns	ns	ns	ns	-38	-60	-39	106
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	0.223	<0.001	-	B	B	B	<LRL	B	<LRL	C	A	-	baseline	ns	ns	<LRL	ns	<LRL	**-92**	335	-	-66	-57	-74	<LRL	-54	<LRL	**ns**	ns
Tin	MLE	0.754	<0.001	<0.001	-	AB	B	<LRL	<LRL	<LRL	A	C	D	-	baseline	ns	<LRL	<LRL	<LRL	ns	-79	**-98**	-	72	ns	<LRL	<LRL	<LRL	169	-63	**ns**
Titanium	MLE	0.006	0.035	0.130	-	-	-	-	<LRL	A	<LRL	A	A	-	-	-	-	<LRL	baseline	<LRL	ns	ns	-	-	-	-	<LRL	164	<LRL	164	
Uranium	MLE	<0.001	0.395	0.003	-	C	AB	BC	BC	C	BC	BC	A	-	baseline	120	ns	ns	ns	ns	ns	256	-	-73	-40	-69	-70	-77	-63	-61	ns
Vanadium	MLE	<0.001	0.355	0.116	-	A	A	A	A	A	A	A	A	-	baseline	ns	ns	ns	ns	ns	ns	ns	-	53							
Zinc	MLE	<0.001	0.002	<0.001	-	AB	C	C	BC	C	A	C	A	-	baseline	-23	-20	ns	-22	ns	-25	ns	-	27	ns	ns	ns	ns	53	ns	43
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.028	-	AB	A	ABC	AB	BC	ABC	BC	C	-	ns	79	ns	ns	ns	ns	ns	ns	-	ns	ns	ns	ns	-32	ns	-25	-38
Fork Length[e]	ANOVAlog	<0.001	<0.001	0.059	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-19								
Body Weight[e]	ANOVAlog	<0.001	<0.001	0.012	A	A	A	AB	A	AB	A	AB	B	baseline	ns	ns	ns	ns	ns	ns	ns	-55	ns	ns	ns	ns	ns	-59	ns	ns	-69

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.7: Statistical Comparisons of Exposed - Reference Relative Differences of Longnose Sucker Kidney Tissue Metal Concentrations for Polley Lake (POL; Exposed) and Bootjack Lake (BOL; Reference), 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.275	<0.001	0.291	<LRL	A	A	A	<LRL	A	A	<LRL	baseline	ns	ns	<LRL	ns	ns	<LRL	ns			<LRL	ns	
Antimony	MLE	0.009	0.004	0.015	A	B	<LRL	B	<LRL	<LRL	<LRL	baseline	**-97**	<LRL	-97	<LRL	<LRL	<LRL	ns	**ns**	<LRL	ns	<LRL	<LRL	<LRL
Arsenic	MLE	<0.001	<0.001	0.354	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	44						
Barium	MLE	<0.001	<0.001	0.197	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-37						
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.002	0.047	0.572	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-29						
Calcium	MLE	<0.001	0.471	0.038	A	A	A	AB	AB	A	B	baseline	ns	ns	ns	ns	ns	-71	ns	-45	-52	-59	-58	-47	-79
Cesium	MLE	<0.001	0.126	0.892	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-25						
Chromium	MLE	0.009	<0.001	0.011	<LRL	BC	BC	AB	A	C	C	<LRL	baseline	ns	ns	362	ns	ns	<LRL	ns	ns	152	415	ns	ns
Cobalt	MLE	0.814	0.509	0.009	C	BC	C	C	AB	BC	A	baseline	ns	ns	ns	96	ns	131	ns	ns	ns	ns	49	ns	76
Copper	MLE	0.337	0.013	0.064	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Iron	MLE	0.781	<0.001	0.084	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Lead	MLE	0.173	0.742	0.104	<LRL	A	<LRL	<LRL	<LRL	A	<LRL	<LRL	baseline	<LRL	<LRL	<LRL	ns	<LRL	<LRL	ns	<LRL	<LRL	<LRL	ns	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.046	<0.001	0.337	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-7.0						
Manganese	MLE	<0.001	0.431	0.014	A	AB	AB	ABC	BC	AB	C	baseline	ns	ns	ns	-68	ns	-77	ns	-49	-51	-64	-77	-55	-84
Mercury[d] (ww)	ANCOVA	<0.001	0.001	0.050	A	AB	B	AB	B	B	B	baseline	ns	-46	ns	-49	-53	-42	ns	ns	-38	ns	-41	-46	-34
Molybdenum	MLE	<0.001	0.002	0.072	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	58						
Nickel	MLE	<0.001	0.025	0.011	BC	C	BC	AB	A	BC	AB	baseline	ns	ns	ns	92	ns	ns	-37	-61	-44	ns	ns	-37	ns
Phosphorus	MLE	0.031	<0.001	0.207	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-7.6						
Potassium	MLE	0.123	<0.001	0.289	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Rubidium	MLE	0.024	<0.001	0.002	A	A	A	A	A	A	B	baseline	ns	ns	ns	ns	ns	-37	ns	36	41	ns	48	ns	-32
Selenium	MLE	<0.001	0.002	0.004	A	A	AB	BC	A	ABC	C	baseline	ns	ns	-23	ns	ns	-31	74	83	66	33	82	44	ns
Silver	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	0.005	0.239	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-24						
Strontium	MLE	<0.001	0.306	0.017	A	AB	AB	ABC	BC	AB	C	baseline	ns	ns	ns	-56	ns	-78	ns	-50	-54	-64	-67	-52	-83
Tellurium	MLE	0.921	0.023	0.050	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Thallium	MLE	<0.001	0.259	<0.001	BC	BC	C	BC	B	BC	A	baseline	ns	ns	ns	ns	ns	396	-84	-81	-88	-80	-68	-79	ns
Tin	MLE	0.104	<0.001	0.010	B	AB	A	<LRL	AB	C	<LRL	baseline	ns	219	<LRL	ns	-99	<LRL	ns	ns	ns	<LRL	ns	ns	<LRL
Titanium	MLE	0.238	<0.001	0.332	-	-	A	A	<LRL	A	A	-	-	baseline	ns	<LRL	ns	ns	-	-	ns		<LRL	ns	
Uranium	MLE	<0.001	0.300	0.128	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-70						
Vanadium	MLE	<0.001	0.242	0.151	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	76						
Zinc	MLE	<0.001	<0.001	0.664	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	47						
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.028	A	ABC	AB	BC	ABC	BC	C	79	ns	ns	ns	ns	ns	ns	ns	ns	ns	-32	ns	-25	-38
Fork Length[e]	ANOVAlog	<0.001	<0.001	0.059	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	-19						
Body Weight[e]	ANOVAlog	<0.001	<0.001	0.012	A	AB	A	AB	A	AB	B	ns	ns	ns	ns	ns	ns	-55	ns	ns	ns	-59	ns	ns	-69

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%

[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.8: Statistical Comparisons of Exposed - Reference Relative Differences of Rainbow Trout Kidney Metal Concentrations for Polley Lake (Exposed) and Bootjack Lake (Reference), 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Polley Lake Mean Relative to Bootjack Lake (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	<0.001	0.924	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	67						
Antimony	MLE	0.415	0.258	0.454	A	A	<LRL	A	<LRL	<LRL	<LRL	baseline	ns	<LRL	ns	<LRL	<LRL	<LRL	ns		<LRL	ns	<LRL	<LRL	<LRL
Arsenic	MLE	<0.001	<0.001	0.865	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	78						
Barium	MLE	0.007	<0.001	0.945	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-26						
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.049	0.007	0.054	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	17						
Calcium	MLE	0.241	0.179	0.577	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Cesium	MLE	0.001	0.002	0.079	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	22						
Chromium	MLE	0.585	0.002	0.059	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Cobalt	MLE	<0.001	0.354	0.113	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	149						
Copper	MLE	0.034	<0.001	0.966	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	12						
Iron	MLE	<0.001	<0.001	0.198	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	23						
Lead	MLE	0.273	0.232	0.200	A	A	<LRL	<LRL	<LRL	A	A	baseline	ns	<LRL	<LRL	<LRL	ns	ns	ns		<LRL	<LRL	<LRL	ns	
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.561	<0.001	0.788	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Manganese	MLE	0.401	<0.001	0.039	C	BC	BC	ABC	A	AB	AB	baseline	ns	ns	ns	166	86	80	-42	ns	ns	ns	53	ns	ns
Mercury[d] (ww)	ANCOVA	0.178	<0.001	<0.001	C	D	BC	A	BC	BC	B	baseline	-41	ns	316	ns	ns	69	ns	-52	ns	239	ns	ns	ns
Molybdenum	MLE	0.606	<0.001	0.746	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Nickel	MLE	<0.001	0.001	0.759	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	37						
Phosphorus	MLE	0.457	<0.001	0.832	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Potassium	MLE	0.062	<0.001	0.429	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Rubidium	MLE	0.009	0.002	0.414	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	-11						
Selenium	MLE	<0.001	0.013	0.171	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	66						
Silver	MLE	0.005	0.032	0.935	-	-	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	-	-	-51				
Sodium	MLE	0.465	<0.001	0.213	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Strontium	MLE	0.673	0.031	0.473	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.052	0.033	0.060	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns						
Tin	MLE	0.548	<0.001	0.055	A	A	A	A	A	<LRL	<LRL	baseline	ns	ns	ns	ns	<LRL	<LRL	ns					<LRL	<LRL
Titanium	MLE	0.036	<0.001	0.897	-	-	A	A	A	A	A	-	-	baseline	ns	ns	ns	ns	-	-	64				
Uranium	MLE	0.641	0.706	0.037	B	AB	B	B	AB	AB	A	baseline	ns	ns	ns	ns	ns	204	ns	ns	-50	ns	ns	ns	123
Vanadium	MLE	<0.001	0.009	0.488	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	123						
Zinc	MLE	0.153	0.097	0.039	BC	C	ABC	A	A	AB	AB	baseline	ns	ns	108	81	ns	ns	ns	ns	ns	63	ns	ns	ns
Zirconium	MLE	0.412	<0.001	0.058	A	<LRL	<LRL	A	A	<LRL	<LRL	baseline	<LRL	<LRL	ns	ns	<LRL	<LRL	ns	<LRL	<LRL	ns		<LRL	<LRL
Age[e]	ANOVA	0.217	<0.001	0.193	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns						
Fork Length[e]	ANOVAlog	0.492	<0.001	0.969	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns						
Body Weight[e]	ANOVAlog	0.684	<0.001	0.980	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	ns	ns						

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data; "LRL" = Laboratory reporting limit; "nt" = not tested because all data were reported below the LRL or because there were only data for a single time period; "ns" = not significant; "baseline" = first year of data included in analysis; "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis; "ww" = wet weight; "ANOVA" = analysis of variance; "MLE" = censored regression using maximum likelihood estimation; "ANCOVA" = two-way analysis of covariance using censored regression, MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Polley Lake: Bootjack Lake) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Polley Lake: Bootjack Lake).
[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.
[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.
[d] Conducted as a two-way ANCOVA with $\log_{10}$(fork length) as a covariate and all contrasts were conducted using mean $\log_{10}$(fork length).
[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle and ovary tissue types were used in data interpretation.

Table E.6.9: Statistical Comparisons of Exposed - Reference Relative Differences of Peamouth Chub Muscle Tissue Metal Concentrations for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]								Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]								Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]							
					Post-Breach Period								Post-Breach Period								Post-Breach Period							
		Area	Year	Area × Year	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.745	<0.001	<0.001	BC	B	<LRL	A	<LRL	C	<LRL	<LRL	baseline	ns	<LRL	**43,815**	<LRL	ns	<LRL	<LRL	ns	ns	<LRL	**ns**	<LRL	-67	<LRL	<LRL
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.005	<0.001	<0.001	AB	BC	C	A	A	BC	C	C	baseline	ns	-56	ns	ns	ns	-49	-60	77	ns	ns	119	129	ns	ns	ns
Barium	MLE	<0.001	<0.001	<0.001	BCD	D	CD	D	CD	ABC	AB	A	baseline	ns	ns	ns	ns	ns	ns	83	ns	ns	ns	ns	ns	60	96	132
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	<0.001	0.282	A	<LRL	<LRL	A	A	A	A	<LRL	baseline	<LRL			ns			<LRL	99	<LRL	<LRL	99				<LRL
Calcium	MLE	0.913	<0.001	<0.001	BC	BC	CD	D	BCD	AB	BCD	A	baseline	ns	ns	-48	ns	ns	ns	169	ns	ns	ns	-50	ns	ns	ns	162
Cesium	MLE	<0.001	<0.001	0.017	ABC	AB	A	CD	D	ABCD	BCD	A	baseline	ns	ns	ns	-30	ns	ns	ns	-38	-38	-29	-56	-56	-47	-52	-30
Chromium	MLE	0.760	0.069	0.010	<LRL	A	<LRL	C	<LRL	AB	BC	<LRL	<LRL	baseline	<LRL	-84	<LRL	ns	-73	<LRL	<LRL	ns	<LRL	-60	<LRL	ns	ns	<LRL
Cobalt	MLE	0.305	<0.001	0.329	A	A	A	A	A	A	A	A	baseline				ns							ns				
Copper	MLE	0.173	<0.001	<0.001	A	BC	AB	BC	D	AB	A	CD	baseline	-35	ns	-32	-58	ns	ns	-51	48	ns	33	ns	-38	ns	61	-27
Iron	MLE	0.392	<0.001	0.091	A	A	A	A	A	A	A	A	baseline				ns							ns				
Lead	MLE	0.338	0.302	0.010	<LRL	A	<LRL	<LRL	<LRL	<LRL	B	<LRL	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	-75	<LRL	<LRL	ns	<LRL	<LRL	<LRL	<LRL	-58	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.022	0.003	<0.001	C	B	B	C	BC	C	C	A	baseline	22	19	ns	ns	ns	ns	52	ns	18	15	ns	ns	ns	ns	47
Manganese	MLE	0.030	<0.001	<0.001	BC	BC	BC	C	BC	B	BC	A	baseline	ns	ns	ns	ns	ns	ns	213	ns	ns	ns	ns	ns	55	ns	209
Mercury (ww)[d]	ANCOVA	<0.001	0.016	0.004	A	BC	BC	C	BC	ABC	AB	A	baseline	-42	-32	-45	-36	ns	ns	ns	63	ns	ns	ns	ns	ns	35	72
Molybdenum	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.139	<0.001	0.005	AB	AB	BC	C	BC	B	BC	A	baseline	ns	ns	-21	ns	ns	ns	ns	11	ns	ns	-12	ns	ns	ns	24
Potassium	MLE	0.164	<0.001	0.057	A	A	A	A	A	A	A	A	baseline				ns							ns				
Rubidium	MLE	<0.001	<0.001	0.014	AB	A	ABC	BCD	CD	ABC	D	ABC	baseline	ns	ns	ns	-28	ns	-37	ns	ns	ns	ns	-24	-28	ns	-36	ns
Selenium	MLE	<0.001	<0.001	0.138	A	A	A	A	A	A	A	A	baseline				ns							74				
Silver	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	<0.001	0.003	ABC	A	D	BCD	AB	CD	BCD	BCD	baseline	ns	-21	ns	ns	ns	ns	ns	26	43	ns	ns	27	ns	16	ns
Strontium	MLE	0.527	<0.001	<0.001	B	B	BC	C	BC	B	B	A	baseline	ns	ns	-65	ns	ns	ns	337	ns	ns	ns	-67	ns	ns	ns	320
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.282	<0.001	0.004	AB	AB	B	C	BC	AB	A	AB	baseline	ns	ns	-50	ns	ns	ns	ns	ns	ns	ns	-51	ns	ns	56	ns
Tin	MLE	0.005	<0.001	<0.001	C	C	<LRL	B	A	C	<LRL	<LRL	baseline	ns	<LRL	700	6,823	ns	<LRL	<LRL	ns	ns	<LRL	438	ns	ns	<LRL	<LRL
Titanium	MLE	0.394	0.512	<0.001	-	-	-	A	<LRL	B	<LRL	<LRL	-	-	-	baseline	<LRL	-92	<LRL	<LRL	-	-	-	472	<LRL	ns	<LRL	<LRL
Uranium	MLE	0.661	<0.001	0.068	A	<LRL	A	A	<LRL	A	A	A	baseline	<LRL			ns				ns	<LRL	ns		<LRL		ns	
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.118	<0.001	0.015	AB	ABC	A	BC	C	ABC	A	BC	baseline	ns	ns	ns	-29	ns	ns	ns	ns	ns	ns	ns	-30	ns	ns	-23
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.230	0.010	0.139	A	A	A	A	A	A	-	A	baseline			ns			-	ns				ns			-	ns
Fork Length[e]	ANOVAlog	0.008	<0.001	0.009	BC	C	C	A	AB	ABC	BC	BC	ns	ns	ns	23	ns	ns	ns	ns	ns	ns	ns	23	15	ns	ns	ns
Body Weight[e]	ANOVAlog	0.010	0.010	0.002	BCD	D	CD	A	AB	ABC	BCD	BCD	ns	ns	ns	90	ns	ns	ns	ns	ns	ns	ns	102	56	40	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or *rpost hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance using censored regression. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.10: **Statistical Comparisons of Exposed - Reference Relative Differences of Northern Pikeminnow Whole-body Tissue Metal Concentrations for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]								Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]								Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]							
					Post-Breach Period								Post-Breach Period								Post-Breach Period							
		Area	Year	Area × Year	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.257	<0.001	0.231	A	A	A	A	A	<LRL	<LRL	A	baseline	ns				<LRL		ns	ns					<LRL		
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	0.507	<0.001	AB	C	BC	A	AB	AB	B	BC	baseline	-71	ns	ns	ns	ns	ns	ns	125	ns	ns	216	81	94	ns	ns
Barium	MLE	0.014	<0.001	0.002	AB	ABC	AB	BC	BC	A	AB	C	baseline	ns	ns	ns	ns	ns	ns	-66	71	ns	93	ns	ns	96	ns	-42
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	<0.001	0.548	A	A	A	A	A	A	A	A	baseline	ns							110							
Calcium	MLE	0.254	0.002	0.013	AB	AB	A	BC	ABC	AB	AB	C	baseline	ns	ns	ns	ns	ns	ns	-49	ns	ns	55	ns	ns	ns	ns	-55
Cesium	MLE	<0.001	0.396	0.238	A	A	A	A	A	A	A	A	baseline	ns							-53							
Chromium	MLE	0.297	<0.001	0.120	A	A	<LRL	A	<LRL	A	A	A	baseline	ns	<LRL	ns	<LRL	ns	ns	ns	ns	ns	<LRL	ns	<LRL	ns	ns	ns
Cobalt	MLE	0.304	0.009	0.392	A	A	A	A	A	A	A	A	baseline	ns							ns							
Copper	MLE	0.855	<0.001	0.704	A	A	A	A	A	A	A	A	baseline	ns							ns							
Iron	MLE	0.591	<0.001	0.338	A	A	A	A	A	A	A	A	baseline	ns							ns							
Lead	MLE	0.001	0.014	0.139	<LRL	A	<LRL	A	<LRL	A	<LRL	A	<LRL	baseline	<LRL	ns	<LRL	ns	<LRL	<LRL	<LRL	-52	<LRL	-52	<LRL	-52	<LRL	-52
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.143	0.087	0.085	A	A	A	A	A	A	A	A	baseline	ns							ns							
Manganese	MLE	0.234	0.041	0.008	AB	BC	A	BC	BC	BC	AB	C	baseline	ns	ns	ns	ns	ns	ns	-59	ns	ns	128	ns	ns	ns	ns	-41
Mercury (ww)[d]	ANCOVA	0.423	<0.001	0.230	-	A	A	A	A	A	A	A	-	baseline	ns							-	ns					
Molybdenum	MLE	0.006	<0.001	0.032	A	BC	BC	C	BC	ABC	BC	AB	baseline	-42	-37	-50	-36	ns	-38	ns	ns	-24	ns	-35	ns	ns	ns	ns
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.059	0.002	0.045	AB	AB	A	AB	AB	A	A	B	baseline	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	-37
Potassium	MLE	0.246	<0.001	0.446	A	A	A	A	A	A	A	A	baseline	ns							ns							
Rubidium	MLE	<0.001	0.002	0.120	A	A	A	A	A	A	A	A	baseline	ns							-15							
Selenium	MLE	<0.001	0.037	0.166	A	A	A	A	A	A	A	A	baseline	ns							67							
Silver	MLE	0.093	0.186	0.737	-	-	-	A	A	<LRL	<LRL	A	-	-	-	baseline	ns	<LRL		ns	-	-	-	ns		<LRL		ns
Sodium	MLE	0.552	<0.001	0.133	A	A	A	A	A	A	A	A	baseline	ns							ns							
Strontium	MLE	0.004	0.005	0.015	AB	BC	A	BC	ABC	AB	AB	C	baseline	ns	ns	ns	ns	ns	ns	-50	ns	ns	ns	-37	ns	ns	ns	-61
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.775	<0.001	0.368	A	A	A	A	A	A	A	A	baseline	ns							ns							
Tin	MLE	0.016	<0.001	0.002	A	<LRL	<LRL	B	A	A	<LRL	<LRL	baseline	<LRL	<LRL	-74	ns	ns	<LRL	<LRL	ns	<LRL	<LRL	-67	ns	ns	<LRL	<LRL
Titanium	MLE	0.673	0.010	0.691	-	-	-	A	A	<LRL	<LRL	A	-	-	-	baseline	ns	<LRL		ns	-	-	-	ns		<LRL		ns
Uranium	MLE	<0.001	0.003	0.005	A	CD	ABC	ABCD	ABCD	AB	BCD	D	baseline	-81	ns	ns	ns	ns	-67	-86	ns	-77	ns	-56	-52	ns	-59	-83
Vanadium	MLE	0.061	0.669	0.011	A	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	B	baseline	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	-89	621	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	ns
Zinc	MLE	0.002	<0.001	0.003	B	AB	AB	BC	B	AB	A	C	baseline	ns	ns	ns	ns	ns	28	-23	ns	ns	ns	-16	ns	ns	ns	-32
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	ANOVA	0.354	<0.001	0.006	ABC	C	C	AB	BC	A	-	BC	baseline	ns	ns	ns	ns	ns	-	ns	ns	-27	-26	ns	ns	43	-	ns
Fork Length	ANOVAlog	0.544	<0.001	0.050	BC	ABC	C	A	ABC	AB	BC	C	baseline	ns	ns	23	ns	ns	ns	ns	ns	ns	ns	21	ns	16	ns	ns
Body Weight	ANOVAlog	0.612	<0.001	0.018	BC	BC	C	A	BC	AB	BC	BC	baseline	ns	ns	94	ns	ns	ns	ns	ns	ns	ns	95	ns	ns	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length

Table E.6.11: **Statistical Comparisons of Exposed - Reference Relative Differences of Lake Trout Muscle Tissue Metal Concentrations for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, 2015 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]						
					Post-Breach Period							Post-Breach Period							Post-Breach Period						
		Area	Year	Area × Year	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.407	0.086	0.133	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Barium	MLE	0.012	<0.001	0.277	A	A	-	A	A	A	A	baseline	ns	-	ns				32		-	32			
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.031	<0.001	0.686	A	A	-	A	A	A	A	baseline	ns	-	ns				37		-	37			
Calcium	MLE	0.006	0.006	0.774	A	A	-	A	A	A	A	baseline	ns	-	ns				-21		-	-21			
Cesium	MLE	<0.001	0.110	0.732	A	A	-	A	A	A	A	baseline	ns	-	ns				-51		-	-51			
Chromium	MLE	0.997	0.639	0.050	<LRL	<LRL	-	<LRL	A	A	<LRL	<LRL		-	<LRL	baseline	ns	<LRL	<LRL		-	<LRL	ns		<LRL
Cobalt	MLE	<0.001	0.793	0.005	A	AB	-	C	A	ABC	BC	baseline	ns	-	-57	ns	ns	-57	ns		-	-52	ns	-27	-52
Copper	MLE	0.612	0.448	0.062	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Iron	MLE	0.633	0.001	0.574	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Lead	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.069	0.003	0.011	A	ABC	-	C	BC	AB	C	baseline	ns	-	-38	-32	ns	-40	ns	ns	-	-25	-18	ns	-27
Manganese	MLE	0.121	0.010	0.233	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Mercury (ww)[d]	ANCOVA	0.099	0.002	0.125	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Molybdenum	MLE	0.021	0.129	0.144	A	A	-	A	A	A	A	baseline	ns	-	ns				-15		-	-15			
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.112	0.031	0.216	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Potassium	MLE	0.120	0.064	0.171	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Rubidium	MLE	<0.001	0.389	0.383	A	A	-	A	A	A	A	baseline	ns	-	ns				-27		-	-27			
Selenium	MLE	0.043	0.039	0.310	A	A	-	A	A	A	A	baseline	ns	-	ns				18		-	18			
Silver	MLE	<0.001	<0.001	0.080	-	-	-	A	A	A	A	-	-	-	baseline	ns	ns	ns	-	-	-	-31			
Sodium	MLE	0.944	<0.001	0.188	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Strontium	MLE	0.011	0.011	0.558	A	A	-	A	A	A	A	baseline	ns	-	ns				-21		-	-21			
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.237	0.688	0.657	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Tin	MLE	0.140	0.003	0.032	<LRL	B	-	<LRL	A	<LRL	<LRL	<LRL	**baseline**	-	<LRL	**17,495**	<LRL	<LRL	<LRL	**ns**	-	<LRL	**ns**	<LRL	<LRL
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	0.513	0.016	0.670	A	A	-	A	A	A	A	baseline	ns	-	ns				ns		-	ns			
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.010	0.182	0.039	A	AB	-	B	AB	A	B	baseline	ns	-	-36	ns	ns	-41	ns	ns	-	-28	ns	ns	-34
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.230	0.010	0.139	A	A	A	A	A	-	A	ns					-	ns	ns					-	ns
Fork Length[e]	ANOVAlog	0.008	<0.001	0.009	C	C	A	AB	ABC	BC	BC	ns	ns	23	ns	ns	ns	ns	ns	ns	23	15	ns	ns	ns
Body Weight[e]	ANOVAlog	0.010	0.010	0.002	D	CD	A	AB	ABC	BCD	BCD	ns	ns	90	ns	ns	ns	ns	ns	ns	102	56	40	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold** font = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no post hoc test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two-way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.12: Statistical Comparisons of Exposed - Reference Relative Differences of Peamouth Chub Ovary Tissue Metal Concentrations for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]								Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]								Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]							
					Post-Breach Period								Post-Breach Period								Post-Breach Period							
		Area	Year	Area × Year	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024	2016	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.154	<0.001	0.447	A	<LRL	A	A	A	A	A	A	baseline	<LRL	ns						ns	<LRL	ns					
Antimony	MLE	0.145	0.277	0.009	A	<LRL	<LRL	<LRL	<LRL	B	<LRL	C	baseline	<LRL	<LRL	<LRL	<LRL	-94	<LRL	-97	ns	<LRL	<LRL	<LRL	<LRL	ns	<LRL	ns
Arsenic	MLE	0.234	<0.001	<0.001	A	AB	ABC	CD	ABC	D	BC	BC	baseline	ns	ns	-68	ns	-83	-58	-61	94	ns	ns	ns	ns	-66	ns	ns
Barium	MLE	0.048	<0.001	0.474	A	A	A	A	A	A	A	A	baseline	ns							28							
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	<0.001	<0.001	0.067	A	A	A	A	A	A	A	A	baseline	ns							-54							
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	<0.001	0.536	A	A	A	A	A	A	A	A	baseline	ns							116							
Calcium	MLE	0.335	0.007	0.307	A	A	A	A	A	A	A	A	baseline	ns							ns							
Cesium	MLE	<0.001	<0.001	0.111	A	A	A	A	A	A	A	A	baseline	ns							-37							
Chromium	MLE	0.524	0.069	<0.001	BC	A	BC	D	CD	B	BC	BCD	baseline	182	ns	-74	ns	ns	ns	ns	ns	254	ns	-68	ns	ns	ns	ns
Cobalt	MLE	0.629	0.041	0.050	ABC	A	AB	A	ABC	AB	C	BC	baseline	ns							ns							
Copper	MLE	0.017	<0.001	0.003	ABC	A	AB	BC	C	BC	BC	C	baseline	ns	ns	ns	ns	ns	ns	ns	ns	108	45	ns	ns	ns	ns	ns
Iron	MLE	<0.001	<0.001	0.931	A	A	A	A	A	A	A	A	baseline	ns							49							
Lead	MLE	0.032	0.014	<0.001	A	<LRL	<LRL	B	<LRL	<LRL	C	<LRL	baseline	<LRL	<LRL	-87	<LRL	<LRL	**-99**	<LRL	ns	<LRL	<LRL	-75	<LRL	<LRL	**ns**	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.050	<0.001	0.142	A	A	A	A	A	A	A	A	baseline	ns							ns							
Manganese	MLE	0.010	<0.001	0.504	A	A	A	A	A	A	A	A	baseline	ns							15							
Mercury (ww)[d]	ANCOVA	<0.001	<0.001	0.097	A	A	A	A	A	A	A	A	baseline	ns							57							
Molybdenum	MLE	<0.001	0.036	0.748	A	A	A	A	A	A	A	A	baseline	ns							31							
Nickel	MLE	0.401	0.018	0.002	B	A	<LRL	BC	C	<LRL	BC	BC	baseline	197	<LRL	ns	-67	<LRL	ns	ns	ns	265	<LRL	ns	-60	<LRL	ns	ns
Phosphorus	MLE	0.017	<0.001	0.208	A	A	A	A	A	A	A	A	baseline	ns							11							
Potassium	MLE	0.044	<0.001	0.724	A	A	A	A	A	A	A	A	baseline	ns							9.2							
Rubidium	MLE	0.139	0.032	0.538	A	A	A	A	A	A	A	A	baseline	ns							ns							
Selenium	MLE	<0.001	<0.001	0.385	A	A	A	A	A	A	A	A	baseline	ns							27							
Silver	MLE	0.002	0.008	0.150	-	-	-	A	A	A	A	A	-	-	-	baseline	ns				-	-	-	-45				
Sodium	MLE	<0.001	<0.001	0.047	BC	A	BC	C	ABC	ABC	C	AB	baseline	49	ns	ns	ns	ns	ns	ns	ns	59	ns	ns	32	ns	ns	57
Strontium	MLE	0.287	0.002	0.288	A	A	A	A	A	A	A	A	baseline	ns							ns							
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.879	0.001	0.536	A	A	A	A	A	A	A	A	baseline	ns							ns							
Tin	MLE	<0.001	<0.001	<0.001	C	BC	<LRL	A	<LRL	B	<LRL	<LRL	baseline	ns	<LRL	1,424	<LRL	329	<LRL	<LRL	ns	235	<LRL	1,811	<LRL	438	<LRL	<LRL
Titanium	MLE	0.479	0.360	0.099	-	-	-	A	A	<LRL	<LRL	<LRL	-	-	-	baseline	ns	<LRL			-	-	-	ns		<LRL		
Uranium	MLE	0.116	<0.001	0.544	A	A	A	A	A	A	A	A	baseline	ns							ns							
Vanadium	MLE	<0.001	<0.001	0.092	A	A	A	A	A	A	A	A	baseline	ns							119							
Zinc	MLE	0.015	<0.001	0.059	A	A	A	A	A	A	A	A	baseline	ns							11							
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.230	0.010	0.139	A	A	A	A	A	A	-	A	baseline	ns							ns							
Fork Length[e]	ANOVAlog	0.008	<0.001	0.009	BC	C	C	A	AB	ABC	BC	BC	ns	ns	ns	23	ns	ns	ns	ns	ns	ns	ns	23	15	ns	ns	ns
Body Weight[e]	ANOVAlog	0.010	0.010	0.002	BCD	D	CD	A	AB	ABC	BCD	BCD	ns	ns	ns	90	ns	ns	ns	ns	ns	ns	ns	102	56	40	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit;."nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.13: **Statistical Comparisons of Exposed - Reference Relative Differences of Peamouth Chub Liver Tissue Metal Concentrations for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2016 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.739	0.166	0.029	BC	<LRL	<LRL	C	AB	AB	A	baseline	<LRL	<LRL	ns	ns	ns	274	ns	<LRL	<LRL	-61	ns	ns	ns
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	<0.001	0.664	A	A	A	A	A	A	A	baseline	ns						24						
Barium	MLE	<0.001	<0.001	0.640	A	A	A	A	A	A	A	baseline	ns						89						
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	<0.001	<0.001	0.366	A	A	A	A	A	A	A	baseline	ns						-50						
Boron	MLE	0.001	<0.001	0.059	A	A	<LRL	<LRL	A	A	<LRL	baseline	ns	<LRL		ns		<LRL	119	<LRL		119		<LRL	
Cadmium	MLE	<0.001	0.018	0.619	A	A	A	A	A	A	A	baseline	ns						151						
Calcium	MLE	0.036	0.025	0.105	A	A	A	A	A	A	A	baseline	ns						37						
Cesium	MLE	<0.001	<0.001	0.034	A	ABC	C	AB	AB	BC	ABC	baseline	ns	-54	ns	ns	-39	ns	ns	-29	-53	ns	ns	-38	-34
Chromium	MLE	0.014	<0.001	<0.001	A	B	BC	C	BC	BC	B	baseline	-69	-83	-90	-78	-83	-73	494	ns	ns	ns	ns	ns	ns
Cobalt	MLE	0.246	<0.001	0.702	A	A	A	A	A	A	A	baseline	ns						ns						
Copper	MLE	0.016	<0.001	0.333	A	A	A	A	A	A	A	baseline	ns						15						
Iron	MLE	0.027	<0.001	0.110	A	A	A	A	A	A	A	baseline	ns						14						
Lead	MLE	0.014	0.018	<0.001	B	A	<LRL	BC	B	C	<LRL	baseline	**2,280**	<LRL	ns	ns	-67	<LRL	ns	**ns**	<LRL	ns	133	ns	<LRL
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.024	<0.001	0.004	A	AB	BC	AB	AB	B	C	baseline	ns	-33	ns	ns	-30	-52	51	ns	ns	30	ns	ns	-28
Manganese	MLE	<0.001	<0.001	0.357	A	A	A	A	A	A	A	baseline	ns						32						
Mercury (ww)[d]	ANCOVA	<0.001	<0.001	0.011	ABCD	ABC	D	CD	A	BCD	AB	baseline	ns	ns	ns	ns	ns	ns	ns	42	ns	ns	83	ns	76
Molybdenum	MLE	<0.001	0.054	0.187	A	A	A	A	A	A	A	baseline	ns						42						
Nickel	MLE	0.064	<0.001	0.009	A	B	B	B	<LRL	B	B	baseline	-66	-62	-78	<LRL	-65	-74	242	ns	ns	ns	<LRL	ns	ns
Phosphorus	MLE	0.001	0.029	0.020	A	BC	BC	AB	ABC	BC	C	baseline	-32	-31	ns	ns	-39	-46	63	ns	ns	40	ns	ns	ns
Potassium	MLE	0.001	0.063	0.042	A	B	AB	A	AB	AB	B	baseline	-35	ns	ns	ns	ns	-39	47	ns	ns	43	ns	ns	ns
Rubidium	MLE	0.689	0.004	0.046	A	B	B	AB	AB	B	B	baseline	-39	-39	ns	ns	-48	-49	48	ns	ns	ns	ns	ns	ns
Selenium	MLE	<0.001	0.002	0.125	A	A	A	A	A	A	A	baseline	ns						36						
Silver	MLE	<0.001	0.140	0.037	-	-	A	B	<LRL	<LRL	A	-	-	baseline	**-90**	<LRL	<LRL	ns	-	-	ns	**ns**	<LRL	<LRL	ns
Sodium	MLE	<0.001	0.020	0.012	A	BC	C	AB	BC	BC	BC	baseline	-45	-51	ns	-37	-35	-48	111	ns	ns	60	33	37	ns
Strontium	MLE	0.019	0.014	0.104	A	A	A	A	A	A	A	baseline	ns						43						
Tellurium	MLE	0.004	0.059	0.789	<LRL	<LRL	A	A	A	A	A	<LRL	<LRL	baseline	ns				<LRL		40				
Thallium	MLE	0.197	0.108	0.326	A	A	A	A	A	A	A	baseline	ns						ns						
Tin	MLE	0.003	0.655	<0.001	B	C	A	<LRL	B	<LRL	<LRL	baseline	**-100**	**32,347**	<LRL	ns	<LRL	<LRL	428	**ns**	**ns**	<LRL	888	<LRL	<LRL
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	0.020	<0.001	0.361	A	A	A	A	A	A	A	baseline	ns						37						
Vanadium	MLE	<0.001	<0.001	0.185	A	A	A	A	A	A	A	baseline	ns						93						
Zinc	MLE	0.030	0.057	0.524	A	A	A	A	A	A	A	baseline	ns						13						
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	0.230	0.010	0.139	A	A	A	A	A	-	A	ns					-	ns	ns					-	ns
Fork Length[e]	ANOVAlog	0.008	<0.001	0.009	C	C	A	AB	ABC	BC	BC	ns	ns	23	ns	ns	ns	ns	ns	ns	23	15	ns	ns	ns
Body Weight[e]	ANOVAlog	0.010	0.010	0.002	D	CD	A	AB	ABC	BCD	BCD	ns	ns	90	ns	ns	ns	ns	ns	ns	102	56	40	ns	ns

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.14: Statistical Comparisons of Exposed - Reference Relative Differences of Peamouth Chub Kidney Tissue Metal Concentrations for the Quesnel Lake near Hazeltine Creek (QUL-NHC; Exposed) and near Grain Creek (QUL-NGC; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024
Aluminum	MLE	0.329	0.001	0.036	<LRL	B	<LRL	<LRL	<LRL	<LRL	A	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	13,144	<LRL	ns	<LRL	<LRL	<LRL	<LRL	ns
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	<0.001	0.012	0.214	A	A	A	A	A	A	A	baseline	ns						67						
Barium	MLE	0.003	<0.001	<0.001	<LRL	C	C	BC	A	B	B	<LRL	baseline	ns	ns	**3,473**	183	107	<LRL	ns	ns	ns	**ns**	126	ns
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	MLE	0.126	0.118	0.032	B	AB	AB	A	A	AB	A	baseline	ns	ns	81	119	ns	76	-41	ns	ns	ns	ns	ns	ns
Cesium	MLE	<0.001	0.006	0.398	A	A	A	A	A	A	A	baseline	ns						-25						
Chromium	MLE	0.550	0.740	0.189	<LRL	<LRL	A	A	<LRL	A	A	<LRL		baseline	ns	<LRL	ns		<LRL		ns		<LRL	ns	
Cobalt	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	MLE	0.176	<0.001	0.017	BC	ABC	C	C	C	AB	A	baseline	ns	ns	ns	ns	ns	51	ns	ns	ns	-25	ns	ns	ns
Iron	MLE	<0.001	0.002	0.469	A	A	A	A	A	A	A	baseline	ns						-32						
Lead	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.241	<0.001	0.042	B	B	B	B	AB	A	AB	baseline	ns	ns	ns	ns	18	ns	ns	ns	ns	ns	ns	21	ns
Manganese	MLE	0.071	<0.001	<0.001	D	CD	D	ABC	A	AB	BC	baseline	ns	ns	42	92	81	37	ns	ns	-25	ns	58	49	ns
Mercury (ww)[d]	ANCOVA	<0.001	0.012	0.145	A	A	A	A	A	A	A	baseline	ns						-34						
Molybdenum	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.018	0.028	<0.001	AB	CD	D	D	CD	A	BC	baseline	-17	-22	-25	-15	ns	ns	19	ns	ns	-10	ns	30	ns
Potassium	MLE	0.061	<0.001	<0.001	A	BC	C	C	AB	A	AB	baseline	-15	-23	-21	ns	ns	ns	15	ns	-12	ns	ns	24	ns
Rubidium	MLE	0.017	<0.001	<0.001	ABC	CDE	DE	E	BCD	AB	A	baseline	ns	-20	-27	ns	ns	ns	15	ns	ns	-16	ns	23	38
Selenium	MLE	0.497	<0.001	0.028	A	ABC	ABC	BC	C	AB	AB	baseline	ns	ns	-19	-27	ns	ns	17	ns	ns	ns	-15	ns	ns
Silver	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	0.003	0.026	BC	AB	C	BC	ABC	A	A	baseline	ns	ns	ns	ns	40	42	-30	ns	-35	-30	ns	ns	ns
Strontium	MLE	0.345	0.004	0.097	A	A	A	A	A	A	A	baseline	ns						ns						
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.128	0.309	0.030	A	AB	AB	B	AB	A	A	baseline	ns	ns	-42	ns	ns	ns	31	ns	ns	-24	ns	37	ns
Tin	MLE	0.105	<0.001	0.022	<LRL	<LRL	<LRL	<LRL	B	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	80	<LRL	<LRL	<LRL	<LRL	<LRL	ns	64	<LRL
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.328	0.083	0.256	A	A	A	A	A	A	A	baseline	ns						ns						
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.182	A	A	A	A	A	A	A	baseline	ns						-33						
Fork Length[e]	ANOVAlog	0.119	0.025	0.190	A	A	A	A	A	A	A	baseline	ns						ns						
Body Weight[e]	ANOVAlog	0.230	<0.001	0.160	A	A	A	A	A	A	A	baseline	ns						ns						

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.15: **Statistical Comparisons of Exposed - Reference Relative Differences of Lake Trout Liver Tissue Metal Concentrations for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, 2015 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]						
					Post-Breach Period							Post-Breach Period							Post-Breach Period						
		Area	Year	Area × Year	2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024
Aluminum	MLE	0.494	0.017	0.012	<LRL	A	B	A	AB	A	A	<LRL	baseline	-71	ns	ns	ns	ns	<LRL	ns	-61	121	ns	ns	ns
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.773	0.002	0.018	AB	AB	C	BC	BC	BC	A	baseline	ns	-60	ns	ns	ns	ns	ns	ns	-46	ns	ns	ns	133
Barium	MLE	0.007	<0.001	<0.001	<LRL	B	C	B	A	<LRL	<LRL	<LRL	baseline	-62	ns	**4,402**	<LRL	<LRL	<LRL	ns	-49	ns	**ns**	<LRL	<LRL
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.733	<0.001	0.002	A	A	B	A	A	A	A	baseline	ns	-74	ns	ns	ns	ns	ns	ns	-65	ns	ns	ns	ns
Calcium	MLE	0.013	0.130	0.083	A	A	A	A	A	A	A	baseline	ns						-21						
Cesium	MLE	0.009	0.003	0.743	A	A	A	A	A	A	A	baseline	ns						-21						
Chromium	MLE	<0.001	0.033	0.055	<LRL	A	A	A	A	A	A	<LRL	baseline	ns					<LRL	-42					
Cobalt	MLE	<0.001	<0.001	0.233	A	A	A	A	A	A	A	baseline	ns						-27						
Copper	MLE	0.025	0.002	0.001	A	AB	AB	B	B	B	A	baseline	ns	ns	-77	-82	-80	ns	ns	ns	ns	-59	-68	-64	ns
Iron	MLE	<0.001	<0.001	0.761	A	A	A	A	A	A	A	baseline	ns						-58						
Lead	MLE	0.621	0.112	0.002	<LRL	B	B	<LRL	A	<LRL	A	<LRL	baseline	ns	<LRL	296	<LRL	276	<LRL	-52	ns	<LRL	ns	<LRL	ns
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.474	0.002	0.108	A	A	A	A	A	A	A	baseline	ns						ns						
Manganese	MLE	0.180	<0.001	0.147	A	A	A	A	A	A	A	baseline	ns						ns						
Mercury (ww)[d]	ANCOVA	<0.001	<0.001	0.019	A	AB	C	AB	BC	ABC	A	baseline	ns	-57	ns	-53	ns	ns	-37	ns	-73	ns	-70	-49	ns
Molybdenum	MLE	0.082	<0.001	0.279	A	A	A	A	A	A	A	baseline	ns						ns						
Nickel	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.407	<0.001	0.062	A	A	A	A	A	A	A	baseline	ns						ns						
Potassium	MLE	0.036	<0.001	0.037	A	A	B	A	A	A	A	baseline	ns	-42	ns	ns	ns	ns	ns	ns	-32	ns	ns	42	ns
Rubidium	MLE	<0.001	<0.001	0.080	A	A	A	A	A	A	A	baseline	ns						38						
Selenium	MLE	<0.001	<0.001	0.067	A	A	A	A	A	A	A	baseline	ns						-22						
Silver	MLE	0.008	0.586	0.035	-	-	-	B	B	B	A	-	-	-	baseline	ns	ns	342	-	-	-	-62	-62	-68	ns
Sodium	MLE	0.019	<0.001	0.038	A	AB	BC	C	AB	ABC	AB	baseline	ns	-39	-51	ns	ns	ns	ns	ns	-33	-46	ns	ns	ns
Strontium	MLE	0.011	0.083	0.094	A	A	A	A	A	A	A	baseline	ns						-21						
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.913	0.001	0.466	A	A	A	A	A	A	A	baseline	ns						ns	ns	ns	ns	ns	ns	ns
Tin	MLE	0.213	<0.001	0.010	A	<LRL	<LRL	<LRL	B	A	<LRL	baseline	<LRL	<LRL	<LRL	**-95**	ns	<LRL	ns	<LRL	<LRL	<LRL	**ns**	ns	<LRL
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	0.002	0.217	0.006	<LRL	A	C	<LRL	B	<LRL	AB	<LRL	baseline	**-99**	<LRL	-75	<LRL	ns	<LRL	ns	**ns**	<LRL	-67	<LRL	ns
Zinc	MLE	0.004	<0.001	<0.001	A	ABC	D	D	CD	BCD	AB	baseline	ns	-47	-44	-37	-32	ns	ns	ns	-37	-33	-25	ns	ns
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.182	A	A	A	A	A	A	A	baseline	ns						-33						
Fork Length[e]	ANOVAlog	0.119	0.025	0.190	A	A	A	A	A	A	A	baseline	ns						ns						
Body Weight[e]	ANOVAlog	0.230	<0.001	0.160	A	A	A	A	A	A	A	baseline	ns						ns						<LRL

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.16: **Statistical Comparisons of Exposed - Reference Relative Differences of Lake Trout Kidney Tissue Metal Concentrations for the Quesnel Lake near Cedar Point (QUL-NCP; Exposed) and East Arm (QUL-EAA; Reference) Monitoring Areas, 2015 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]						
					Post-Breach Period							Post-Breach Period							Post-Breach Period						
		Area	Year	Area × Year	2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024	2015	2018	2019	2020	2021	2022	2024
Aluminum	MLE	0.419	<0.001	0.004	BC	AB	C	AB	BC	A	BC	baseline	ns	ns	ns	ns	190	ns	ns	ns	-64	ns	ns	120	ns
Antimony	MLE	0.285	0.786	0.004	<LRL	<LRL	B	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	418	<LRL	<LRL	<LRL	<LRL	<LRL	ns	244	<LRL	<LRL	<LRL
Arsenic	MLE	<0.001	<0.001	0.396	A	A	A	A	A	A	A	baseline	ns							46						
Barium	MLE	<0.001	<0.001	<0.001	A	A	B	B	B	A	B	baseline	ns	-65	-47	-46	ns	-61		113	164	ns	ns	ns	131	ns
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Cadmium	MLE	0.077	<0.001	0.185	A	A	A	A	A	A	A	baseline	ns							ns						
Calcium	MLE	0.514	0.004	0.087	A	A	A	A	A	A	A	baseline	ns							ns						
Cesium	MLE	<0.001	<0.001	<0.001	C	B	B	AB	AB	A	B	baseline	45	57	91	68	136	53		-54	-34	-28	ns	-23	ns	-30
Chromium	MLE	0.224	<0.001	0.365	A	A	A	A	A	A	A	baseline	ns							ns						
Cobalt	MLE	0.120	0.003	0.010	BCD	ABCD	A	ABC	CD	AB	D	baseline	ns	94	ns	ns	ns	ns		ns	ns	ns	ns	-37	ns	-48
Copper	MLE	0.617	0.050	0.513	A	A	A	A	A	A	A	baseline	ns							ns						
Iron	MLE	<0.001	<0.001	0.512	A	A	A	A	A	A	A	baseline	ns							-36						
Lead	MLE	0.984	0.002	<0.001	A	C	C	BC	B	B	BC	**baseline**	**-100**	**-100**	**-99**	**-98**	**-98**	**-99**		**ns**	**-58**	**-61**	**ns**	**ns**	**ns**	**ns**
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Magnesium	MLE	0.810	0.001	<0.001	C	BC	AB	BC	AB	A	C	baseline	ns	38	ns	33	62	ns		-18	ns	ns	ns	ns	33	-21
Manganese	MLE	<0.001	<0.001	0.007	AB	BC	BC	AB	AB	A	C	baseline	ns	ns	ns	ns	ns	-33		42	32	ns	49	78	101	ns
Mercury (ww)[d]	ANCOVA	<0.001	0.031	0.616	A	A	A	A	A	A	A	baseline	ns							-38						
Molybdenum	MLE	0.624	0.002	0.202	A	A	A	A	A	A	A	baseline	ns							ns						
Nickel	MLE	0.520	0.001	0.170	A	A	A	A	A	A	A	baseline	ns							ns						
Phosphorus	MLE	0.003	0.032	<0.001	C	BC	BC	BC	B	A	C	baseline	ns	ns	ns	24	70	ns		ns	ns	ns	ns	19	63	ns
Potassium	MLE	0.583	0.038	<0.001	C	B	B	B	B	A	B	baseline	28	48	32	51	119	30		-27	ns	ns	ns	ns	60	ns
Rubidium	MLE	0.018	<0.001	0.001	BC	C	BC	BC	BC	A	AB	baseline	ns	ns	ns	ns	57	ns		ns	ns	ns	ns	ns	53	22
Selenium	MLE	0.010	<0.001	0.040	A	AB	AB	AB	B	A	B	baseline	ns	ns	ns	-54	ns	-50		ns	ns	ns	ns	-47	ns	-43
Silver	MLE	0.040	<0.001	<0.001	-	-	-	B	A	A	A	-	-	-	baseline	3,536	3,791	1,313		-	-	-	-95	ns	ns	ns
Sodium	MLE	0.010	<0.001	<0.001	A	BC	C	C	C	AB	C	baseline	-34	-35	-39	-44	ns	-41		59	ns	ns	ns	ns	37	ns
Strontium	MLE	0.004	<0.001	0.449	A	A	A	A	A	A	A	baseline	ns							-20						
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Thallium	MLE	0.266	<0.001	0.005	A	BC	AB	ABC	BC	A	C	baseline	-35	ns	ns	-33	ns	-40		32	ns	ns	ns	ns	41	ns
Tin	MLE	0.036	<0.001	<0.001	B	C	<LRL	A	B	B	<LRL	baseline	-89	<LRL	1,641	ns	ns	<LRL		120	-76	<LRL	ns	ns	158	<LRL
Titanium	MLE	<0.001	0.243	0.135	-	-	-	A	A	A	A	-	-	-	baseline	ns				-	-	-	182	182	182	182
Uranium	MLE	0.736	0.080	0.167	<LRL	A	A	A	A	A	A	<LRL	baseline	ns						<LRL	ns					
Vanadium	MLE	0.699	0.612	0.086	<LRL	A	A	A	A	<LRL	<LRL	<LRL	baseline	ns			<LRL			<LRL	ns			<LRL		
Zinc	MLE	0.432	<0.001	0.002	AB	CD	BCD	BCD	ABC	A	D	baseline	-27	ns	ns	ns	ns	-32		20	ns	ns	ns	ns	36	-18
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Age[e]	ANOVA	<0.001	<0.001	0.182	A	A	A	A	A	A	A	baseline	ns							-33						
Fork Length[e]	ANOVAlog	0.119	0.025	0.190	A	A	A	A	A	A	A	baseline	ns							ns						
Body Weight[e]	ANOVAlog	0.230	<0.001	0.160	A	A	A	A	A	A	A	baseline	ns							ns						

Area x Year or Area P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available or no *post hoc* test conducted because of censored data. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% LRL data for both stations so the time period was omitted from the analysis. "ww" = wet weight. "ANOVA" = two way analysis of variance. "MLE" = censored regression using maximum likelihood estimation. "ANCOVA" = two-way analysis of covariance. MOD = magnitude of difference. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).
[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.
[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.
[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).
[e] Results of statistical contrasts for age, fork length, and body weight may differ among tissue types for a given species due to different sample sizes or sampling years among tissue types. Only the results associated with muscle were used in data interpretation.

Table E.6.17: Statistical Comparisons of Temporal Differences of Lake Trout Ovary Tissue Metal Concentrations for Quesnel Lake near Cedar Point (QUL-NCP; Exposed), 2015 to 2024

Parameter	Test	One-way ANOVA Year P-Values	Temporal Contrasts Among Periods[a]								Magnitude of Difference Relative to Baseline Period (%)[b]							
			2015	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.133	<LRL	<LRL	A	<LRL	<LRL	<LRL	<LRL	A	<LRL	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	ns
Antimony	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.048	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	0.002	<LRL	A	AB	B	<LRL	B	<LRL	<LRL	<LRL	baseline	ns	-71.0	<LRL	-61.2	<LRL	<LRL
Beryllium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.313	A	A	A	<LRL	A	A	<LRL	<LRL	baseline	ns	ns	<LRL	ns	ns	<LRL	<LRL
Calcium	MLE	0.258	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Cesium	MLE	0.264	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Chromium	MLE	0.725	<LRL	A	A	<LRL	A	A	<LRL	<LRL	<LRL	baseline	ns	<LRL	ns	ns	<LRL	<LRL
Cobalt	MLE	0.025	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Copper	MLE	0.003	AB	AB	A	B	AB	AB	B	B	baseline	ns	ns	ns	ns	ns	ns	ns
Iron	MLE	0.047	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Lead	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.399	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	0.017	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Mercury (ww)[c]	ANCOVA	0.008	AB	AB	AB	AB	B	AB	A	B	baseline	ns	ns	ns	ns	ns	ns	ns
Molybdenum	MLE	0.500	<LRL	A	A	<LRL	A	A	<LRL	<LRL	<LRL	baseline	ns	<LRL	ns	ns	<LRL	<LRL
Nickel	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.775	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Potassium	MLE	0.038	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Rubidium	MLE	0.129	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Selenium	MLE	0.057	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Silver	MLE	0.006	-	-	-	B	AB	A	AB	AB	-	-	-	baseline	ns	173	ns	ns
Sodium	MLE	0.059	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Strontium	MLE	0.748	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Tellurium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.185	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Tin	MLE	0.432	<LRL	<LRL	<LRL	<LRL	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL
Titanium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.007	ABC	AB	A	C	ABC	ABC	ABC	BC	baseline	ns	ns	ns	ns	ns	ns	ns
Zirconium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	ANOVA	0.119	A	A	A	A	A	A	-	A	baseline	ns	ns	ns	ns	ns	-	ns
Fork Length	ANOVAlog	0.212	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns
Body Weight	ANOVAlog	0.083	B	AB	AB	AB	AB	AB	A	AB	baseline	ns	ns	ns	ns	ns	153	ns

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis\. "ANOVA" = one way analysis of variance. ANCOVA = one-way censored analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww).

[a] Years that share a letter (e.g., A,B,C) had concentrations that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest concentrations. <LRL = greater than 50% of concentrations were reported as <LRL so the time period was omitted from the analysis.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as $(year_i - year_{baseline})/year_{baseline} \times 100\%$.

[c] Assessed as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

Table E.6.18: Statistical Comparisons of Temporal Differences of Rainbow Trout Muscle Tissue Metal Concentrations for Quesnel River (QUR; Exposed), 2015 to 2024

Parameter	Test	One-way ANOVA Year P-Values	Temporal Contrasts Among Periods[a]									Magnitude of Difference Relative to Baseline Period (%)[b]								
			2015	2017	2018	2019	2020	2021	2022	2023	2024	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.936	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	A	<LRL	A	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	ns
Antimony	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.005	AB	AB	AB	AB	B	A	AB	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	C	<LRL	C	BC	BC	C	A	AB	C	baseline	<LRL	ns	ns	ns	ns	414	138	ns
Beryllium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	MLE	<0.001	A	BC	ABC	BC	ABC	AB	A	C	A	baseline	-65.9	ns	-66.1	ns	ns	ns	-72.3	ns
Cesium	MLE	0.054	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Chromium	MLE	0.076	<LRL	<LRL	<LRL	A	<LRL	<LRL	A	<LRL	A	<LRL	<LRL	<LRL	baseline	<LRL	<LRL	ns	<LRL	ns
Cobalt	MLE	0.006	A	AB	AB	A	AB	AB	AB	AB	B	baseline	ns	ns	ns	ns	ns	ns	ns	-49.9
Copper	MLE	<0.001	BC	AB	BC	A	ABC	C	C	BC	C	baseline	ns	ns	69.9	ns	ns	ns	ns	ns
Iron	MLE	<0.001	ABC	A	BC	A	ABC	C	ABC	ABC	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Lead	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	<0.001	BC	C	BC	BC	BC	AB	A	BC	ABC	baseline	ns	ns	ns	ns	ns	29.0	ns	ns
Manganese	MLE	<0.001	AB	BC	BC	BC	BC	AB	A	C	AB	baseline	ns	ns	ns	ns	ns	ns	-58.5	ns
Mercury (ww)[c]	ANCOVA	<0.001	AB	A	C	BC	ABC	ABC	ABC	A	ABC	baseline	ns	-42.7	ns	ns	ns	ns	ns	ns
Molybdenum	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	<0.001	C	BC	BC	BC	BC	AB	A	ABC	AB	baseline	ns	ns	ns	ns	18.0	34.3	ns	19.7
Potassium	MLE	<0.001	C	BC	BC	BC	BC	BC	A	B	B	baseline	ns	ns	ns	ns	ns	38.8	16.8	16.9
Rubidium	MLE	0.013	AB	AB	AB	AB	B	AB	A	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Selenium	MLE	0.029	AB	A	AB	AB	B	AB	A	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Silver	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	A	A	B	B	B	B	B	B	B	baseline	ns	-44.5	-36.3	-43.5	-44.4	-30.8	-39.2	-41.8
Strontium	MLE	<0.001	A	CD	ABC	BCD	ABC	ABC	A	D	AB	baseline	-75.0	ns	-70.2	ns	ns	ns	-83.9	ns
Tellurium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.018	AB	AB	AB	A	AB	AB	AB	B	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Tin	MLE	0.035	<LRL	AB	<LRL	A	<LRL	B	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	ns	<LRL	ns	<LRL	<LRL	<LRL
Titanium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	MLE	0.001	ABC	ABC	ABC	A	AB	ABC	ABC	BC	C	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Zirconium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	ANOVA	0.014	AB	AB	A	AB	AB	B	AB	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Fork Length	ANOVAlog	0.018	AB	AB	AB	AB	AB	AB	B	A	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Body Weight	ANOVAlog	0.129	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns

Year P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis. "ANOVA" = one way analysis of variance. ANCOVA = one-way censored analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww).

[a] Years that share a letter (e.g., A,B,C) had concentrations that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest concentrations. <LRL = greater than 50% of concentrations were reported as <LRL so the time period was omitted from

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as ($year_i$-$year_{baseline}$)/$year_{baseline}$ x 100%.

[c] Assessed as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

Table E.6.19: Statistical Comparisons of Temporal Differences of Rainbow Trout Ovary Tissue Metal Concentrations for Quesnel River (QUR; Exposed), 2015 to 2024

Parameter	Test	One-way ANOVA Year P-Values	Temporal Contrasts Among Periods[a]				Magnitude of Difference Relative to Baseline Period (%)[b]			
			2018	2022	2023	2024	2018	2022	2023	2024
Aluminum	MLE	<0.001	B	A	<LRL	<LRL	baseline	491	<LRL	<LRL
Antimony	MLE	nt	-	-	-	-	-	-	-	-
Arsenic	MLE	0.060	A	A	A	A	baseline	ns	ns	ns
Barium	MLE	0.294	A	A	A	A	baseline	ns	ns	ns
Beryllium	MLE	nt	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	-	-	-	-	-	-	-	-
Boron	MLE	nt	-	-	-	-	-	-	-	-
Cadmium	MLE	0.367	A	A	A	A	baseline	ns	ns	ns
Calcium	MLE	0.137	A	A	A	A	baseline	ns	ns	ns
Cesium	MLE	0.031	B	A	AB	AB	baseline	255	ns	ns
Chromium	MLE	0.780	<LRL	A	<LRL	A	<LRL	baseline	<LRL	ns
Cobalt	MLE	0.439	A	A	A	A	baseline	ns	ns	ns
Copper	MLE	0.769	A	A	A	A	baseline	ns	ns	ns
Iron	MLE	0.559	A	A	A	A	baseline	ns	ns	ns
Lead	MLE	nt	-	-	-	-	-	-	-	-
Lithium	MLE	nt	-	-	-	-	-	-	-	-
Magnesium	MLE	0.309	A	A	A	A	baseline	ns	ns	ns
Manganese	MLE	0.325	A	A	A	A	baseline	ns	ns	ns
Mercury (ww)[c]	ANCOVA	0.041	B	AB	A	AB	baseline	ns	199	ns
Molybdenum	MLE	0.094	A	A	<LRL	A	baseline	ns	<LRL	ns
Nickel	MLE	nt	-	-	-	-	-	-	-	-
Phosphorus	MLE	0.014	AB	A	B	AB	baseline	ns	ns	ns
Potassium	MLE	0.007	B	A	B	AB	baseline	318	ns	ns
Rubidium	MLE	0.009	B	A	B	AB	baseline	297	ns	ns
Selenium	MLE	0.068	A	A	A	A	baseline	ns	ns	ns
Silver	MLE	0.437	-	A	A	A	-	baseline	ns	ns
Sodium	MLE	<0.001	C	A	BC	AB	baseline	143	ns	124
Strontium	MLE	0.106	A	A	A	A	baseline	ns	ns	ns
Tellurium	MLE	nt	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	B	A	B	AB	baseline	273	ns	ns
Tin	MLE	nt	-	-	-	-	-	-	-	-
Titanium	MLE	nt	-	-	-	-	-	-	-	-
Uranium	MLE	0.564	A	A	<LRL	A	baseline	ns	<LRL	ns
Vanadium	MLE	nt	-	-	-	-	-	-	-	-
Zinc	MLE	0.479	A	A	A	A	baseline	ns	ns	ns
Zirconium	MLE	0.029	A	A	<LRL	<LRL	baseline	ns	<LRL	<LRL
Age	ANOVA	0.014	A	AB	AB	AB	ns	ns	ns	ns
Fork Length	ANOVAlog	0.018	AB	B	A	AB	ns	ns	ns	ns
Body Weight	ANOVAlog	0.129	A	A	A	A	ns	ns	ns	ns

Year P-value < 0.05.
Contrast is significant (α = 0.05) and magnitude of difference is positive.
Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis. "ANOVA" = one way analysis of variance. ANCOVA = one-way censored analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww). Analyses only included years in which the sample size was n ≥ 2; all other years were excluded from data analyses and presentation.

[a] Years that share a letter (e.g., A,B,C) had concentrations that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest concentrations. <LRL = greater than 50% of concentrations were reported as <LRL for at least one area so the time period was omitted from the analysis.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as $(year_i - year_{baseline})/year_{baseline} \times 100\%$.

[c] Assessed as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

Table E.6.20: Statistical Comparisons of Temporal Differences of Rainbow Trout Liver Tissue Metal Concentrations for Quesnel River (QUR; Exposed), 2015 to 2024

Parameter	Test	One-way ANOVA Year P-Values	Temporal Contrasts Among Periods[a]									Magnitude of Difference Relative to Baseline Period (%)[b]								
			2015	2017	2018	2019	2020	2021	2022	2023	2024	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.973	A	A	<LRL	<LRL	A	A	A	A	A	baseline	ns	<LRL	<LRL	ns	ns	ns	ns	ns
Antimony	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	MLE	0.012	AB	AB	B	B	AB	A	AB	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	B	B	A	A	A	B	A	A	B	baseline	ns	418	167	320	ns	502	344	ns
Beryllium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.847	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Calcium	MLE	<0.001	A	BC	C	BC	BC	BC	C	B	C	baseline	-37.5	-52.0	-46.2	-49.9	-44.2	-52.0	-34.0	-51.9
Cesium	MLE	0.012	A	AB	AB	AB	B	AB	AB	AB	AB	baseline	ns	ns	ns	-44.4	ns	ns	ns	ns
Chromium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	MLE	0.059	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Copper	MLE	0.052	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Iron	MLE	0.445	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Lead	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	0.002	AB	AB	B	AB	AB	A	B	AB	B	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	0.018	A	AB	AB	AB	B	AB	AB	AB	B	baseline	ns	ns	ns	-40.1	ns	ns	ns	-41.7
Mercury (ww)[c]	ANCOVA	<0.001	A	A	B	B	A	AB	AB	A	AB	baseline	ns	-47.0	-48.9	ns	ns	ns	ns	ns
Molybdenum	MLE	0.328	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Nickel	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	MLE	<0.001	D	CD	D	ABC	AB	A	BCD	ABC	ABCD	baseline	ns	ns	21.6	27.9	29.1	ns	19.8	ns
Potassium	MLE	<0.001	C	AB	B	AB	A	A	B	AB	B	baseline	47.0	34.4	45.3	72.5	73.6	39.1	56.2	41.1
Rubidium	MLE	0.004	B	A	A	A	AB	A	AB	A	AB	baseline	61	77.8	77.1	ns	74.7	ns	72.7	ns
Selenium	MLE	0.428	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Silver	MLE	0.089	-	-	-	-	A	A	A	A	A	-	-	-	-	baseline	ns	ns	ns	ns
Sodium	MLE	<0.001	C	AB	C	AB	ABC	A	BC	ABC	C	baseline	42.6	ns	39.8	ns	55.2	ns	ns	ns
Strontium	MLE	<0.001	A	BC	BC	BC	C	AB	C	BC	C	baseline	-40.0	-49.2	-48.5	-56.6	ns	-58.3	-46.4	-55.1
Tellurium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.815	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Tin	MLE	<0.001	B	B	<LRL	B	A	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	ns	231	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	MLE	0.265	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Vanadium	MLE	0.762	A	<LRL	<LRL	<LRL	<LRL	<LRL	A	A	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	<LRL	ns	ns	<LRL
Zinc	MLE	0.007	A	B	AB	AB	AB	AB	B	AB	AB	baseline	-27.5	ns	ns	ns	ns	-28.3	ns	ns
Zirconium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	ANOVA	0.014	AB	AB	A	AB	AB	B	AB	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Fork Length	ANOVAlog	0.018	AB	AB	AB	AB	AB	AB	B	A	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Body Weight	ANOVAlog	0.129	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis. "ANOVA" = one way analysis of variance. ANCOVA = one-way censored analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww).

[a] Years that share a letter (e.g., A,B,C) had concentrations that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest concentrations. <LRL = greater than 50% of concentrations were reported as <LRL so the time period was omitted from the analysis.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (year $_i$-year$_{baseline}$)/year$_{baseline}$ x 100%.

[c] Assessed as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

Table E.6.21: **Statistical Comparisons of Temporal Differences of Rainbow Trout Kidney Tissue Metal Concentrations for Quesnel River (QUR; Exposed), 2015 to 2024**

Parameter	Test	One-way ANOVA Year P-Values	Temporal Contrasts Among Periods[a]									Magnitude of Difference Relative to Baseline Period (%)[b]								
			2015	2017	2018	2019	2020	2021	2022	2023	2024	2015	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.020	<LRL	B	B	AB	A	AB	AB	B	AB	<LRL	baseline	ns	ns	470	ns	ns	ns	ns
Antimony	MLE	0.117	<LRL	A	<LRL	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	ns	ns	<LRL	<LRL	<LRL	<LRL
Arsenic	MLE	0.196	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	BC	BC	AB	ABC	A	BC	AB	C	BC	baseline	ns	ns	ns	189	ns	ns	ns	ns
Beryllium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.214	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Calcium	MLE	0.013	AB	AB	B	B	AB	AB	AB	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Cesium	MLE	<0.001	A	AB	B	B	AB	B	B	B	B	baseline	ns	-50.8	-51.3	ns	-47.5	-52.3	-53.1	-58.4
Chromium	MLE	<0.001	<LRL	B	B	B	A	AB	B	B	AB	<LRL	baseline	ns	ns	201	ns	ns	ns	ns
Cobalt	MLE	0.506	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Copper	MLE	0.019	AB	AB	B	AB	A	AB	B	B	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Iron	MLE	<0.001	AB	B	B	B	AB	AB	B	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Lead	MLE	0.186	<LRL	<LRL	<LRL	<LRL	A	<LRL	<LRL	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	<LRL	ns	<LRL
Lithium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	MLE	<0.001	AB	BC	C	BC	A	BC	C	BC	BC	baseline	ns	-29.7	ns	ns	ns	-25.5	ns	ns
Manganese	MLE	0.009	AB	B	AB	AB	A	B	B	B	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Mercury (ww)[c]	ANCOVA	<0.001	AB	A	B	B	AB	AB	AB	AB	B	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Molybdenum	MLE	0.417	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Nickel	MLE	<0.001	B	AB	B	B	A	B	B	AB	AB	baseline	ns	ns	ns	218	ns	ns	ns	ns
Phosphorus	MLE	<0.001	BC	BC	C	AB	A	BC	BC	BC	BC	baseline	ns	ns	ns	35.6	ns	ns	ns	ns
Potassium	MLE	<0.001	AB	B	B	B	A	B	B	B	B	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Rubidium	MLE	0.136	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Selenium	MLE	<0.001	C	AB	ABC	ABC	BC	ABC	ABC	A	A	baseline	56.2	ns	ns	ns	ns	ns	77.2	80.5
Silver	MLE	0.279	-	-	-	-	A	A	A	A	A	-	-	-	-	baseline	ns	ns	ns	ns
Sodium	MLE	<0.001	D	BC	C	ABC	A	BC	BC	ABC	AB	baseline	95.0	82.2	131	189	103	92.5	117	160
Strontium	MLE	0.078	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Tellurium	MLE	0.484	<LRL	A	<LRL	<LRL	<LRL	<LRL	A	A	A	<LRL	baseline	<LRL	<LRL	<LRL	<LRL	ns	ns	ns
Thallium	MLE	0.669	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Tin	MLE	0.004	AB	AB	B	AB	A	<LRL	<LRL	<LRL	<LRL	baseline	ns	ns	ns	ns	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	0.352	-	-	-	-	A	<LRL	<LRL	<LRL	A	-	-	-	-	baseline	<LRL	<LRL	<LRL	ns
Uranium	MLE	0.004	B	AB	AB	AB	A	AB	B	AB	AB	baseline	ns	ns	ns	285	ns	ns	ns	ns
Vanadium	MLE	0.178	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Zinc	MLE	<0.001	C	C	C	BC	A	ABC	C	ABC	AB	baseline	ns	ns	ns	41	ns	ns	ns	36.7
Zirconium	MLE	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	ANOVA	0.014	AB	AB	A	AB	AB	B	AB	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Fork Length	ANOVAlog	0.018	AB	AB	AB	AB	AB	AB	B	A	AB	baseline	ns	ns	ns	ns	ns	ns	ns	ns
Body Weight	ANOVAlog	0.129	A	A	A	A	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available. "LRL" = Laboratory reporting limit. "nt" = not tested because all data were reported below the method detection limit (LRL) or because there were only data for a single time period. "ns" = not significant. "baseline" = first year of data included in analysis. "<LRL" = greater than 50% of the concentrations were reported as < LRL so the time period was omitted from the analysis. "ANOVA" = one way analysis of variance. ANCOVA = one-way censored analysis of covariance. "MOD" = Magnitude of Difference. 'MLE" = censored regression using maximum likelihood estimation. Data were analysed in units of mg/kg dry weight (dw) except mercury which was analysed in units of mg/kg wet weight (ww).

[a] Years that share a letter (e.g., A,B,C) had concentrations that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest concentrations. <LRL = greater than 50% of concentrations were reported so the time period was omitted from the analysis.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as ($year_i$-$year_{baseline}$)/$year_{baseline}$ x 100%.

[c] Assessed as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

Table E.6.22: Tissue Accumulation of Primary Analytes

Metal	Tissue Reported to Accumulate	Reference
Arsenic (non-essential)	liver, kidney	McIntyre, D.O., and T.K. Linton. 2012. Arsenic. In: C.M. Wood, A.P. Farrell and C.J. Brauner (eds.), pp. 297-349, Homeostasis and Toxicology of Non-Essential Metals. Elsevier/Academic Press, New York, NY.
		Kumari, B., V. Kumar, A.K. Sinha, J. Ahsan, A.K. Ghosh, H. Wang, and G. DeBoeck. 2016. Toxicology of Arsenic in Fish and Aquatic Systems. Environmental Chemistry Letters 15(1): 1–22.
Copper (essential)	liver, kidney	Miller, P.A., R.P. Lanno, M.E.McMaster and D.G. Dixon. 1993. Relative contributions of dietary and waterborne copper to tissue copper burdens and waterborne-copper tolerance in rainbow trout (Oncorhynchus mykiss). Canadian Journal of Fisheries and Aquatic Sciences. 50:1683-1689.
		Clearwater, S.J., S. Baskin, C.M. Wood, D.G. McDonald. 2000. Gastrointestinal uptake and distribution of copper in rainbow trout. Journal of Experimental Biology 203:2455-2466.
		Kamunde, C., M. Grosell, D. Higgs, C.M. Wood (2002). Copper metabolism in actively growing rainbow trout (*Oncorhynchus mykiss*): interactions between dietary and waterborne copper uptake. Journal of Experimental Biology 205:279-290.
		Grosell, M. 2012. Copper. In: C.M. Wood, A.P. Farrell and C.J. Brauner (eds.), pp. 53-133, Homeostasis and Toxicology of Essential Metals. Elsevier / Academic Press, New York, NY.
Iron (essential)	liver, kidney	Bury, N.R., D. Boyle and C.A. Cooper. 2012. Iron. In: C.M. Wood, A.P. Farrell and C.J. Brauner (eds.). Homeostasis and Toxicology of Essential Metals. Elsevier /Academic Press, New York. pp. 201-251.
		Desjardins, L. M., B.D. Hicks, and J.W. Hilton. 1987. Iron Catalyzed Oxidation of Trout Diets and its Effect on the Growth and Physiological Response of Rainbow Trout. Fish Physiol. Biochem. 3(4): 173–182.
Selenium (essential)	liver, kidney, ovary	Sato, T., Ose, Y., and Sakai, T. 1980. Toxicological effect of selenium on fish. Environmental Pollution Series A, Ecological and Biological 21(3): 217–224.
		Janz, D.M. 2012. Selenium. In: C.M. Wood, A.P. Farrell, and C.J. Brauner (Eds.), pp. 327-374, Homeostasis and Toxicology of Essential Metals. Elsevier/Academic Press, New York, NY.

Note: See Table 2.4 for a list of analytes of interest.

APPENDIX F
STATISTICAL ANALYSES - CREEK HABITAT

APPENDIX F.1
SEDIMENT QUALITY

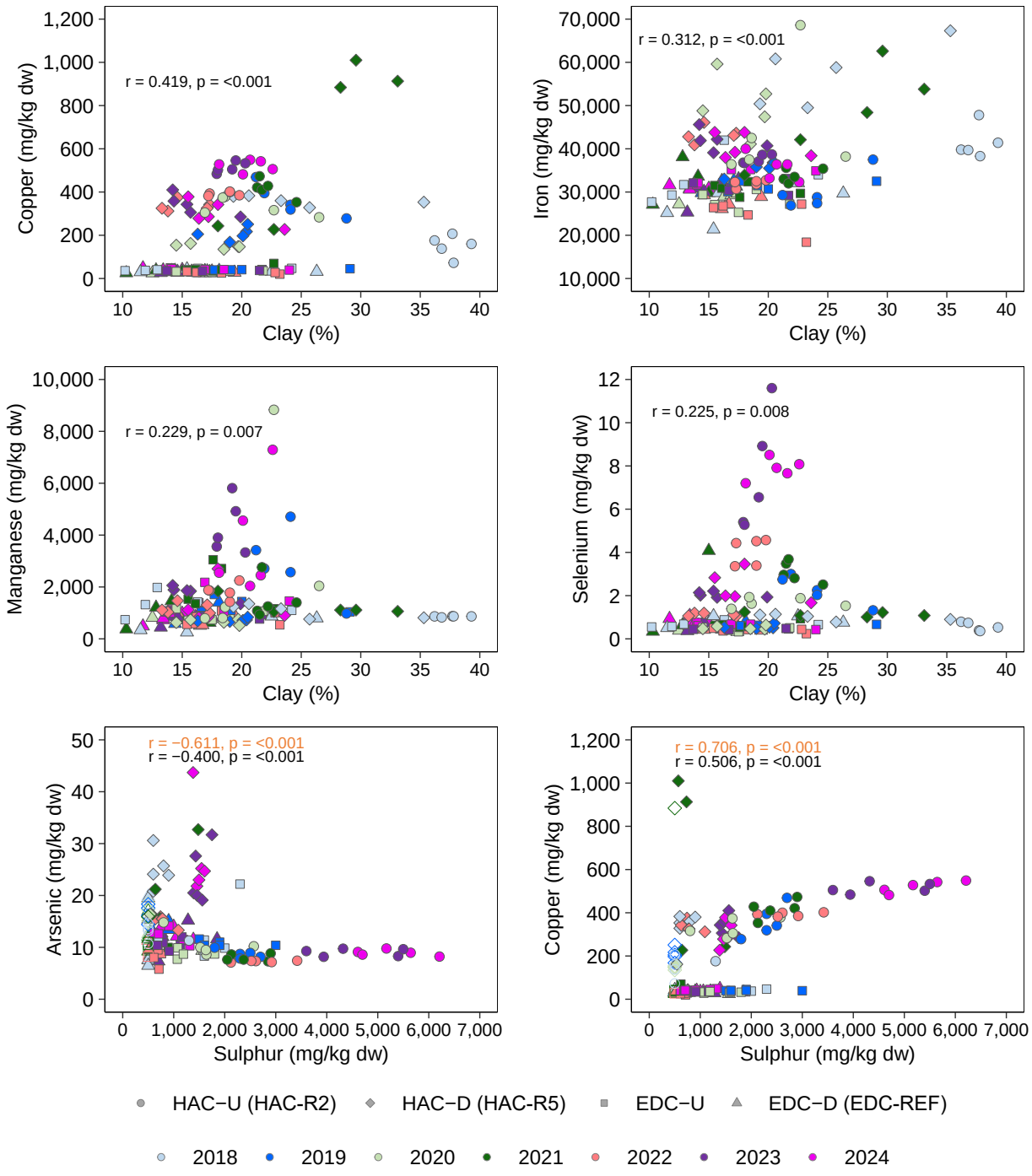


Figure F.1.1: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting. Results of correlations that evaluated data from exposed (HAC−U and HAC−D) and reference (EDC−U and EDC−D) creek sampling areas are shown in black font on each plot. Results of correlations that only evaluated data from the exposed Hazeltine Creek areas (HAC−U and HAC−D) are shown in orange font. An absence of either the orange or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = HAC−U, HAC−D, EDC−U, and EDC−D; orange font = HAC−U and HAC−D only). Open data points indicate at least one of the two variables plotted were <LRL.

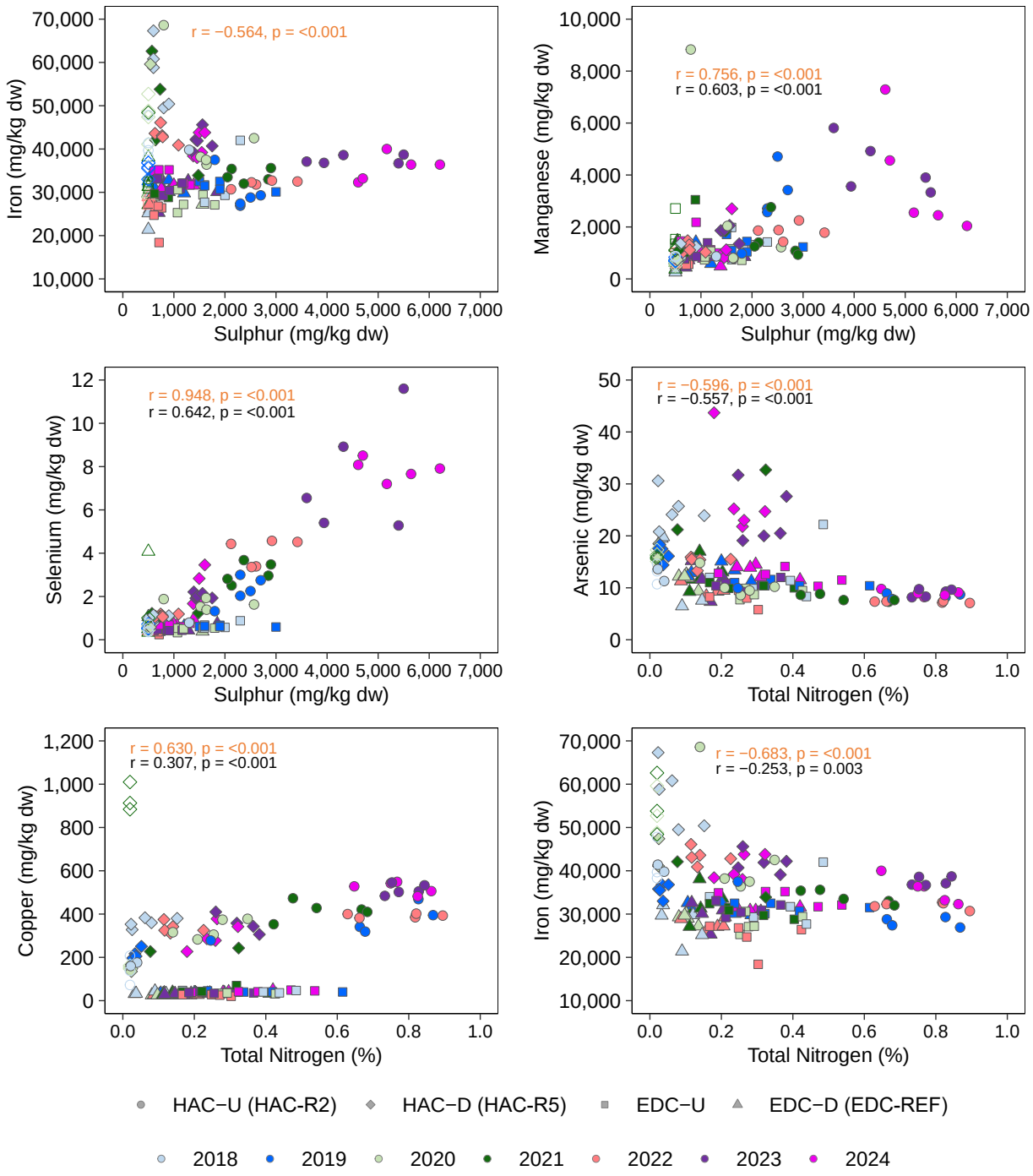


Figure F.1.1: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting. Results of correlations that evaluated data from exposed (HAC−U and HAC−D) and reference (EDC−U and EDC−D) creek sampling areas are shown in black font on each plot. Results of correlations that only evaluated data from the exposed Hazeltine Creek areas (HAC−U and HAC−D) are shown in orange font. An absence of either the orange or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = HAC−U, HAC−D, EDC−U, and EDC−D; orange font = HAC−U and HAC−D only). Open data points indicate at least one of the two variables plotted were <LRL.

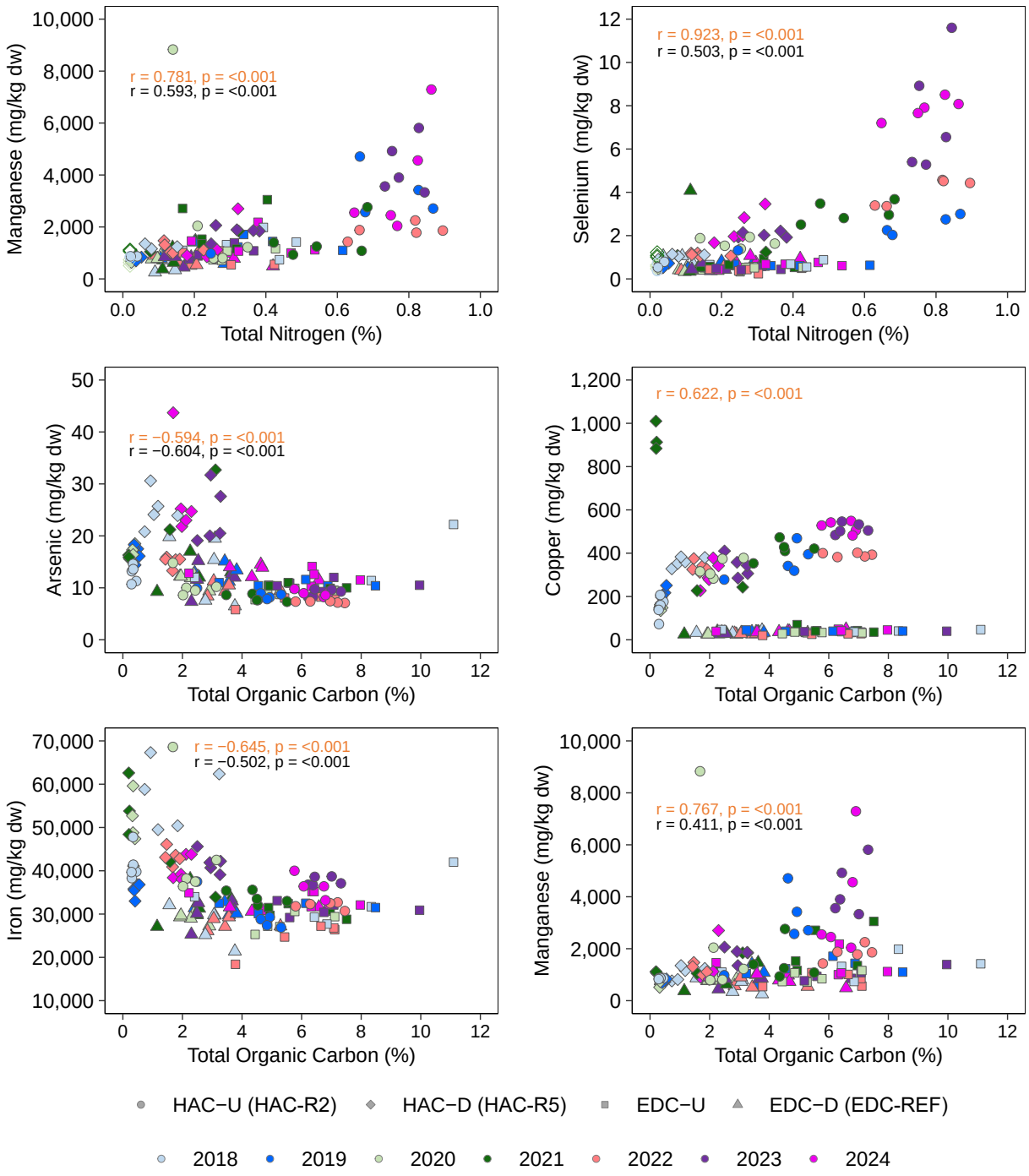
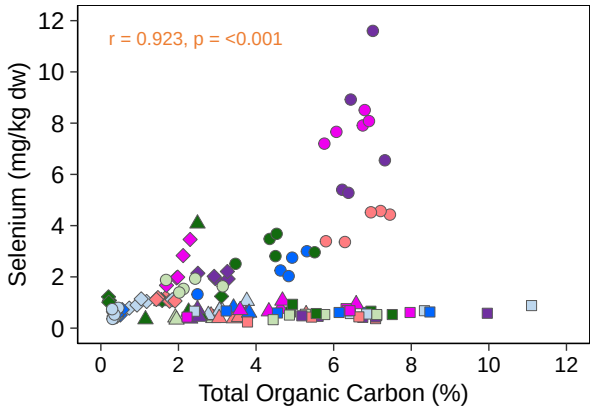


Figure F.1.1: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting. Results of correlations that evaluated data from exposed (HAC−U and HAC−D) and reference (EDC−U and EDC−D) creek sampling areas are shown in black font on each plot. Results of correlations that only evaluated data from the exposed Hazeltine Creek areas (HAC−U and HAC−D) are shown in orange font. An absence of either the orange or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = HAC−U, HAC−D, EDC−U, and EDC−D; orange font = HAC−U and HAC−D only). Open data points indicate at least one of the two variables plotted were <LRL.



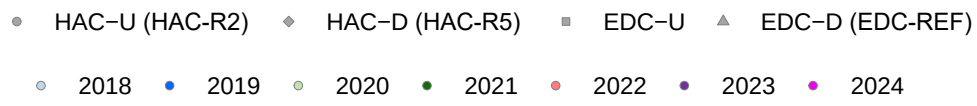


Figure F.1.1: Scatterplots of Significant Spearman's Correlation Relationships (p < 0.0125, Bonferroni Corrected) Between Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parameters for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight. HAC-R2, HAC-R5, and EDC-REF are the alternate names used for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting. Results of correlations that evaluated data from exposed (HAC−U and HAC−D) and reference (EDC−U and EDC−D) creek sampling areas are shown in black font on each plot. Results of correlations that only evaluated data from the exposed Hazeltine Creek areas (HAC−U and HAC−D) are shown in orange font. An absence of either the orange or black font on a plot indicates the displayed variables were not significantly correlated for the associated data grouping (black font = HAC−U, HAC−D, EDC−U, and EDC−D; orange font = HAC−U and HAC−D only). Open data points indicate at least one of the two variables plotted were <LRL.

Table F.1.1: **Statistical Comparisons of Spatial and Temporal Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024**

ANOVA Model						Area	Pairwise Differences Among Years for Each Area[a]							Do Concentrations Differ Over Time? MOD[b]						Do Concentrations Differ Between the Areas? HAC-U [HAC-R2] vs EDC-U[c]						
Parameter	Units	Transformation	Area	Year	Area x Year		2018	2019	2020	2021	2022	2023	2024	2019 vs 2018	2020 vs 2018	2021 vs 2018	2022 vs 2018	2023 vs 2018	2024 vs 2018	2018	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	EDC-U	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	-95.1	ns	-58.5	ns	ns	ns	ns
						HAC-U (HAC-R2)	C	AB	BC	AB	A	A	A	1,181	ns	1,190	1,845	1,826	1,763							
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	EDC-U	A	A	AB	A	B	A	A	ns	ns	ns	-36.0	ns	ns	244	765	921	838	1,384	1,272	1,111
						HAC-U (HAC-R2)	C	B	B	AB	AB	A	A	149	131	192	176	261	266							
Iron	mg/kg dw	log10	<0.001	<0.001	<0.001	EDC-U	A	A	AB	A	B	A	A	ns	ns	ns	-24.9	ns	ns	26.7	ns	55.4	ns	30.8	20.8	ns
						HAC-U (HAC-R2)	AB	D	A	BCD	CD	ABC	ABCD	-27.9	ns	ns	-22.5	ns	ns							
Manganese	mg/kg dw	log10	<0.001	0.001	<0.001	EDC-U	AB	AB	AB	A	B	AB	AB	ns	ns	ns	ns	ns	ns	ns	99.6	90.8	ns	135	328	157
						HAC-U (HAC-R2)	D	ABC	BCD	CD	BCD	A	AB	197	ns	ns	ns	389	289							
Selenium	mg/kg dw	log10	<0.001	<0.001	<0.001	EDC-U	A	A	AB	A	B	AB	A	ns	ns	ns	-41.9	ns	ns	ns	252	246	370	948	1,422	1,166
						HAC-U (HAC-R2)	E	CD	D	BC	B	A	A	309	211	472	651	1,247	1,371							

P-value < 0.05.

Indicates negative MOD.

Indicates positive MOD.

Notes: dw = dry weight. "-" indicates comparison not-relevant. "ns" indicates not significant. "MOD" = Magnitude of Difference. "ANOVA" = analysis of variance. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

[a] Years that do not share a letter are significantly different for that area.

[b] MOD is calculated as $((year_{recent} - year_{older})/year_{older})*100$.

[c] MOD calculated as ((HAC-U - EDC-U)/EDC-U)*100.

Table F.1.2: Statistical Comparisons of Exposed - Reference Relative Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

ANOVA Model						Exposed - Reference Relative Differences Among Years[a]							Relative MOD for Exposed - Reference Over Time (%)[b]					
Parameter	Units	Transformation	Area	Year	Area x Year	2018	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	C	AB	B	AB	A	A	A	639	292	730	1107	2745	884
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	E	D	BCD	CD	A	AB	ABC	151	196	172	331	298	252
Iron	mg/kg dw	log10	<0.001	<0.001	<0.001	BC	D	A	BCD	AB	BC	CD	-30	20	ns	ns	ns	ns
Manganese	mg/kg dw	log10	<0.001	0.001	<0.001	C	AB	B	C	AB	A	AB	189	176	ns	240	520	272
Selenium	mg/kg dw	log10	<0.001	<0.001	<0.001	C	B	B	B	A	A	A	333	326	479	1192	1776	1461

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Notes: dw = dry weight. "-" indicates comparison not-relevant. "ns" indicates not significant. "MOD" = Magnitude of Difference. "ANOVA" = analysis of variance. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

[a] Years that share a letter are not significantly different among years.

[b] MOD calculated as $((Observed_{HAC\text{-}U} - Predicted_{EDC\text{-}U})/Predicted_{EDC\text{-}U})*100$. $Predicted_{EDC\text{-}U} = Observed_{EDC\text{-}U} + (Observed_{HAC\text{-}U\ 2018} - Observed_{EDC\text{-}U\ 2018})$.

Table F.1.3: Spearman's Correlation Relationships Between Analyte of Interest Concentrations (<63 µm Fraction) and Sediment Physical and Chemical Parametersa for the Upper (HAC-U [HAC-R2]; Exposed) and Lower (HAC-D [HAC-R5]; Exposed) Hazeltine Creek and Upper (EDC-U; Reference) and Lower (EDC-D [EDC-REF]; Reference) Edney Creek Monitoring Areas, 2018 to 2024

Analyte of Interest	Correlation Parameter	Data Used in Correlation: HAC-U [HAC-R2], EDC-U, HAC-D [HAC-R5], EDC-D [EDC-REF][c]				Data Used in Correlation: HAC-U [HAC-R2], HAC-D [HAC-R5][d]			
		Clay (%)[b]	Total Sulphur (mg/kg dw)	Total Nitrogen (%)	Total Organic Carbon (%)	Clay (%)[b]	Total Sulphur (mg/kg dw)	Total Nitrogen (%)	Total Organic Carbon (%)
Arsenic (mg/kg dw)	Correlation Coefficient	0.00224	-0.400	-0.557	-0.604	-0.128	-0.611	-0.596	-0.594
	Sig. (2-tailed)	0.979	<0.001	<0.001	<0.001	0.292	<0.001	<0.001	<0.001
Copper (mg/kg dw)	Correlation Coefficient	0.419	0.506	0.307	-0.0598	0.00948	0.706	0.630	0.622
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.483	0.938	<0.001	<0.001	<0.001
Iron (mg/kg dw)	Correlation Coefficient	0.312	0.0361	-0.253	-0.502	-0.0297	-0.564	-0.683	-0.645
	Sig. (2-tailed)	<0.001	0.672	0.003	<0.001	0.807	<0.001	<0.001	<0.001
Manganese (mg/kg dw)	Correlation Coefficient	0.229	0.603	0.593	0.411	-0.0136	0.756	0.781	0.767
	Sig. (2-tailed)	0.007	<0.001	<0.001	<0.001	0.911	<0.001	<0.001	<0.001
Selenium (mg/kg dw)	Correlation Coefficient	0.225	0.642	0.503	0.151	-0.145	0.948	0.923	0.923
	Sig. (2-tailed)	0.008	<0.001	<0.001	0.074	0.232	<0.001	<0.001	<0.001

Significant correlation; p-value < 0. 0125 (p<0.05, Bonferroni corrected for 4 independent variables).

Notes: "mg/kg" = milligrams per kilogram; "dw" = dry weight; "ns" = correlation was non-significant for both datasets. Analyte of Interest was defined as an analyte at the exposed areas with a mean concentration that exceeded guidelines as well as reference 95th percentile values. HAC-R2, HAC-R5, and EDC-REF are the alternate names for the HAC-U, HAC-D, and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Results below the Laboratory Reporting Limit (LRL) were used at the LRL for calculations.

[b] % clay represents the clay proportion of the < 63 µm (silt and clay) sediment fraction that was used for metals analysis. % clay was calculated as: [% clay] / [% silt and clay].

[c] n = 140 for comparisons.

[d] n = 70 for comparisons.

Table F.1.4: Statistical Comparisons of Spatial and Temporal Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

ANOVA Model						Area	Pairwise Differences Among Years for Each Area[a]							Do Concentrations Differ Over Time? MOD[b]						Do Concentrations Differ Between Areas? HAC-D [HAC-R5] vs EDC-D [EDC-REF][c]						
Parameter	Units	Transformation	Area	Year	Area x Year		2018	2019	2020	2021	2022	2023	2024	2019 vs 2018	2020 vs 2018	2021 vs 2018	2022 vs 2018	2023 vs 2018	2024 vs 2018	2018	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	EDC-D (EDC-REF)	BC	BC	C	BC	AB	BC	A	ns	ns	ns	ns	ns	ns	-59.8	-85.9	-84.5	-56.0	-54.6	ns	-57.8
						HAC-D (HAC-R5)	BC	C	C	BC	ABC	A	AB	ns	ns	ns	ns	161	75.4							
Arsenic	mg/kg dw	log10	<0.001	0.002	0.146	EDC-D (EDC-REF)	A	AB	AB	AB	B	AB	A	ns	ns	ns	-30.9	ns	ns	67.9						
						HAC-D (HAC-R5)																				
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	EDC-D (EDC-REF)	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	966	489	471	1,580	1,088	1,022	657
						HAC-D (HAC-R5)	AB	CD	D	A	B	B	BC	-42.9	-58.7	ns	ns	ns	ns							
Iron	mg/kg dw	log10	<0.001	0.007	<0.001	EDC-D (EDC-REF)	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns	108	ns	70.6	48.4	56.2	38.4	30.5
						HAC-D (HAC-R5)	A	C	AB	AB	BC	BC	BC	-37.6	ns	ns	-24.1	-26.6	-28.8							
Selenium	mg/kg dw	log10	<0.001	<0.001	<0.001	EDC-D (EDC-REF)	A	AB	B	A	AB	AB	A	ns	-46.7	ns	ns	ns	ns	ns	ns	ns	ns	154	301	185
						HAC-D (HAC-R5)	CD	DE	E	BC	BC	AB	A	ns	-47.5	ns	ns	107	133							

P-value < 0.05.

Indicates negative MOD.

Indicates positive MOD.

Notes: mg/kg dw = milligram per kilogram dry weight. "-" indicates comparison not-relevant. ns = indicates not significant. MOD = Magnitude of Difference. ANOVA = analysis of variance. HAC-R5, and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Years that do not share a letter are significantly different for that area.

[b] MOD is calculated as $((year_{recent} - year_{older})/year_{older})*100$.

[c] MOD calculated as ((HAC-D - EDC-D)/EDC-D)*100.

Table F.1.5: Statistical Comparisons of Exposed - Reference Relative Differences of Sediment Analyte of Interest Concentrations (<63 µm Fraction) for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

ANOVA Model						Exposed - Reference Relative Differences Among Years[a]							Relative MOD for Exposed - Reference Over Time (%)[b]					
Parameter	Units	Transformation	Area	Year	Area x Year	2018	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Total Organic Carbon	%	none	<0.001	<0.001	<0.001	BC	C	BC	B	BC	A	C	ns	ns	ns	ns	140	ns
Arsenic	mg/kg dw	log10	<0.001	0.002	0.146	A	A	A	A	A	A	A	ns	ns	ns	ns	ns	ns
Copper	mg/kg dw	log10	<0.001	<0.001	<0.001	BC	D	D	A	AB	ABC	CD	-40	-50	58	ns	ns	ns
Iron	mg/kg dw	log10	<0.001	0.007	<0.001	A	D	B	BC	BC	CD	CD	-50	-20	-30	-20	-30	-40
Selenium	mg/kg dw	log10	<0.001	<0.001	<0.001	C	C	C	BC	AB	A	A	ns	ns	ns	102	218	127

P-value < 0.05.
Indicates negative MOD.
Indicates positive MOD.

Notes: mg/kg dw = milligram per kilogram dry weight. "-" indicates comparison not-relevant. ns = not significant; MOD = Magnitude of Difference. ANOVA = analysis of variance. HAC-R5, and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting.

[a] Years that share a letter are not significantly different among years.

[b] MOD calculated as $((Observed_{HAC\text{-}D} - Predicted_{EDC\text{-}D})/Predicted_{EDC\text{-}D})*100$. $Predicted_{EDC\text{-}D} = Observed_{EDC\text{-}D} + (Observed_{HAC\text{-}D\ 2018} - Observed_{EDC\text{-}D\ 2018})$.

APPENDIX F.2
PERIPHYTON COMMUNITY AND PRODUCTIVITY

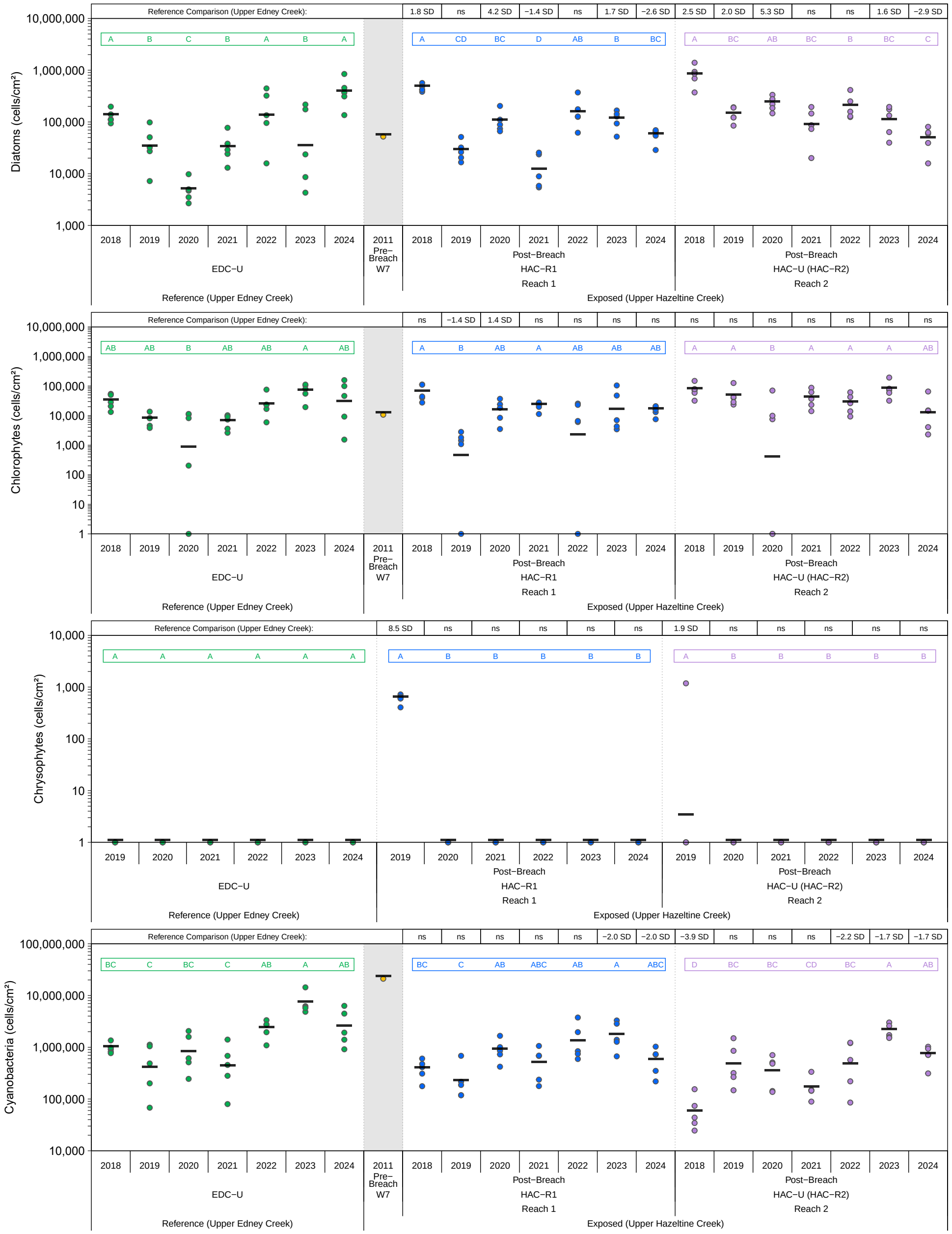


Figure F.2.1: Periphyton Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'ns' indicates a non −significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0. Grey shading indicates semi−quantitative data that were not included in statistical comparisons but are shown for visual comparison only. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this 'Other' category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details. Plots are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses.

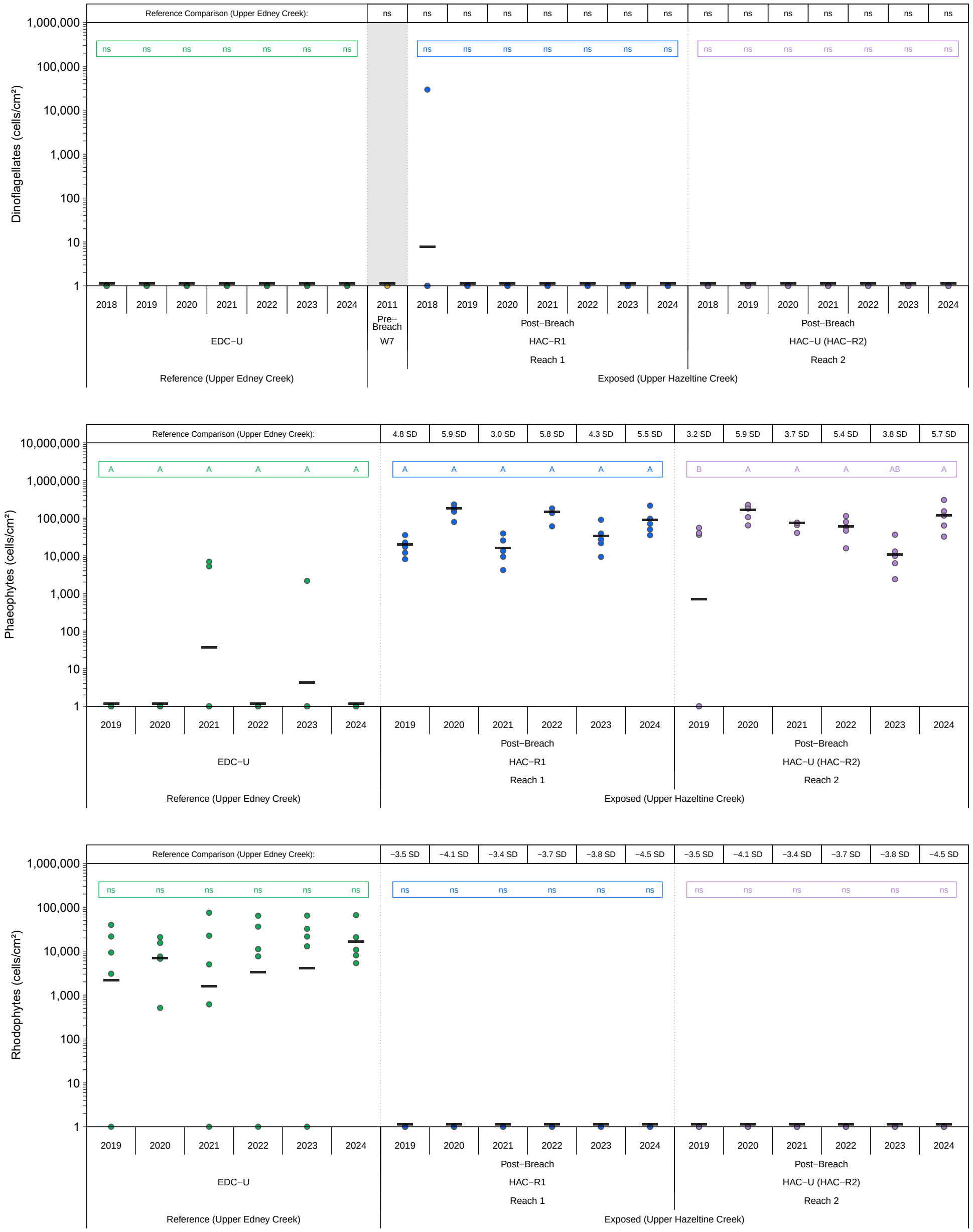


Figure F.2.1: Periphyton Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0. Grey shading indicates semi−quantitative data that were not included in statistical comparisons but are shown for visual comparison only. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this 'Other' category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details. Plots are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses.

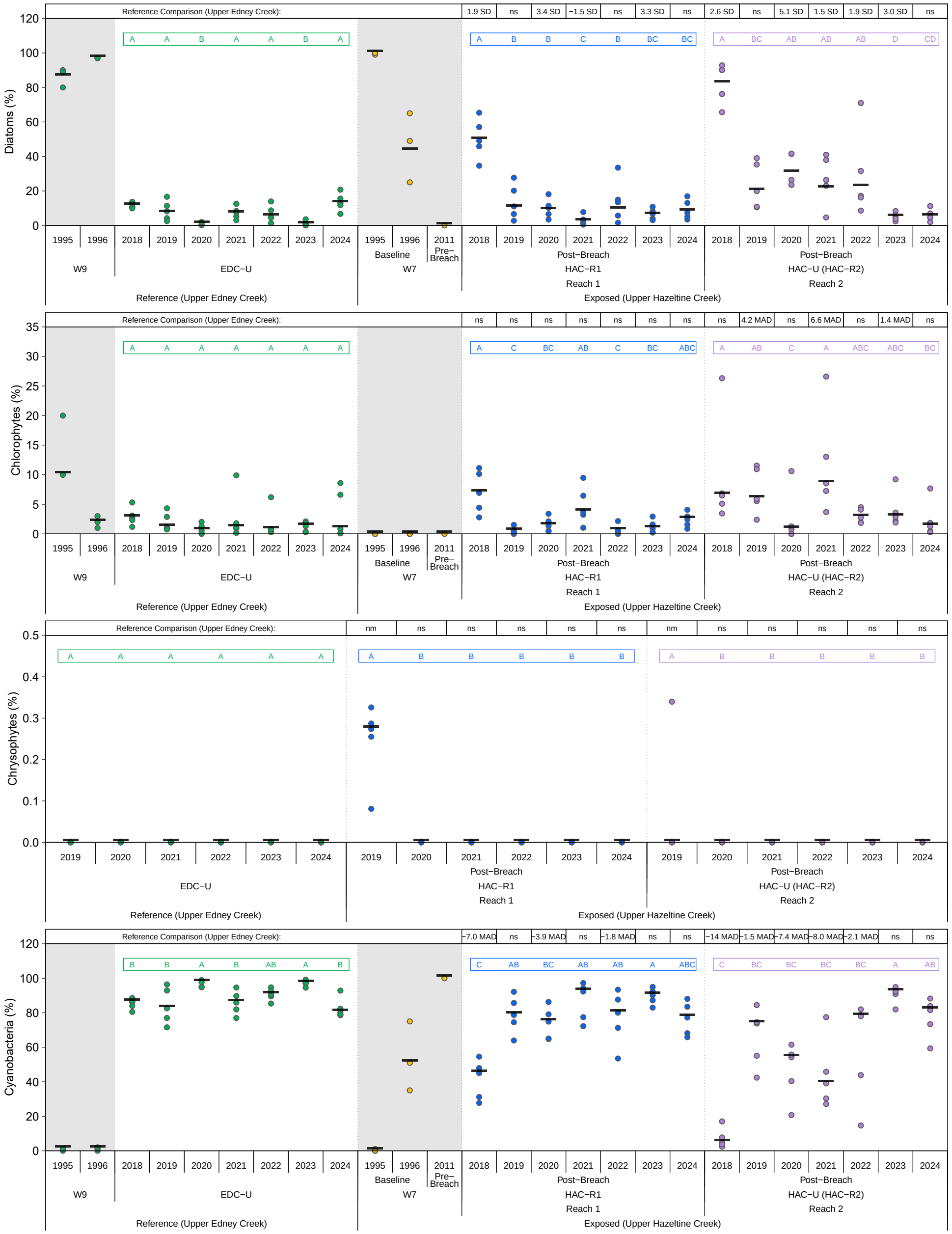


Figure F.2.1: Periphyton Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'ns' indicates a non −significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0. Grey shading indicates semi−quantitative data that were not included in statistical comparisons but are shown for visual comparison only. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this 'Other' category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details. Plots are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses.

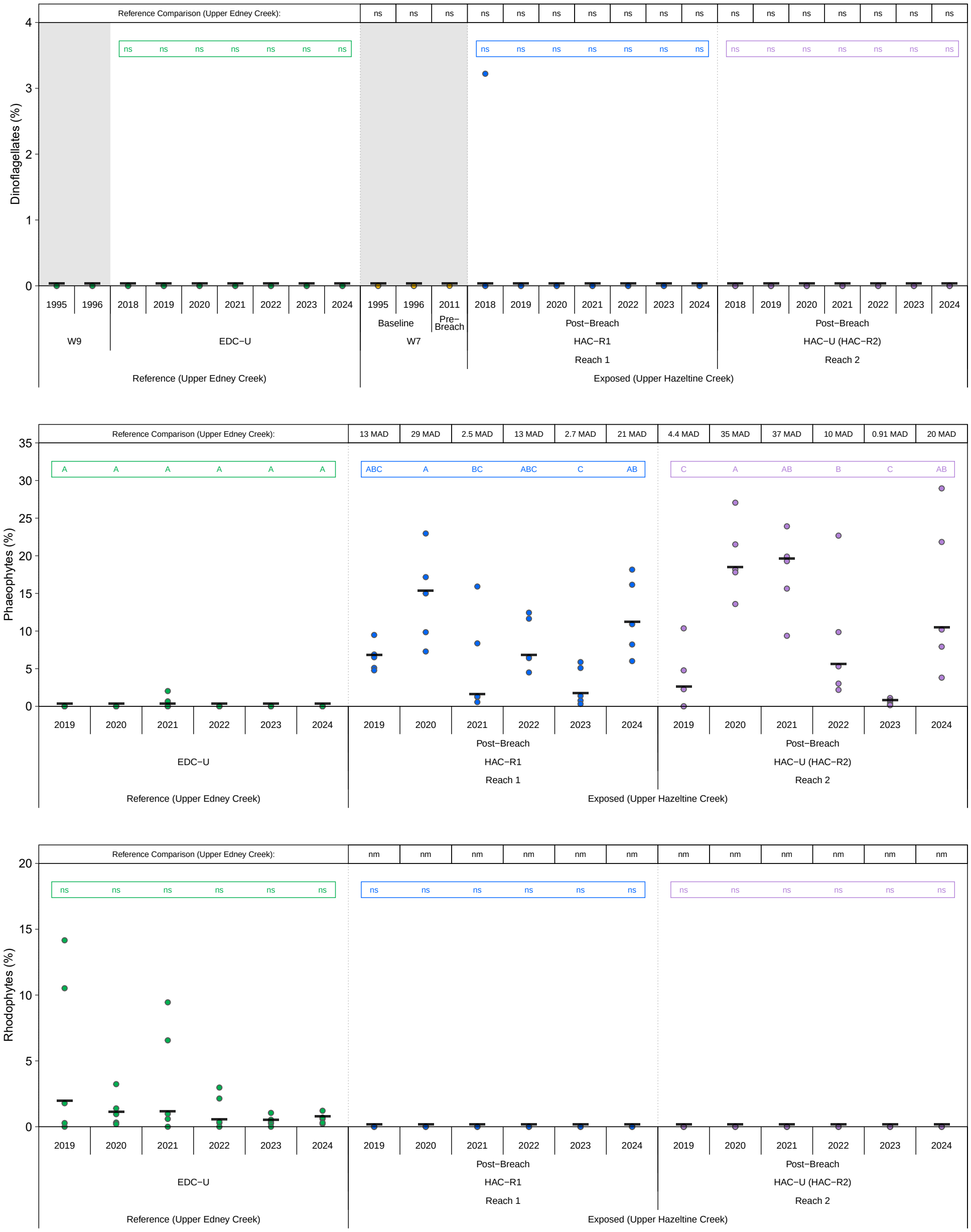


Figure F.2.1: Periphyton Community Metrics for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 1995 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) *post hoc* comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. A number above the plot indicates significant exposed vs. reference *post hoc* comparisons within a given year. The magnitude of difference (MOD) for these significant *post hoc* comparisons are expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'ns' indicates a non −significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0. Grey shading indicates semi−quantitative data that were not included in statistical comparisons but are shown for visual comparison only. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this 'Other' category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details. Plots are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses.

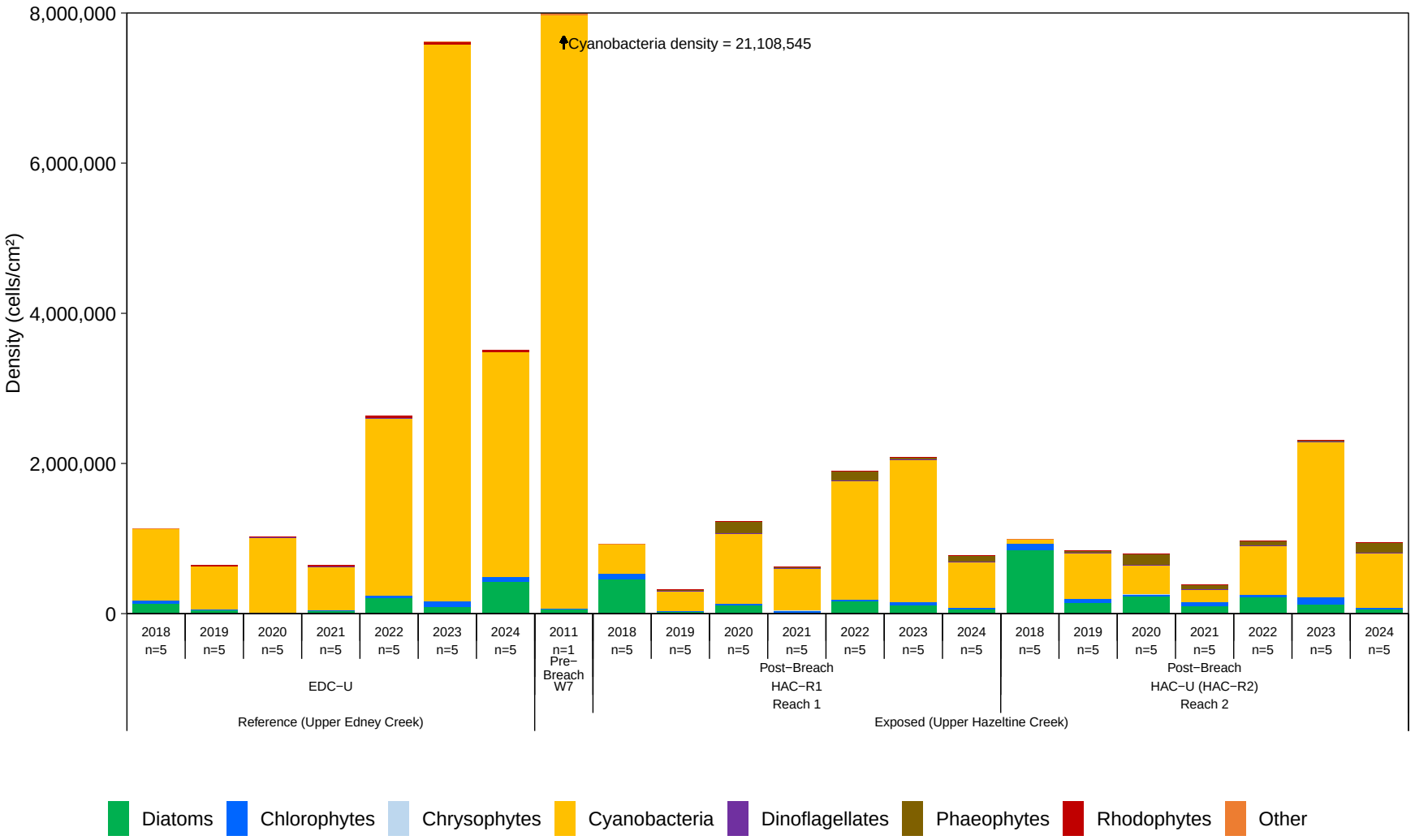


Figure F.2.2: Mean Densities of Major Periphyton Taxa for the Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2011 to 2024

Notes: The sampling area W7 is the baseline and pre−breach equivalent of the post−breach sampling areas HAC−R1 and HAC−U (2018 to 2024). HAC−R2 is the alternate name used for the HAC−U sampling area for Habitat Remediation Working Group (HRWG) reporting. In 2018 and earlier, Chrysophytes, Phaeophytes, and Rhodophytes are grouped into the 'Other' category. Periphyton data were classified as 'Other' taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic idenification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. See Minnow 2019a for detailed laboratory results for 2018. Periphyton taxonomy results have not been reported in an 'Other' category by the laboratory since 2018. See report Section 4.2.3.1 for details.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas														Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Diatoms (cells/cm²)	log10	-	-	<0.001	Reference	EDC-U	2018	126,176	A	B	C	B	A	B	A	Baseline	-1.9	-4.6	-2.0	ns	-1.9	ns	1.8	2.5
							2019	31,531															ns	2.0
							2020	4,644															4.2	5.3
							2021	30,567															-1.4	ns
							2022	123,963															ns	ns
							2023	31,944															1.7	1.6
							2024	359,480															-2.6	-2.9
					Exposed	HAC-R1	2018	450,027	A	CD	BC	D	AB	B	BC	Baseline	-3.9	-2.1	-5.1	ns	-2.0	-2.9		ns
							2019	27,089																2.2
							2020	99,548																ns
							2021	11,119																2.7
							2022	145,276																ns
							2023	107,913																ns
							2024	54,057																ns
						HAC-U (HAC-R2)[c]	2018	778,654	A	BC	AB	BC	B	BC	C	Baseline	-2.4	ns	-3.1	-1.9	-2.8	-3.9		
							2019	135,723																
							2020	223,317																
							2021	81,504																
							2022	192,176																
							2023	102,847																
							2024	45,053																
Chlorophytes (cells/cm²)	log10(x+1)	-	-	0.009	Reference	EDC-U	2018	29,250	AB	AB	B	AB	AB	A	AB	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2019	6,913															-1.4	ns
							2020	731															1.4	ns
							2021	5,798															ns	ns
							2022	20,992															ns	ns
							2023	63,131															ns	ns
							2024	25,299															ns	ns
					Exposed	HAC-R1	2018	57,246	A	B	AB	A	AB	AB	AB	Baseline	-2.4	ns	ns	ns	ns	ns		ns
							2019	379																2.3
							2020	13,681																-1.8
							2021	20,221																ns
							2022	1,879																ns
							2023	13,889																ns
							2024	14,575																ns
						HAC-U (HAC-R2)[c]	2018	68,990	A	A	B	A	A	A	AB	Baseline	ns	-2.6	ns	ns	ns	ns		
							2019	42,943																
							2020	349																
							2021	36,554																
							2022	24,563																
							2023	73,499																
							2024	10,605																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas														Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Chrysophytes (cells/cm²)	log10(x+1)	-	-	<0.001	Reference	EDC-U	2018	-	-	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	-	
							2019	0															8.5	1.9
							2020	0															ns	ns
							2021	0															ns	ns
							2022	0															ns	ns
							2023	0															ns	ns
							2024	0															ns	ns
					Exposed	HAC-R1	2018	-	-	A	B	B	B	B	B	-	Baseline	-8.5	-8.5	-8.5	-8.5	-8.5		-
							2019	586																-6.6
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	-	-	A	B	B	B	B	B	-	Baseline	-1.9	-1.9	-1.9	-1.9	-1.9		
							2019	3.12																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																
Cyanobacteria (cells/cm²)	log10	-	-	<0.001	Reference	EDC-U	2018	948,559	BC	C	BC	C	AB	A	AB	Baseline	ns	ns	ns	ns	2.7	ns	ns	-3.9
							2019	378,869															ns	ns
							2020	758,872															ns	ns
							2021	396,551															ns	ns
							2022	2,217,139															ns	-2.2
							2023	6,822,952															-2.0	-1.7
							2024	2,334,263															-2.0	-1.7
					Exposed	HAC-R1	2018	364,886	BC	C	AB	ABC	AB	A	ABC	Baseline	ns	ns	ns	ns	2.0	ns		-2.6
							2019	207,639																ns
							2020	849,061																ns
							2021	461,427																-1.5
							2022	1,223,298																-1.4
							2023	1,620,128																ns
							2024	529,531																ns
						HAC-U (HAC-R2)[c]	2018	53,085	D	BC	BC	CD	BC	A	AB	Baseline	2.9	2.5	ns	2.9	5.0	3.5		
							2019	437,074																
							2020	320,667																
							2021	156,406																
							2022	436,124																
							2023	1,998,837																
							2024	685,999																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Dinoflagellates (cells/cm²)	log10(x+1)	0.371	0.430	0.456	Reference	EDC-U	2018	0	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2019	0															ns	ns
							2020	0															ns	ns
							2021	0															ns	ns
							2022	0															ns	ns
							2023	0															ns	ns
							2024	0															ns	ns
					Exposed	HAC-R1	2018	6.83	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns		ns
							2019	0																ns
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	0	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns		
							2019	0																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																
Phaeophytes (cells/cm²)	log10(x+1)	-	-	0.007	Reference	EDC-U	2018	-	-	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	-	-
							2019	0															4.8	3.2
							2020	0															5.9	5.9
							2021	31.5															3.0	3.7
							2022	0															5.8	5.4
							2023	3.64															4.3	3.8
							2024	0															5.5	5.7
					Exposed	HAC-R1	2018	-	-	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns		-
							2019	16,835																-1.6
							2020	154,113																ns
							2021	13,960																ns
							2022	124,398																ns
							2023	28,644																ns
							2024	76,251																ns
						HAC-U (HAC-R2)[c]	2018	-	-	B	A	A	A	AB	A	-	Baseline	2.7	2.3	2.2	ns	2.5		
							2019	603																
							2020	141,111																
							2021	64,349																
							2022	52,018																
							2023	9,341																
							2024	102,356																

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Rhodophytes (cells/cm²)	log10(x+1)	<0.001	0.921	0.988	Reference	EDC-U	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns	-	
							2019	1,893															-3.5	-3.5
							2020	6,077															-4.1	-4.1
							2021	1,390															-3.4	-3.4
							2022	2,878															-3.7	-3.7
							2023	3,566															-3.8	-3.8
							2024	14,472															-4.5	-4.5
					Exposed	HAC-R1	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns		-
							2019	0																ns
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns		
							2019	0																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																
Diatoms (%)	log10	-	-	<0.001	Reference	EDC-U	2018	11.3	A	A	B	A	A	B	A	Baseline	ns	-3.8	ns	ns	-4.1	ns	1.9	2.6
							2019	6.96															ns	ns
							2020	0.594															3.4	5.1
							2021	6.60															-1.5	1.5
							2022	5.06															ns	1.9
							2022	0.455															3.3	3.0
							2024	12.7															ns	ns
					Exposed	HAC-R1	2018	49.3	A	B	B	C	B	BC	BC	Baseline	-2.0	-2.2	-4.1	-2.2	-2.7	-2.4		ns
							2019	10.2																ns
							2020	8.62																1.6
							2021	2.07																3.0
							2022	9.00																ns
							2023	5.96																ns
							2024	7.77																ns
						HAC-U (HAC-R2)[c]	2018	82.3	A	BC	AB	AB	AB	D	CD	Baseline	-1.8	ns	ns	ns	-3.7	-3.6		
							2019	19.9																
							2020	30.3																
							2021	21.3																
							2022	22.2																
							2023	4.65																
							2024	5.03																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas														Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Chlorophytes (%)	rank	-	-	0.016	Reference	EDC-U	2018	2.71	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2019	1.13															ns	4.2
							2020	0.547															ns	ns
							2021	1.05															ns	6.6
							2022	0.739															ns	ns
							2023	1.31															ns	1.4
							2024	0.851															ns	ns
					Exposed	HAC-R1	2018	6.93	A	C	BC	AB	C	BC	ABC	Baseline	-5.7	-4.9	ns	-5.6	-5.3	ns		ns
							2019	0.456																4.8
							2020	1.36																ns
							2021	3.72																ns
							2022	0.574																1.9
							2023	0.914																1.7
							2024	2.46																ns
						HAC-U (HAC-R2)[c]	2018	6.49	A	AB	C	A	ABC	ABC	BC	Baseline	ns	-5.0	ns	ns	ns	-4.6		
							2019	5.92																
							2020	0.802																
							2021	8.55																
							2022	2.76																
							2023	2.88																
							2024	1.26																
Chrysophytes (%)	rank	-	-	<0.001	Reference	EDC-U	2018	-	-	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	-	
							2019	0															nm	nm
							2020	0															ns	ns
							2021	0															ns	ns
							2022	0															ns	ns
							2023	0															ns	ns
							2024	0															ns	ns
					Exposed	HAC-R1	2018	-	-	A	B	B	B	B	B	-	Baseline	nm	nm	nm	nm	nm		-
							2019	0.273																nm
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	-	-	A	B	B	B	B	B	-	Baseline	nm	nm	nm	nm	nm		
							2019	0																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas													Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Cyanobacteria (%)	rank	-	-	<0.001	Reference	EDC-U	2018	86.2	B	B	A	B	AB	A	B	Baseline	ns	2.0	ns	ns	1.8	ns	-7.0	-14
							2019	82.6															ns	-1.5
							2020	97.7															-3.9	-7.4
							2021	85.9															ns	-8.0
							2022	90.5															-1.8	-2.1
							2023	97.1															ns	ns
							2024	80.2															ns	ns
					Exposed	HAC-R1	2018	45.0	C	AB	BC	AB	AB	A	ABC	Baseline	5.7	ns	8.0	5.9	7.7	ns		ns
							2019	78.8																ns
							2020	74.9																-3.5
							2021	92.3																-9.0
							2022	80.0																ns
							2023	90.2																ns
							2024	77.2																ns
						HAC-U (HAC-R2)[c]	2018	4.76	C	BC	BC	BC	BC	A	AB	Baseline	ns	ns	ns	ns	15	13		
							2019	73.8																
							2020	54.2																
							2021	39.1																
							2022	78.0																
							2023	92.2																
							2024	81.5																
Dinoflagellates (%)	rank	0.371	0.430	0.456	Reference	EDC-U	2018	0	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns	ns	ns
							2019	0															ns	ns
							2020	0															ns	ns
							2021	0															ns	ns
							2022	0															ns	ns
							2023	0															ns	ns
							2024	0															ns	ns
					Exposed	HAC-R1	2018	0	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns		ns
							2019	0																ns
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	0	ns	ns	ns	ns	ns	ns	ns	Baseline	ns	ns	ns	ns	ns	ns		
							2019	0																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.1: Statistical Comparisons of Periphyton Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Endpoint	Transformation	2-Way ANOVA p-values			Type	Area	Year	MCT[a]	Temporal Contrasts Within Areas														Spatial Comparison Within Years	
									Pairwise Comparisons Between Years							MOD Relative to Baseline[b]								
		Area	Year	Area x Year					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)
Phaeophytes (%)	rank	-	-	<0.001	Reference	EDC-U	2018	-	-	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	-	
							2019	0															13	4.4
							2020	0															29	35
							2021	0															2.5	37
							2022	0															13	10
							2023	0															2.7	0.91
							2024	0															21	20
					Exposed	HAC-R1	2018	-	-	ABC	A	BC	ABC	C	AB	-	Baseline	ns	ns	ns	ns	ns		-
							2019	6.52																-8.2
							2020	15.0																ns
							2021	1.31																35
							2022	6.51																ns
							2023	1.39																ns
							2024	10.9																ns
						HAC-U (HAC-R2)[c]	2018	-	-	C	A	AB	B	C	AB	-	Baseline	31	33	5.9	ns	15		
							2019	2.27																
							2020	18.2																
							2021	19.3																
							2022	5.31																
							2023	0.473																
							2024	10.2																
Rhodophytes (%)	rank	<0.001	0.931	0.991	Reference	EDC-U	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns	-	
							2019	1.79															nm	nm
							2020	0.958															nm	nm
							2021	0.985															nm	nm
							2022	0.369															nm	nm
							2023	0.343															nm	nm
							2024	0.605															nm	nm
					Exposed	HAC-R1	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns		-
							2019	0																ns
							2020	0																ns
							2021	0																ns
							2022	0																ns
							2023	0																ns
							2024	0																ns
						HAC-U (HAC-R2)[c]	2018	-	-	ns	ns	ns	ns	ns	ns	-	Baseline	ns	ns	ns	ns	ns		
							2019	0																
							2020	0																
							2021	0																
							2022	0																
							2023	0																
							2024	0																

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the MAD=0 (MAD = Median Absolute Deviation). HAC-R2 is the alternate name used for the HAC-R2 sampling area for HRWG reporting. Results are only displayed for periphyton community endpoints with sufficient data available to complete statistical analyses. Periphyton data were classified as "Other" taxa in laboratory results issued in 2018 but the taxonomic groups contained in this category were unknown (i.e., unknown taxonomic identification of these organisms), but suspected to include Phaeophytes, Chrysophytes, and Rhodophytes. Temporal statistical contrasts therefore excluded 2018 data for these taxon groups (Phaeophytes, Chrysophytes, and Rhodophytes) which were reported as absent from all samples in 2018 data. See Minnow 2019a for detailed laboratory results for 2018. Data reported in 2018 for this "Other" category has therefore excluded from data presentation and analyses in the present report. Periphyton taxonomy results have not been reported in an "Other" category by the laboratory since 2018. See report Section 4.2.3.1 for details.

[a] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[b] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[c] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.2: Statistical Comparisons of Periphyton Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas – Pairwise Comparisons Between Years										Temporal Contrasts Within Areas – MOD Relative to Baseline[c,b]										Spatial Comparison Within Years[c,e]		
		Area	Year	Area x Year					1995 [d]	1996 [d]	2011 [d]	2017	2018	2019	2020	2021	2022	2023	2024	1995	1996	2011	2017	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Chlorophyll-a (mg/m²)	rank	-	-	<0.001	Reference	FPC-R3	2017	6.10	-	-	-	C	BC	AB	ABC	A	AB	AB	AB	-	-	-	Baseline	ns	4.1	ns	6.4	7.8	3.9	4.5	ns	nc	nc
							2018	17.1																							ns	ns	nc
							2019	27.4																							ns	ns	nc
							2020	20.1																							5.7	ns	-3.5
							2021	39.8																							ns	ns	-6.7
							2022	46.8																							ns	ns	-8.5
							2023	26.4																							ns	ns	-4.2
							2024	29.6																							ns	ns	-2.6
						EDC-U	1995	9.43	BC	ABC	nc	nc	BC	AB	BC	C	A	BC	BC	Baseline	ns	nc	nc	ns	ns	ns	ns	4.8	ns	ns	nc	ns	nc
							1996	15.6																							nc	ns	nc
							2018	12.1																							ns	ns	nc
							2019	19.1																							6.6	ns	nc
							2020	6.80																							8.3	ns	ns
							2021	6.20																							4.4	3.6	ns
							2022	34.3																							ns	ns	-6.1
							2023	18.1																							3.9	ns	ns
							2024	12.2																							5.9	ns	ns
					Exposed	HAC-R1	1995	10.6	D	BCD	ABCD	D	CD	AB	AB	ABC	A	ABC	AB	Baseline	ns	ns	ns	ns	8.2	7.6	3.6	12	5.3	6.3		nc	nc
							1996	17.7																								nc	nc
							2011	14.6																								nc	nc
							2018	12.7																								ns	nc
							2019	53.5																								ns	nc
							2020	50.0																								-7.2	-9.2
							2021	29.1																								ns	-4.7
							2022	71.5																								-8.3	-13
							2023	38.5																								ns	-6.5
							2024	43.3																								-5.5	-5.2
						HAC-U (HAC-R2)[f]	1995	10.6	C	ABC	ABC	nc	BC	A	BC	AB	AB	AB	ABC	Baseline	ns	ns	nc	ns	4.1	ns	2.7	3.4	2.5	ns			nc
							1996	17.7																										nc
							2011	14.6																										nc
							2018	10.9																										nc
							2019	31.9																										nc
							2020	12.4																										-2.1
							2021	24.8																										-3.9
							2022	28.1																										-4.9
							2023	23.7																										-3.7
							2024	14.3																										ns
						HAC-R3	2020	1.74	AB	A	AB	nc	nc	nc	B	B	B	AB	A	Baseline	ns	ns	nc	nc	nc	ns	ns	ns	ns	ns			
							2021	4.54																										
							2022	2.43																										
							2023	4.51																										
							2024	16.1																										

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. mg/m² = milligrams per metre squared. g/m² = grams per metre. "nc" = no comparison. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) =0.

[a] 1995, 1996 and 2011 data from W7 which is the pre-breach equivalent of the post-breach sampling areas HAC-R1 and HAC-U (HAC-R2) in 2017 to 2024.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2017 to 2024) data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 against baseline (1995 and 1996) and pre-breach (2011) data from W7 are indicated with an * for contrasts to 1995 data , † for contrasts to 1996 data, and ‡ for contrasts to 2011 data in Figure 6.5.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 1995, 1996, and 2011 were not calculated because W7 data from these years represents baseline or pre-breach conditions for HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

Table F.2.2: Statistical Comparisons of Periphyton Productivity Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 1995 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas – Pairwise Comparisons Between Years										Temporal Contrasts Within Areas – MOD Relative to Baseline[c,b]										Spatial Comparison Within Years[c,e]		
		Area	Year	Area x Year					1995 [d]	1996 [d]	2011 [d]	2017	2018	2019	2020	2021	2022	2023	2024	1995	1996	2011	2017	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Ash Free Dry Mass (g/m²)	rank	-	-	<0.001	Reference	FPC-R3	2017	5.55	-	-	-	B	B	AB	A	AB	AB	AB	AB	-	-	-	Baseline	ns	ns	2.8	ns	ns	ns	ns	ns	nc	nc
							2018	4.50																							ns	ns	nc
							2019	11.2																							12	4.8	nc
							2020	16.2																							30	12	-3.5
							2021	7.35																							1.9	8.8	-1.5
							2022	6.60																							21	6.9	-1.2
							2023	6.85																							ns	2.6	ns
							2024	11.0																							16	13	13
						EDC-U	2018	6.05	-	-	-	-	B	AB	AB	B	AB	AB	A	-	-	-	-	Baseline	ns	ns	ns	ns	ns	2.6	ns	ns	nc
							2019	6.55																							13	6.0	nc
							2020	8.60																							ns	14	-1.5
							2021	4.00																							2.8	9.7	ns
							2022	12.2																							ns	5.5	-2.7
							2023	7.65																							ns	2.4	ns
							2024	16.1																							14	12	12
					Exposed	HAC-R1	2017	6.25	-	-	-	D	CD	AB	A	BC	A	C	A	-	-	-	Baseline	ns	13	32	2.2	21	2.7	17		nc	nc
							2018	10.4																									ns	nc
							2019	57.0																									ns	nc
							2020	128																									ns	-33
							2021	14.4																									ns	-3.3
							2022	85.5																									ns	-22
							2023	16.4																									ns	ns
							2024	71.0																									ns	ns
						HAC-U (HAC-R2)[f]	2018	9.15	-	-	-	-	B	A	A	A	A	AB	A	-	-	-	-	Baseline	5.3	14	8.3	6.3	ns	14			nc
							2019	29.2																										nc
							2020	62.0																										-16
							2021	40.5																										-10
							2022	32.8																										-8.2
							2023	16.6																										-2.5
							2024	61.5																										ns
						HAC-R3	2020	3.10	-	-	-	-	-	-	C	C	C	B	A	-	-	-	-	-	-	Baseline	ns	ns	1.1	15			
							2021	1.75																										
							2022	1.90																										
							2023	7.30																										
							2024	61.0																										

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. mg/m² = milligrams per metre squared. g/m² = grams per metre. "nc" = no comparison. "ns" = non significance. "nm" = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) =0.

[a] 1995, 1996 and 2011 data from W7 which is the pre-breach equivalent of the post-breach sampling areas HAC-R1 and HAC-U (HAC-R2) in 2017 to 2024.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2017 to 2024) data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 against baseline (1995 and 1996) and pre-breach (2011) data from W7 are indicated with an * for contrasts to 1995 data , † for contrasts to 1996 data, and ‡ for contrasts to 2011 data in Figure 6.5.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 1995, 1996, and 2011 were not calculated because W7 data from these years represents baseline or pre-breach conditions for HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

APPENDIX F.3
BENTHIC INVERTEBRATE COMMUNITY AND PRODUCTIVITY

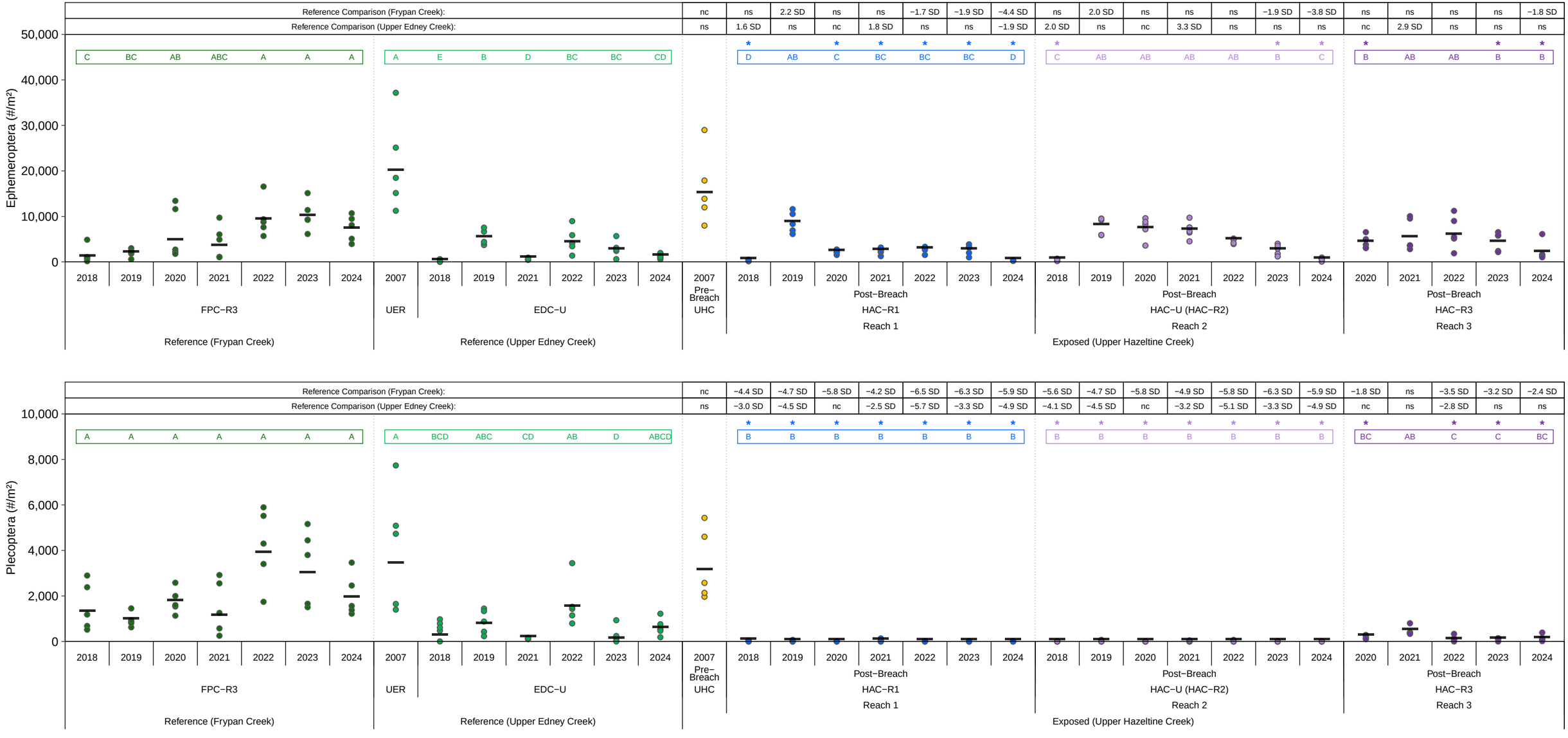


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

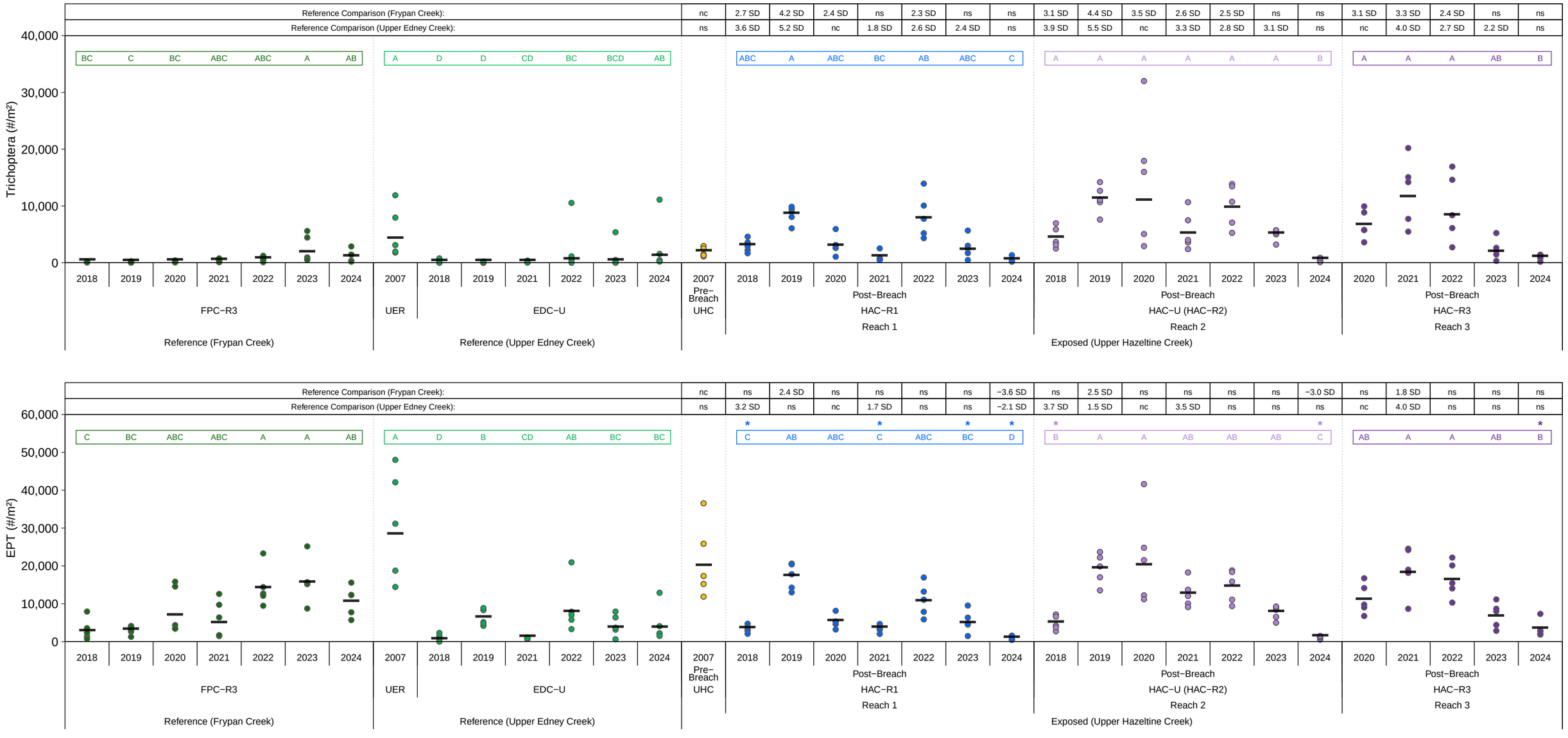


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

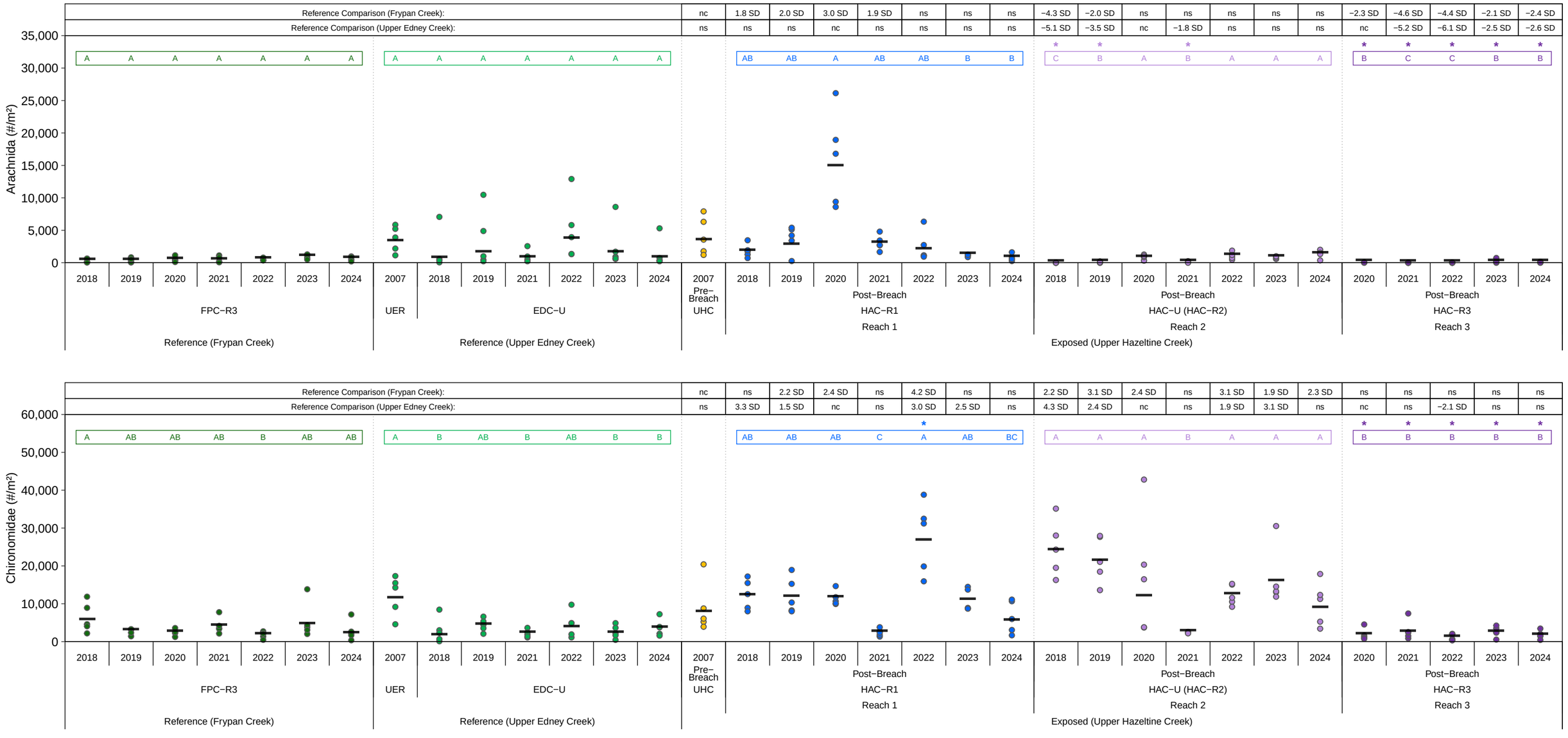


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

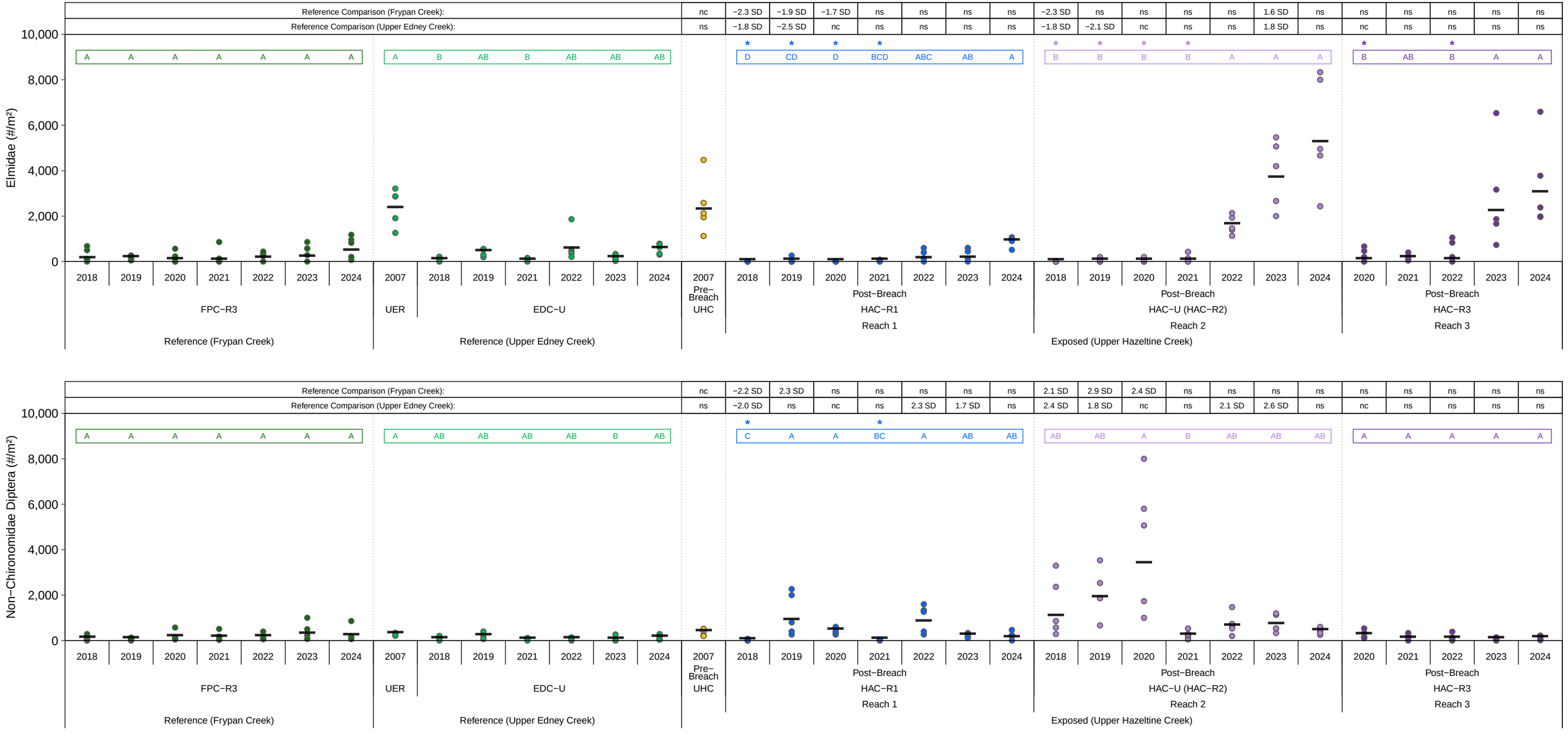


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

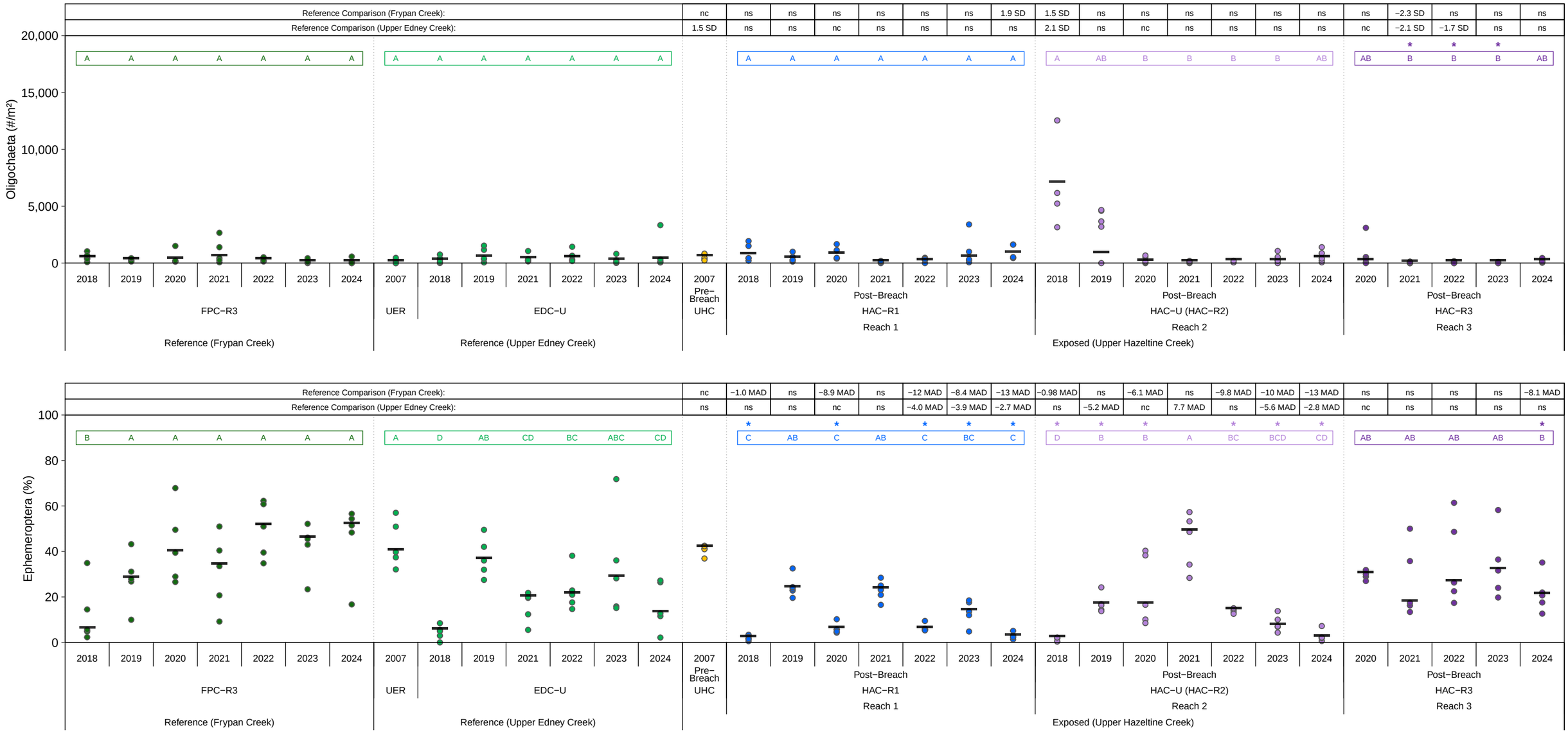


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

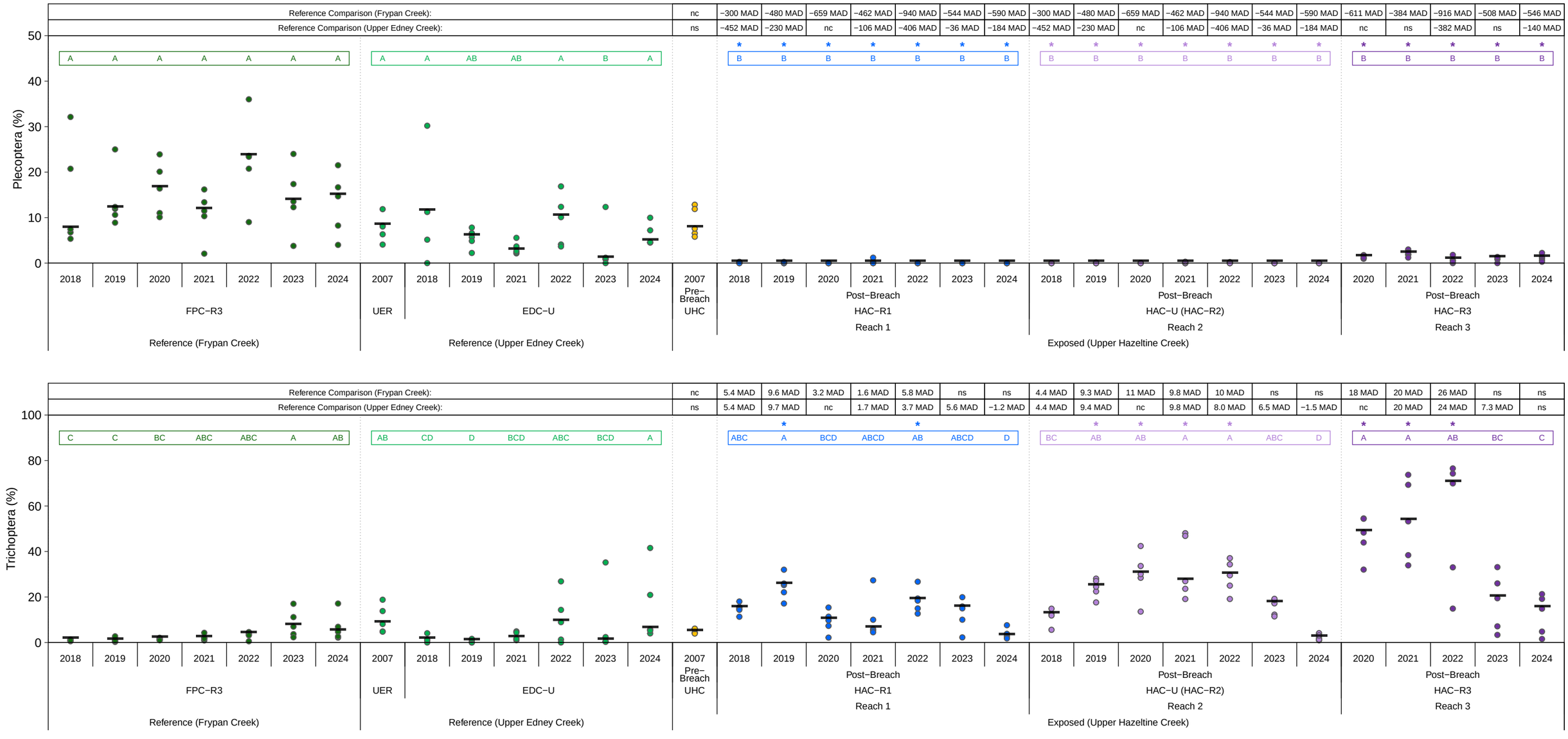


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

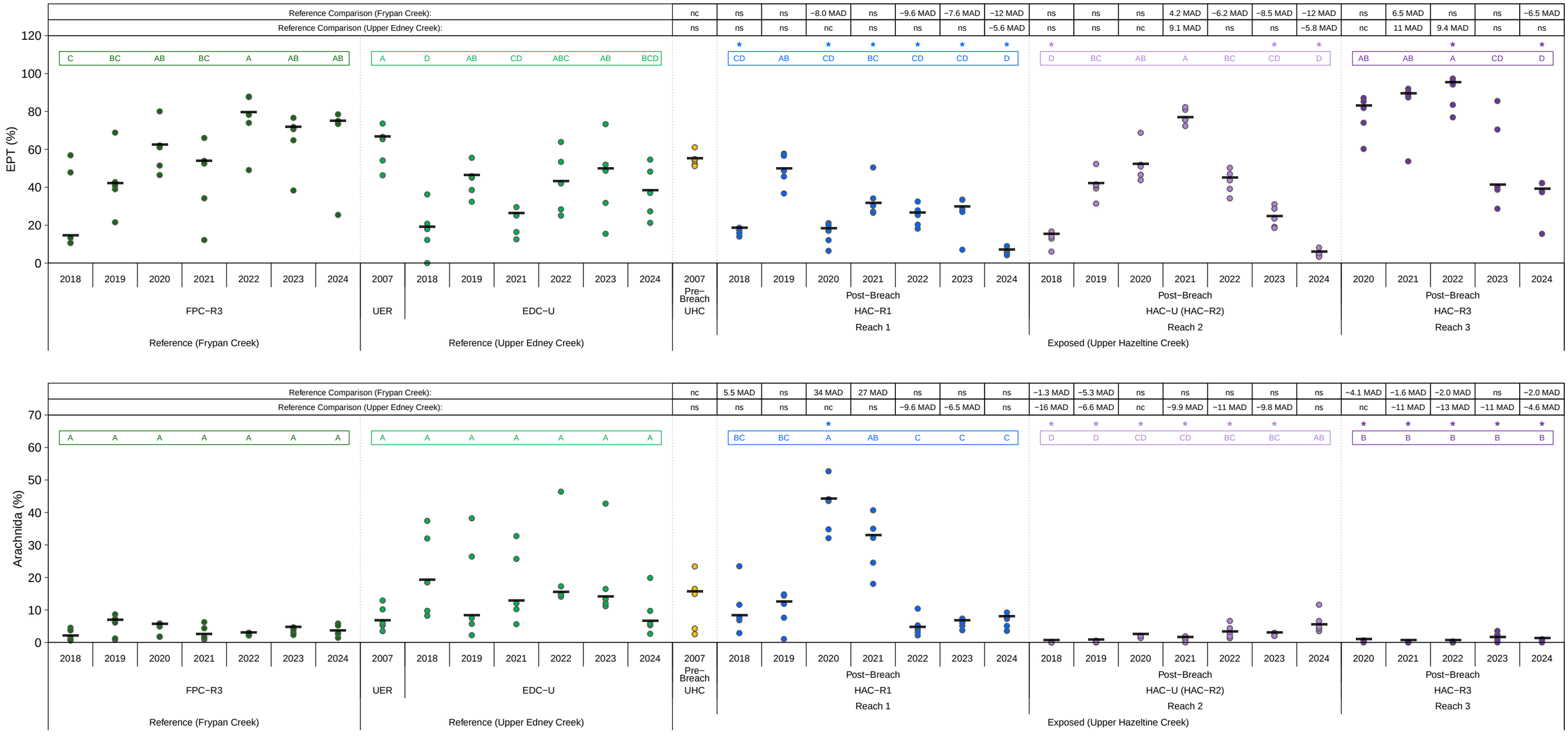


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

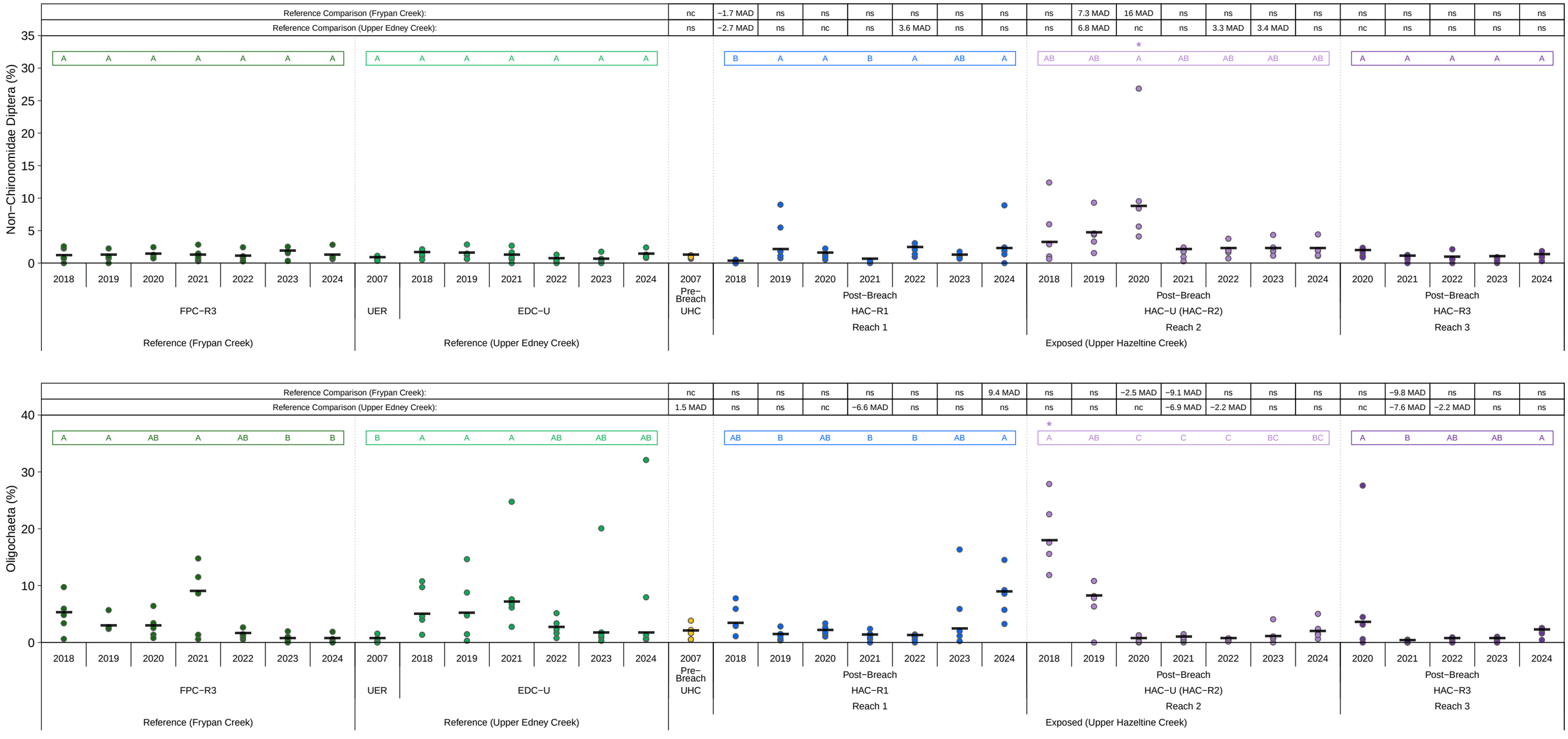


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

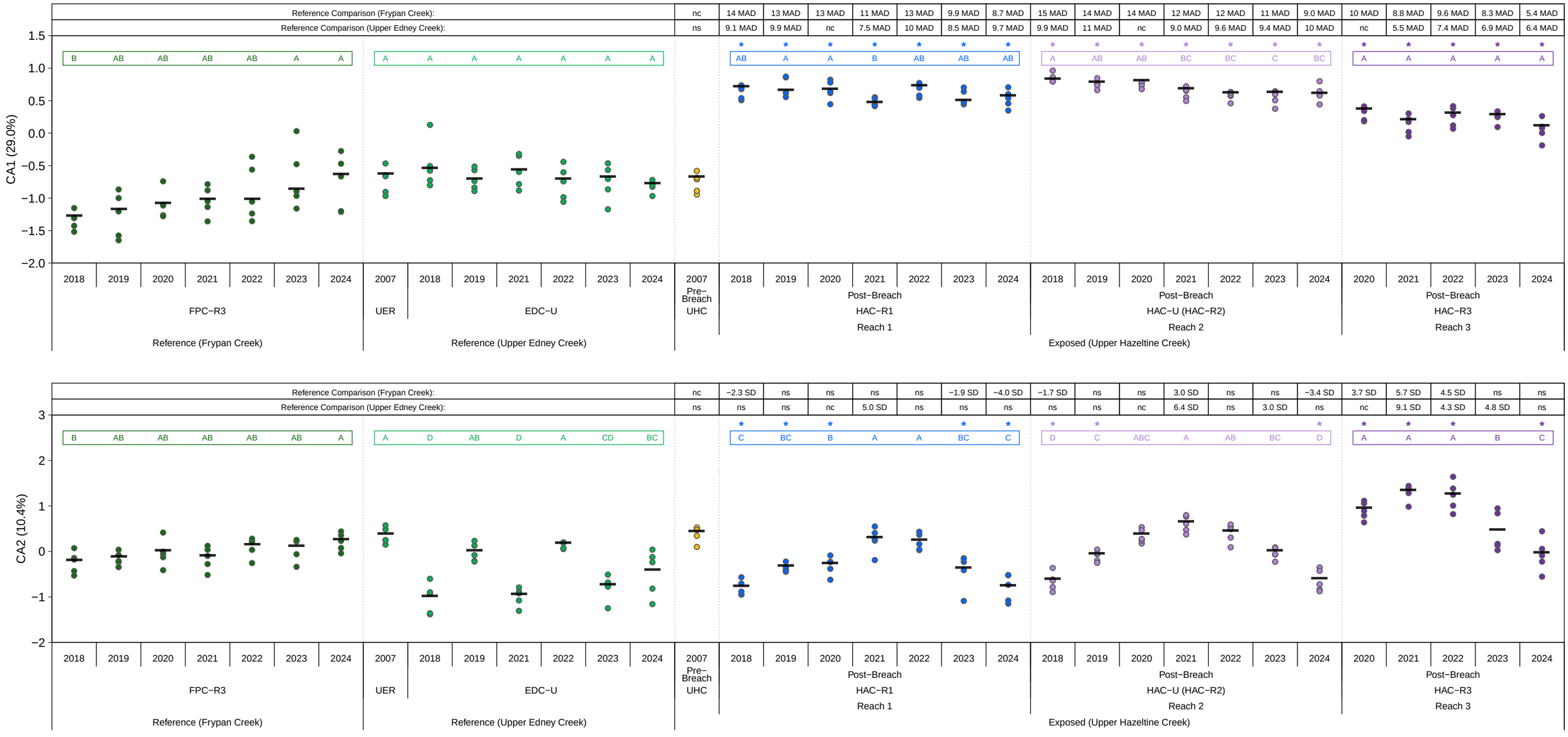


Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

Figure F.3.1: Benthic Invertebrate Community Metrics for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. Reference area EDC−U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC−R1, HAC−U (HAC−R2), and HAC−R3. Monitoring at area HAC−R3 was initiated in 2020. See Section 4.3 for details. Black bars represent measures of central tendency (mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10−transformed or rank−transformed data). Coloured letters represent significant (p−value <0.1) post−hoc comparisons within areas over time; years that share a letter of the same colour (e.g., A, B) within a box of the same colour do not differ significantly within an area. Data from 2007 were used in the analyses to compare post−breach (2018 to 2024) to pre−breach conditions (2007). Post−breach data from HAC−R1, HAC−U (HAC−R2), and HAC−R3 were compared to pre−breach data from upper Hazeltine Creek (UHC), and post−breach data from EDC−U was compared to pre−breach data from upper Edney Creek (UER). An * indicates a significant difference between HAC−R1, HAC−U (HAC−R2), or HAC−R3 and UHC in 2007. A number above the plot indicates significant exposed vs. reference post−hoc comparisons within a given year. The magnitude of difference (MOD) for these significant post−hoc comparisons is expressed in units of standard deviation (SD) or median absolute deviations (MAD; if the data were rank−transformed prior to analysis) relative to reference. A 'nc' indicates no comparisons were possible, a 'ns' indicates a non−significant contrast, and a 'nm' indicates that the MOD could not be calculated because MAD = 0.

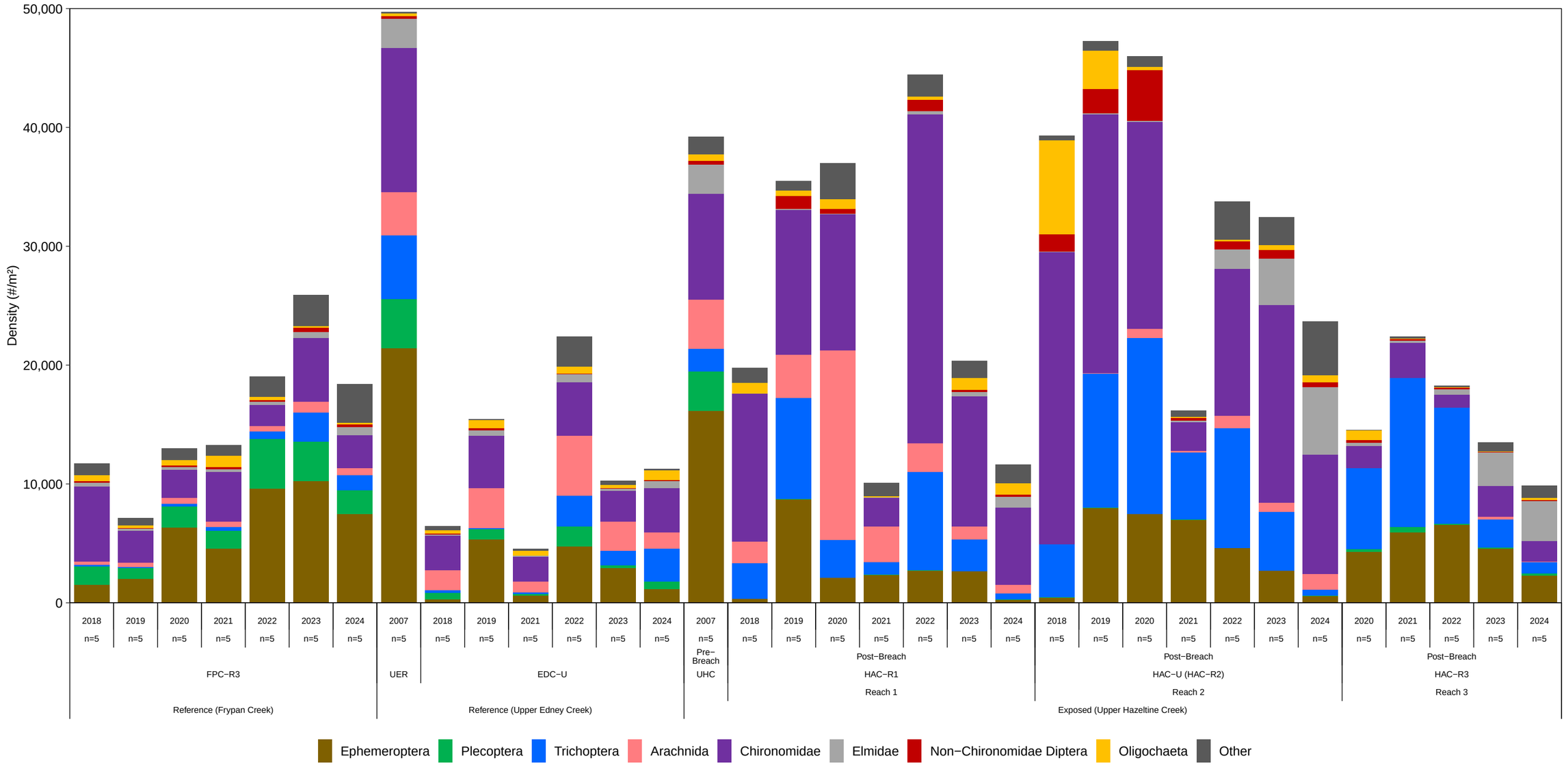


Figure F.3.2: Mean Densities of Major Benthic Invertebrate Community Taxa for Upper Hazeltine Creek (HAC−R1, HAC−U [HAC−R2], HAC−R3; Exposed), Frypan Creek (FPC−R3; Reference), and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2007 to 2024

Notes: The sampling area UHC (2007) is the pre−breach equivalent of the post−breach sampling areas HAC−R1, HAC−U (HAC−R2), and HAC−R3 (2018 to 2024). The sampling area UER (2007) is the pre−breach equivalent of the post−breach sampling area EDC−U (2018 to 2024). HAC−R2 is the alternate name for the HAC−U sampling area for HRWG reporting

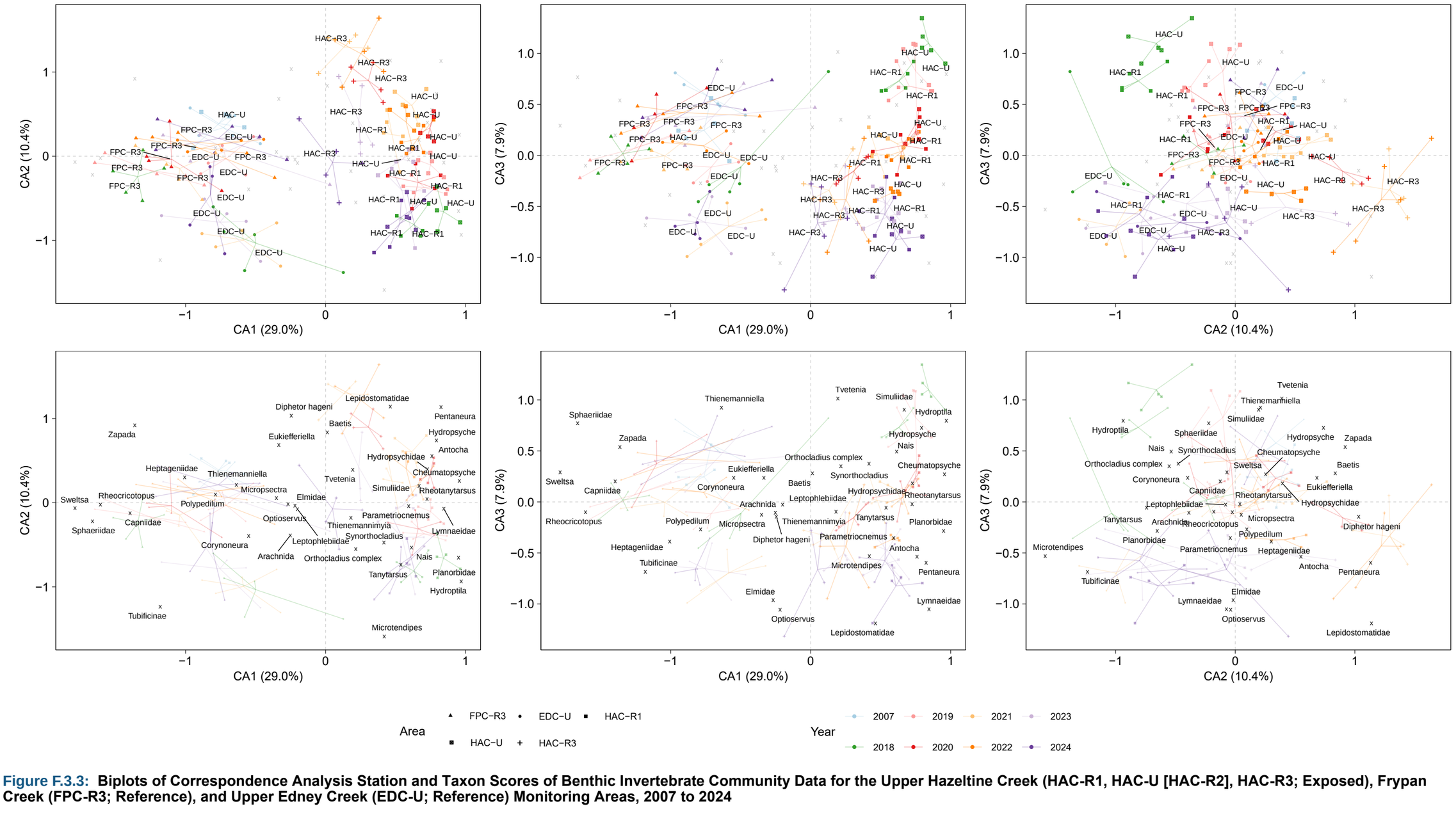


Figure F.3.3: Biplots of Correspondence Analysis Station and Taxon Scores of Benthic Invertebrate Community Data for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Notes: Analysis was completed using data at the Lowest Practicable Level (LPL). Taxa present at fewer than 1% of samples or less than 1% of total abundance were excluded from the analysis. Correspondence Analysis was conducted on ln(x+1)−transformed densities. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

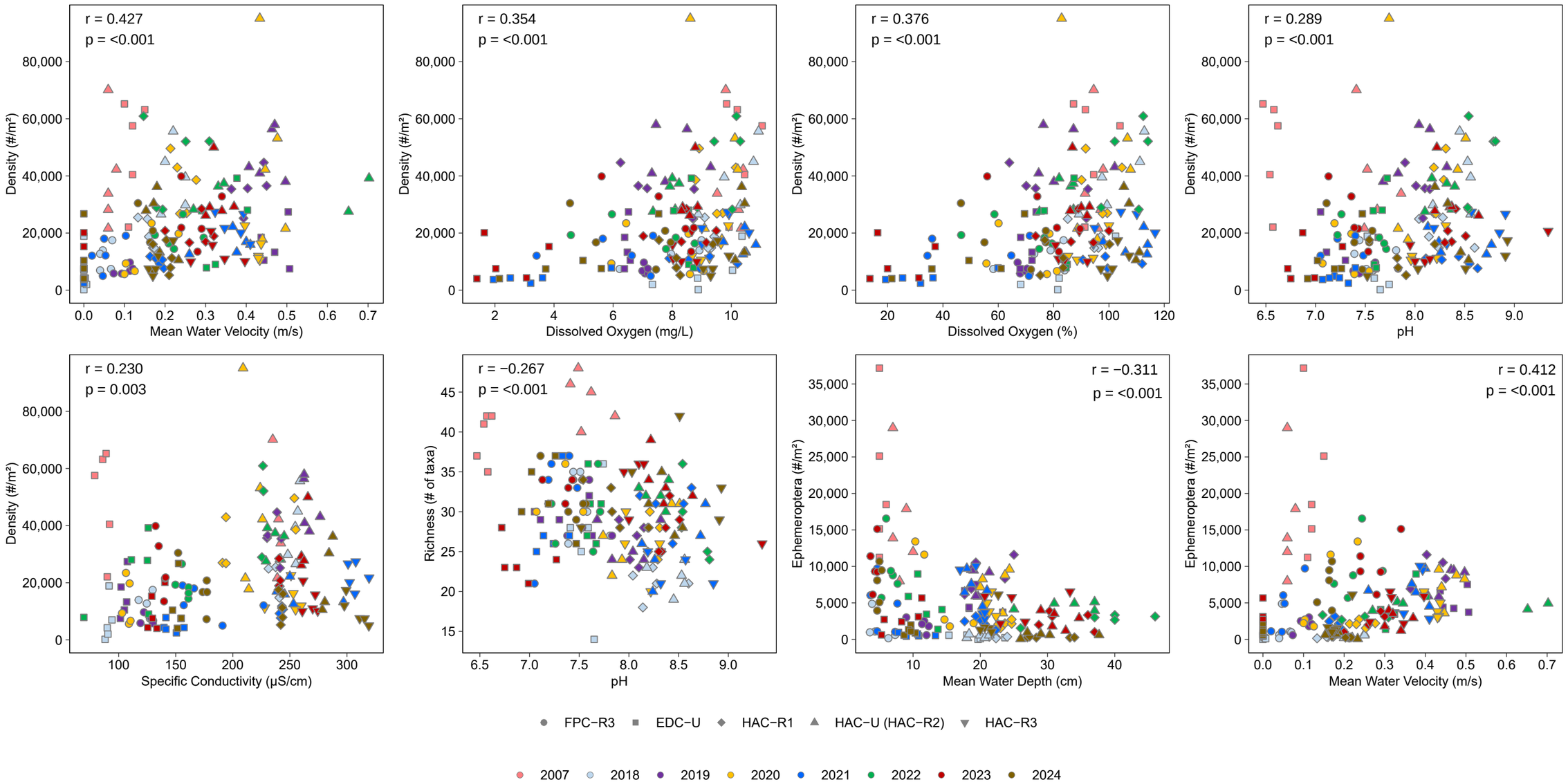
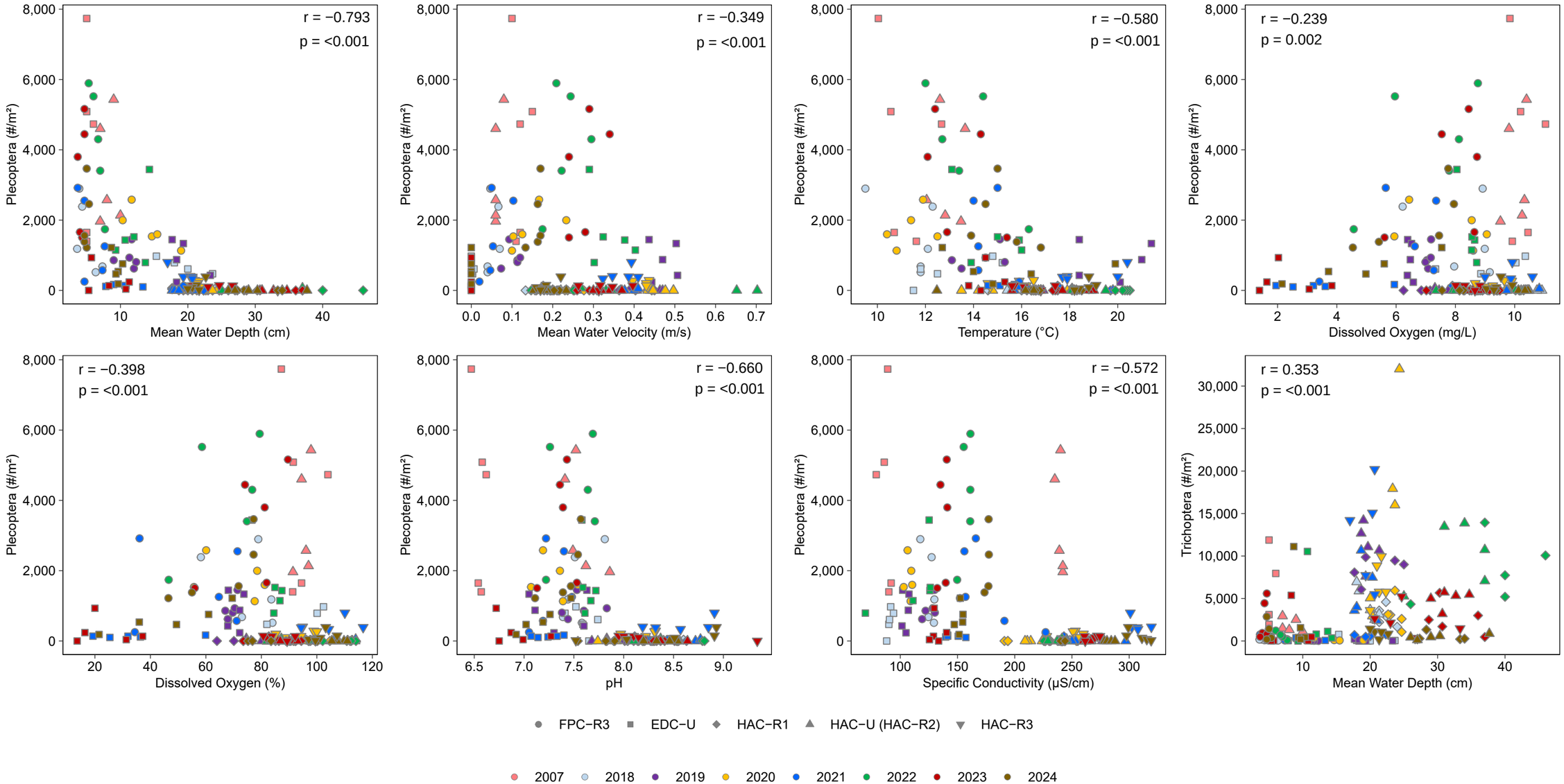


Figure F.3.4: Scatterplots of Spearman's Correlation Relationships (p < 0.05, Bonferroni Corrected) Between Benthic Invertebrate Community Metrics and Supporting *In Situ* Measures for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.



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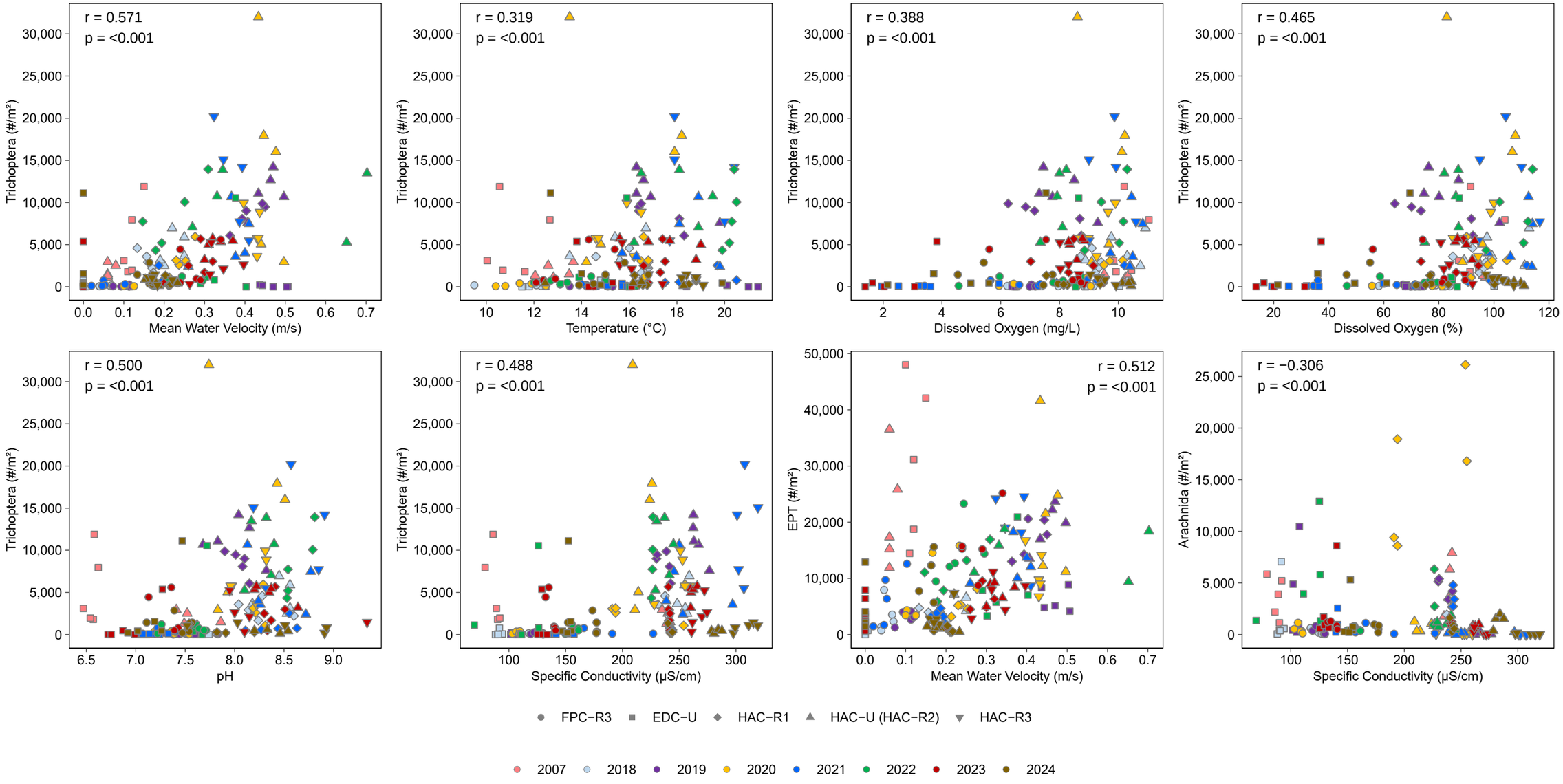

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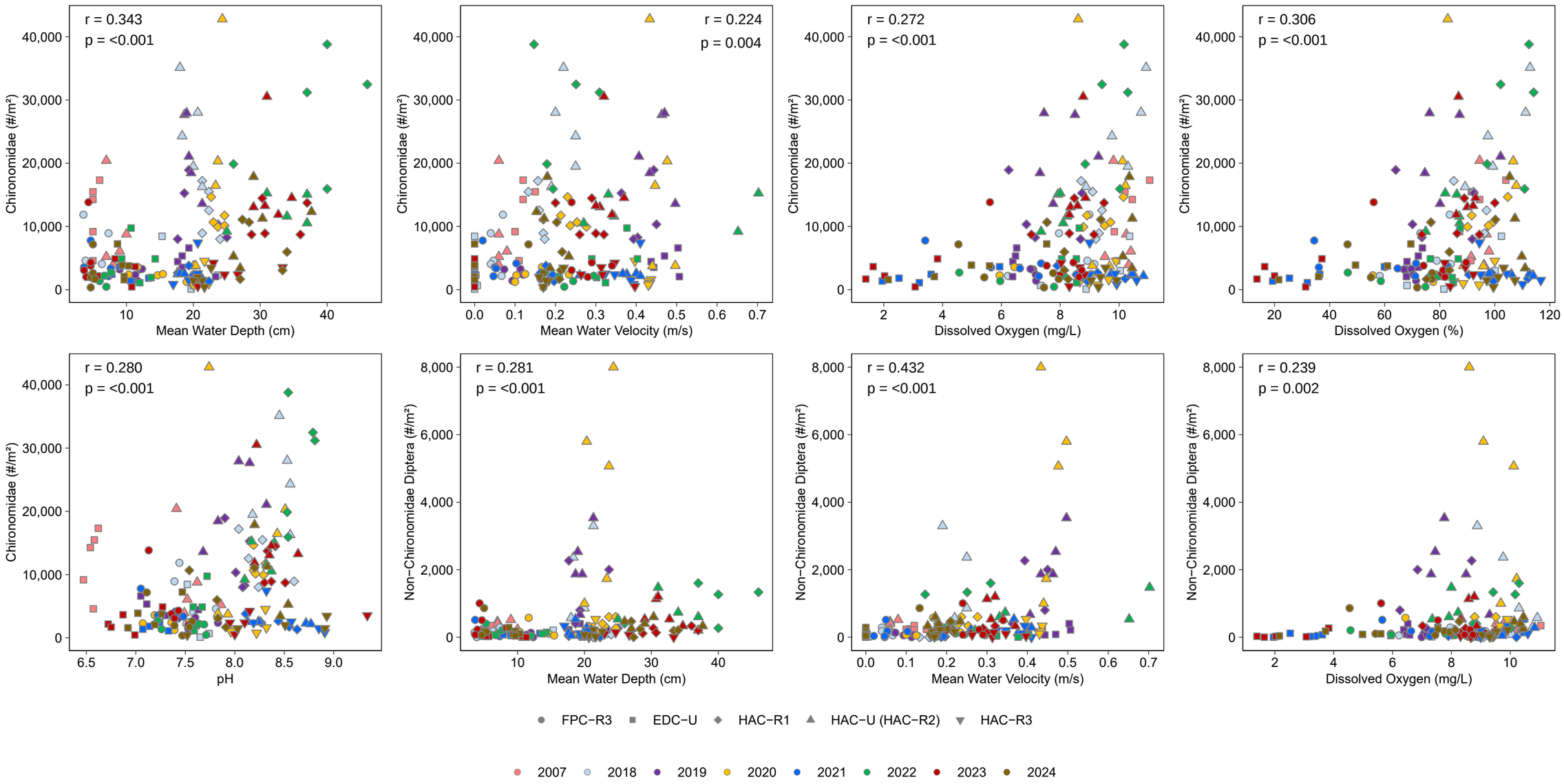

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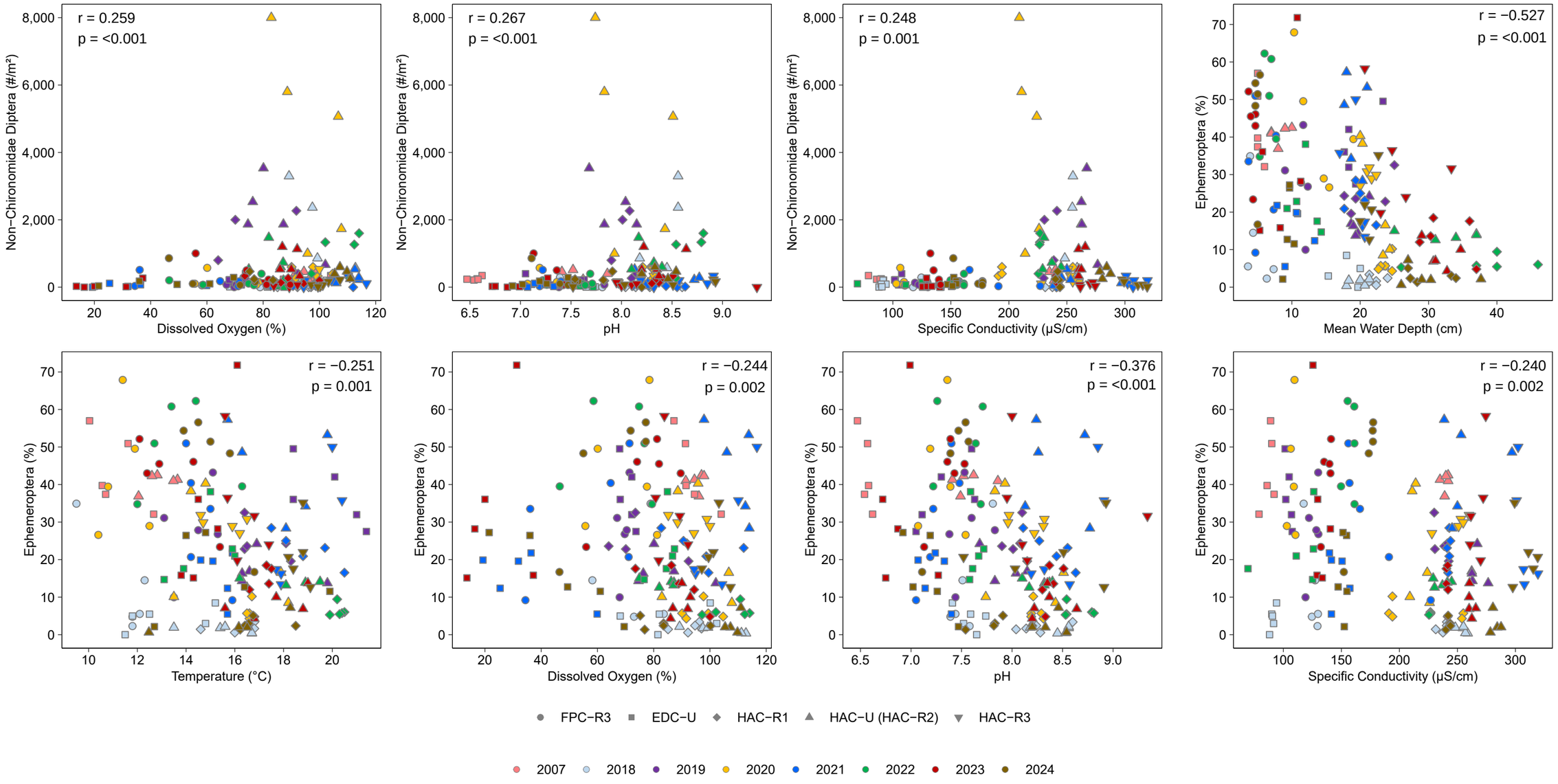

Figure F.3.4: Scatterplots of Spearman's Correlation Relationships (p < 0.05, Bonferroni Corrected) Between Benthic Invertebrate Community Metrics and Supporting *In Situ* Measures for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

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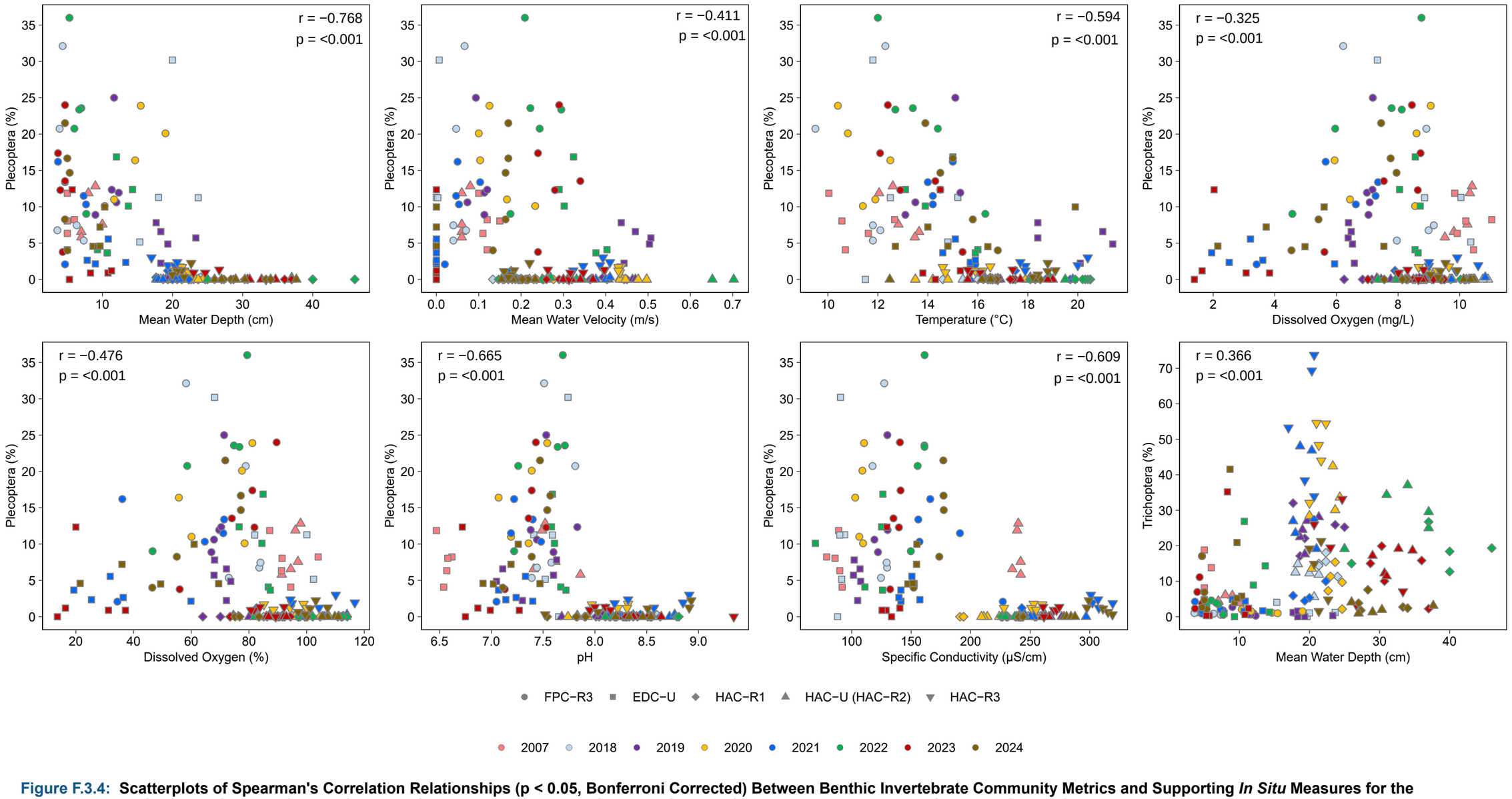

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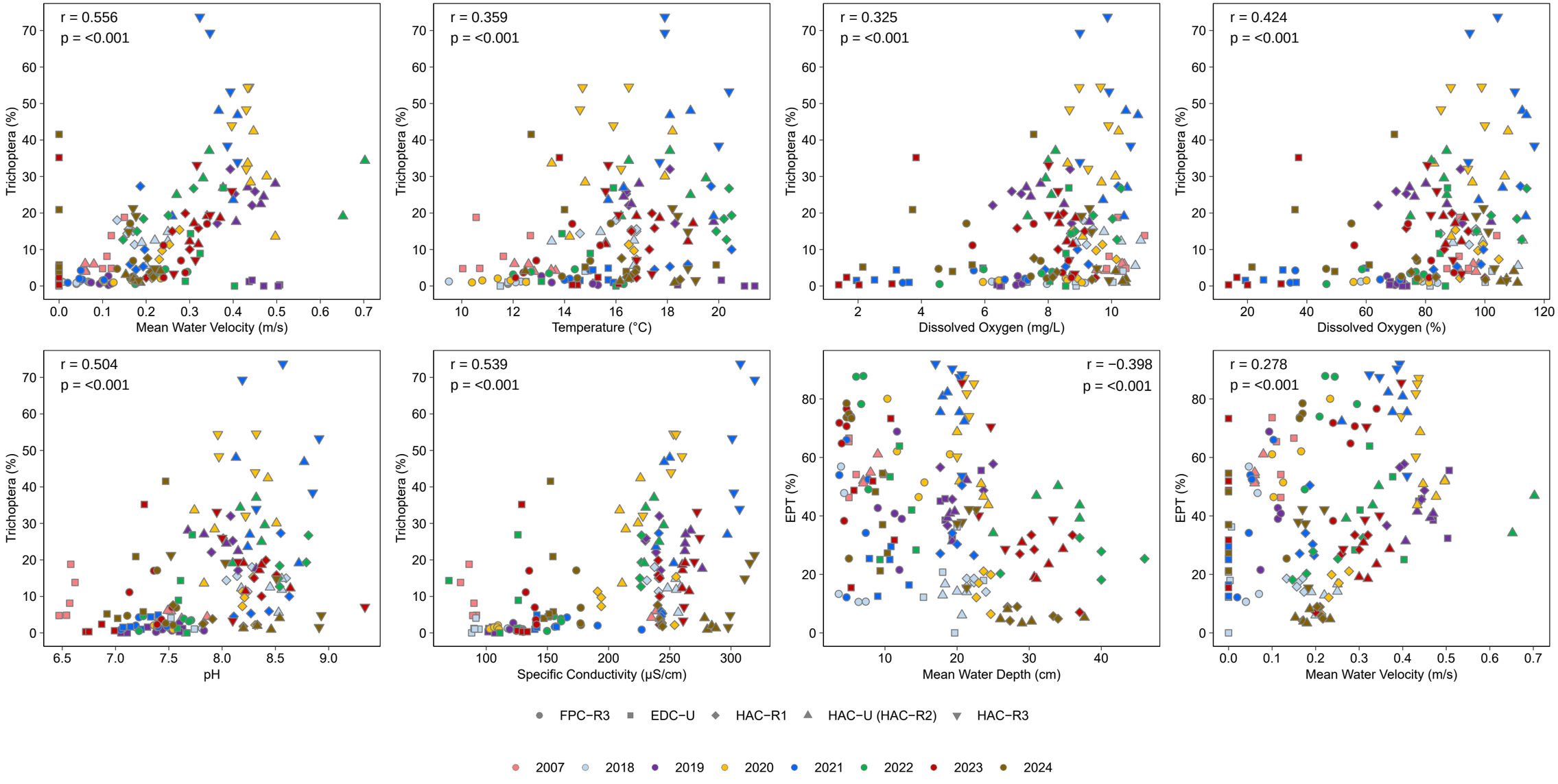
Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.



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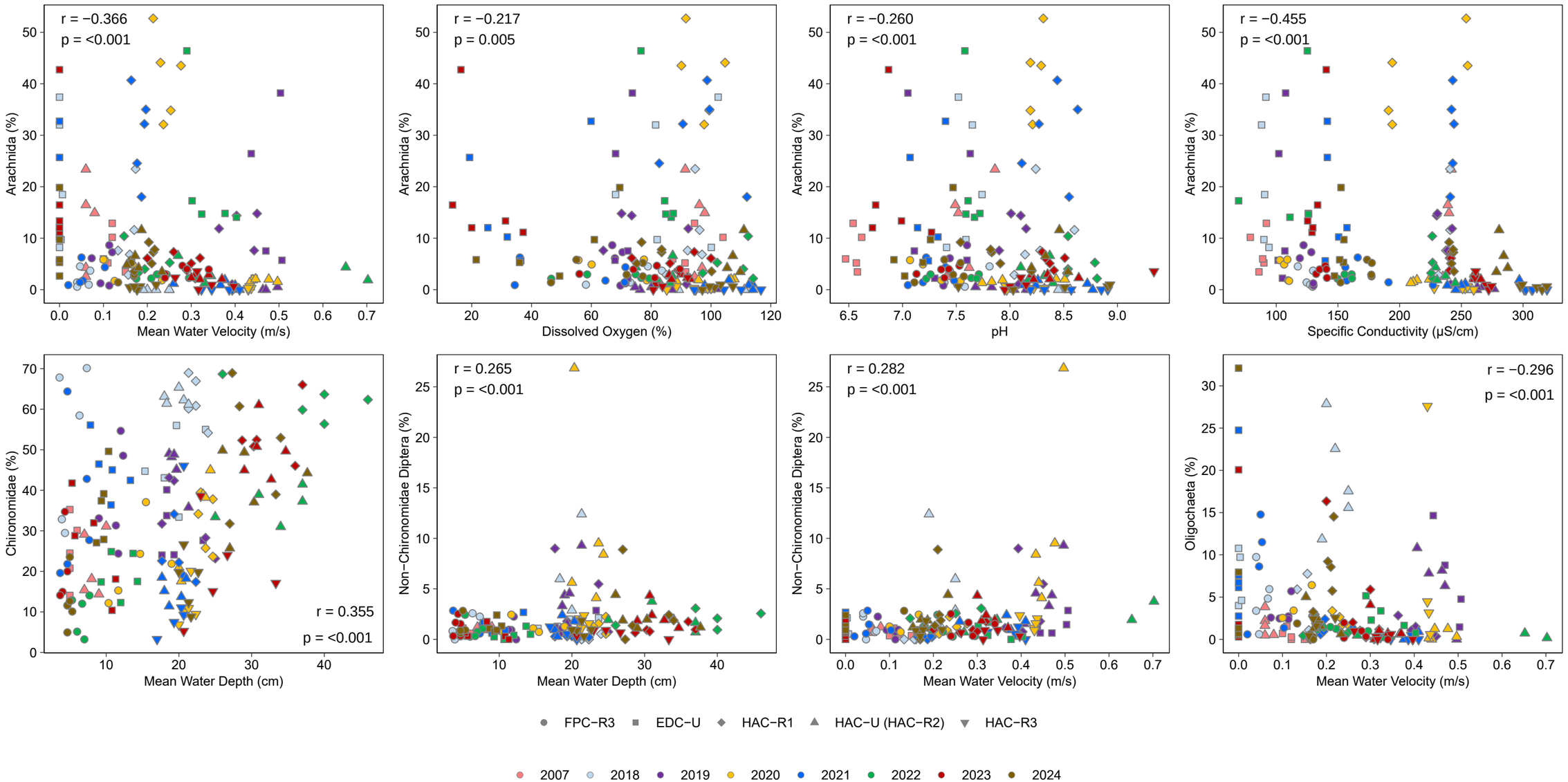

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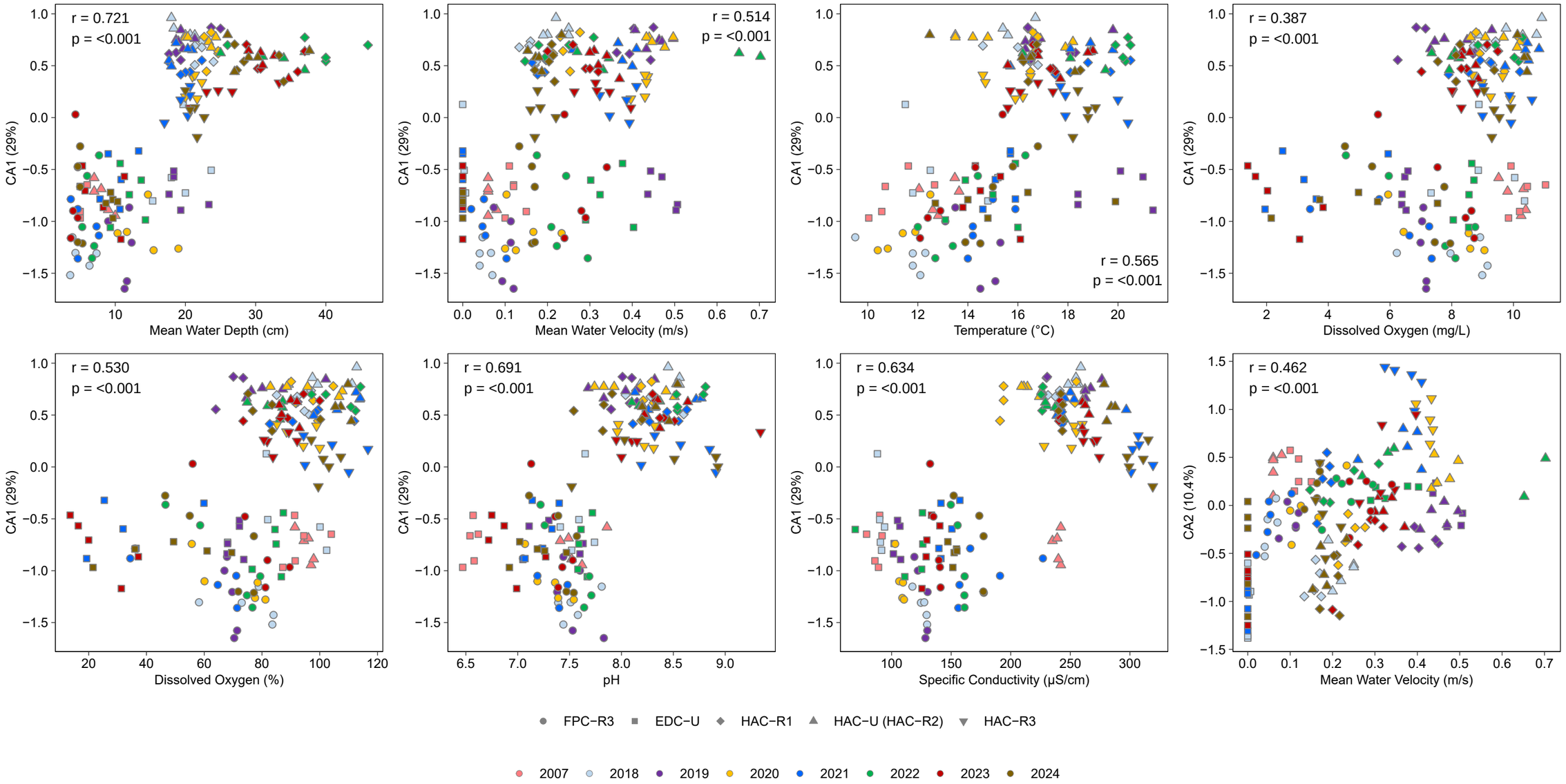

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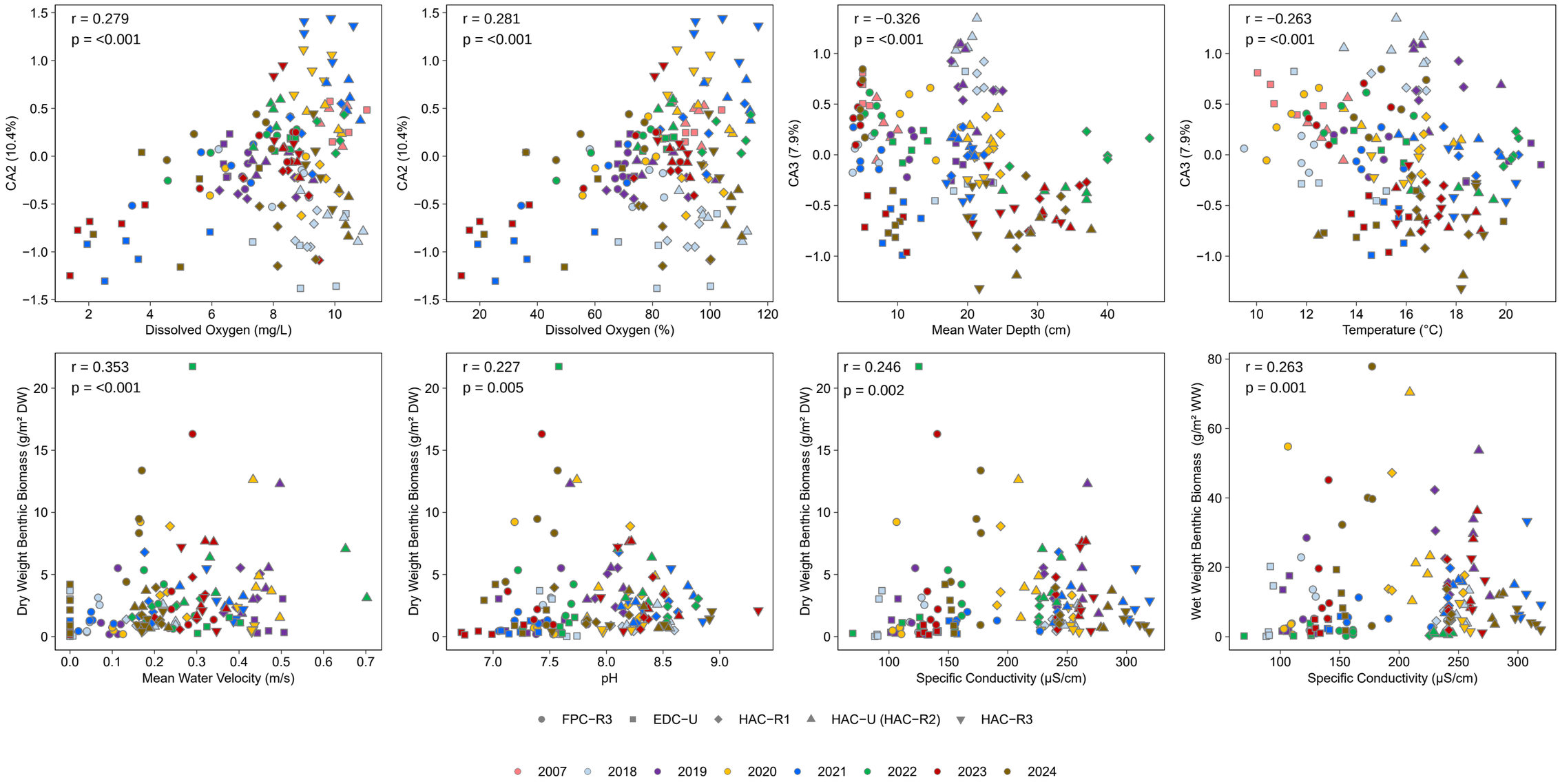

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Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Ephemeroptera (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	869	-	C	BC	AB	ABC	A	A	A	-	Baseline	ns	2.2	ns	3.2	3.3	2.9	ns	ns	nc
							2019	1,759																	2.2	2.0	nc
							2020	4,411																	ns	ns	ns
							2021	3,191																	ns	ns	ns
							2022	9,006																	-1.7	ns	ns
							2023	9,817																	-1.9	-1.9	ns
							2024	6,970																	-4.4	-3.8	-1.8
						EDC-U	2007	19,658	A	E	B	nc	D	BC	BC	CD	Baseline	-7.3	-1.9	nc	-4.8	-2.2	-2.9	-4.0	ns	ns	nc
							2018	94.2																	1.6	2.0	nc
							2019	5,111																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	599																	1.8	3.3	2.9
							2022	4,000																	ns	ns	ns
							2023	2,344																	ns	ns	ns
							2024	1,076																	-1.9	ns	ns
					Exposed	HAC-R1	2007	14,712	A	D	AB	C	BC	BC	BC	D	Baseline	-5.3	ns	-2.7	-2.6	-2.4	-2.5	-5.5		nc	nc
							2018	310																		ns	nc
							2019	8,459																		ns	nc
							2020	2,098																		1.7	ns
							2021	2,240																		ns	ns
							2022	2,640																		ns	ns
							2023	2,407																		ns	ns
							2024	275																		ns	2.6
						HAC-U (HAC-R2)[f]	2007	14,712	A	C	AB	AB	AB	AB	B	C	Baseline	-4.9	ns	ns	ns	ns	-2.5	-4.8			nc
							2018	405																			nc
							2019	7,802																			nc
							2020	7,098																			ns
							2021	6,793																			ns
							2022	4,587																			ns
							2023	2,457																			ns
							2024	443																			1.9
						HAC-R3	2007	14,712	A	-	-	B	AB	AB	B	B	Baseline	nc	nc	-1.7	ns	ns	-1.8	-2.9			
							2020	4,124																			
							2021	5,112																			
							2022	5,582																			
							2023	4,098																			
							2024	1,833																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Plecoptera (#/m²)	log10(x+1)	-	-	0.007	Reference	FPC-R3	2018	1,236	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-4.4	-5.6	nc
							2019	898																	-4.7	-4.7	nc
							2020	1,703																	-5.8	-5.8	-1.8
							2021	1,062																	-4.2	-4.9	ns
							2022	3,835																	-6.5	-5.8	-3.5
							2023	2,934																	-6.3	-6.3	-3.2
							2024	1,862																	-5.9	-5.9	-2.4
						EDC-U	2007	3,361	A	BCD	ABC	nc	CD	AB	D	ABCD	Baseline	-2.3	ns	nc	-2.6	ns	-3.1	ns	ns		nc
							2018	185																	-3.0	-4.1	nc
							2019	701																	-4.5	-4.5	nc
							2020	-																	nc	nc	nc
							2021	129																	-2.5	-3.2	ns
							2022	1,469																	-5.7	-5.1	-2.8
							2023	64.4																	-3.3	-3.3	ns
							2024	533																	-4.9	-4.9	ns
						HAC-R1	2007	3,064	A	B	B	B	B	B	B	B	Baseline	-5.2	-5.6	-6.3	-5.0	-6.3	-6.3	-6.3		nc	nc
							2018	3.32																		ns	nc
							2019	1.32																		ns	nc
							2020	0																		ns	4.1
							2021	4.40																		ns	3.5
							2022	0																		ns	3.0
							2023	0																		ns	3.0
							2024	0																		ns	3.5
					Exposed	HAC-U (HAC-R2)[f]	2007	3,064	A	B	B	B	B	B	B	B	Baseline	-6.3	-5.6	-6.3	-5.7	-5.6	-6.3	-6.3			nc
							2018	0																			nc
							2019	1.32																			nc
							2020	0																			4.1
							2021	1.17																			4.2
							2022	1.32																			2.3
							2023	0																			3.0
							2024	0																			3.5
						HAC-R3	2007	3,064	A	-	-	BC	AB	C	C	BC	Baseline	nc	nc	-2.2	ns	-3.3	-3.3	-2.8			
							2020	183																			
							2021	436																			
							2022	43.4																			
							2023	47.3																			
							2024	81.6																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Trichoptera (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	104	-	BC	C	BC	ABC	ABC	A	AB	-	Baseline	ns	ns	ns	ns	2.3	ns	2.7	3.1	nc
							2019	54.3																	4.2	4.4	nc
							2020	153																	2.4	3.5	3.1
							2021	224																	ns	2.6	3.3
							2022	472																	2.3	2.5	2.4
							2023	1,561																	ns	ns	ns
							2024	834																	ns	ns	ns
						EDC-U	2007	4,005	A	D	D	nc	CD	BC	BCD	AB	Baseline	-3.9	-4.6	nc	-3.1	-2.1	-2.9	ns	ns		nc
							2018	35.6																	3.6	3.9	nc
							2019	14.6																	5.2	5.5	nc
							2020	-																	nc	nc	nc
							2021	94.1																	1.8	3.3	4.0
							2022	321																	2.6	2.8	2.7
							2023	118																	2.4	3.1	2.2
							2024	921																	ns	ns	ns
					Exposed	HAC-R1	2007	1,744	ABC	ABC	A	ABC	BC	AB	ABC	C	Baseline	ns	ns	ns	ns	ns	ns	ns		ns	nc
							2018	2,820																		ns	nc
							2019	8,372																		ns	nc
							2020	2,753																		ns	ns
							2021	826																		ns	2.2
							2022	7,545																		ns	ns
							2023	2,021																		ns	ns
							2024	339																		ns	ns
						HAC-U (HAC-R2)[f]	2007	1,744	AB	A	A	A	A	A	A	B	Baseline	ns	ns	ns	ns	ns	ns	ns			nc
							2018	4,117																			nc
							2019	11,004																			nc
							2020	10,637																			ns
							2021	4,875																			ns
							2022	9,431																			ns
							2023	4,847																			ns
							2024	421																			ns
						HAC-R3	2007	1,744	AB	-	-	A	A	A	AB	B	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	6,375																			
							2021	11,282																			
							2022	8,080																			
							2023	1,705																			
							2024	765																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
EPT (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	2,311	-	C	BC	ABC	ABC	A	A	AB	-	Baseline	ns	ns	ns	2.4	2.5	2.0	ns	ns	nc
							2019	2,792																	2.4	2.5	nc
							2020	6,528																	ns	ns	ns
							2021	4,555																	ns	ns	1.8
							2022	13,731																	ns	ns	ns
							2023	15,160																	ns	ns	ns
							2024	10,083																	-3.6	-3.0	ns
						EDC-U	2007	27,942	A	D	B	nc	CD	AB	BC	BC	Baseline	-6.1	-2.1	nc	-4.6	ns	-2.9	-2.9	ns		nc
							2018	283																	3.2	3.7	nc
							2019	5,968																	ns	1.5	nc
							2020	-																	nc	nc	nc
							2021	877																	1.7	3.5	4.0
							2022	7,394																	ns	ns	ns
							2023	3,260																	ns	ns	ns
							2024	3,243																	-2.1	ns	ns
						HAC-R1	2007	19,692	A	C	AB	ABC	C	ABC	BC	D	Baseline	-2.4	ns	ns	-2.4	ns	-1.9	-4.5		nc	nc
							2018	3,216																		ns	nc
							2019	16,921																		ns	nc
							2020	5,061																		1.8	ns
							2021	3,269																		1.8	2.2
							2022	10,268																		ns	ns
							2023	4,539																		ns	ns
							2024	655																		ns	2.0
					Exposed	HAC-U (HAC-R2)[f]	2007	19,692	A	B	A	A	AB	AB	AB	C	Baseline	-1.9	ns	ns	ns	ns	ns	-3.9			nc
							2018	4,587																			nc
							2019	18,884																			nc
							2020	19,797																			ns
							2021	12,252																			ns
							2022	14,168																			ns
							2023	7,446																			ns
							2024	1,027																			ns
						HAC-R3	2007	19,692	A	-	-	AB	A	A	AB	B	Baseline	nc	nc	ns	ns	ns	ns	-2.5			
							2020	10,716																			
							2021	17,778																			
							2022	15,843																			
							2023	6,277																			
							2024	2,960																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Arachnida (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	184	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	1.8	-4.3	nc
							2019	230																	2.0	-2.0	nc
							2020	384																	3.0	ns	-2.3
							2021	275																	1.9	ns	-4.6
							2022	461																	ns	ns	-4.4
							2023	843																	ns	ns	-2.1
							2024	529																	ns	ns	-2.4
						EDC-U	2007	3,126	A	A	A	nc	A	A	A	A	Baseline	ns	ns	nc	ns	ns	ns	ns	ns		nc
							2018	514																	ns	-5.1	nc
							2019	1,387																	ns	-3.5	nc
							2020	-																	nc	nc	nc
							2021	600																	ns	-1.8	-5.2
							2022	3,509																	ns	ns	-6.1
							2023	1,385																	ns	ns	-2.5
							2024	631																	ns	ns	-2.6
						HAC-R1	2007	3,282	AB	AB	AB	A	AB	AB	B	B	Baseline	ns	ns	ns	ns	ns	ns	ns		nc	nc
							2018	1,603																		-6.0	nc
							2019	2,541																		-4.0	nc
							2020	14,638																		-2.5	-5.3
							2021	2,890																		-3.1	-6.5
							2022	1,834																		ns	-5.6
							2023	1,108																		ns	-2.3
							2024	659																		ns	-2.6
					Exposed	HAC-U (HAC-R2)[f]	2007	3,282	A	C	B	A	B	A	A	A	Baseline	-6.6	-4.2	ns	-3.2	ns	ns	ns			nc
							2018	0																			nc
							2019	18.4																			nc
							2020	665																			-2.7
							2021	63.1																			-3.4
							2022	948																			-5.0
							2023	758																			-2.0
							2024	1,183																			-3.1
						HAC-R3	2007	3,282	A	-	-	B	C	C	B	B	Baseline	nc	nc	-4.0	-6.6	-6.1	-3.2	-3.9			
							2020	22.8																			
							2021	0																			
							2022	1.03																			
							2023	64.2																			
							2024	25.7																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Chironomidae (#/m²)	log10	-	-	<0.001	Reference	FPC-R3	2018	5,333	-	A	AB	AB	AB	B	AB	AB	-	Baseline	ns	ns	ns	-1.9	ns	ns	ns	2.2	nc
							2019	2,573																	2.2	3.1	nc
							2020	2,268																	2.4	2.4	ns
							2021	3,828																	ns	ns	ns
							2022	1,517																	4.2	3.1	ns
							2023	4,261																	ns	1.9	ns
							2024	1,859																	ns	2.3	ns
						EDC-U	2007	10,998	A	B	AB	nc	B	AB	B	B	Baseline	-3.1	ns	nc	-2.6	ns	-2.6	-1.8	ns		nc
							2018	1,319																	3.3	4.3	nc
							2019	4,090																	1.5	2.4	nc
							2020	-																	nc	nc	nc
							2021	1,893																	ns	ns	ns
							2022	3,458																	3.0	1.9	-2.1
							2023	1,964																	2.5	3.1	ns
							2024	3,224																	ns	ns	ns
					Exposed	HAC-R1	2007	7,409	BC	AB	AB	AB	C	A	AB	BC	Baseline	ns	ns	ns	ns	1.9	ns	ns		nc	nc
							2018	11,901																		ns	nc
							2019	11,458																		ns	nc
							2020	11,306																		ns	-3.0
							2021	2,237																		ns	ns
							2022	26,240																		ns	-5.1
							2023	10,611																		ns	-2.4
							2024	5,148																		ns	-1.9
						HAC-U (HAC-R2)[f]	2007	7,409	AB	A	A	A	B	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns			nc
							2018	23,772																			nc
							2019	21,005																			nc
							2020	11,518																			-3.0
							2021	2,406																			ns
							2022	12,092																			-4.0
							2023	15,562																			-2.9
							2024	8,512																			-2.6
						HAC-R3	2007	7,409	A	-	-	B	B	B	B	B	Baseline	nc	nc	-2.4	-1.8	-3.2	-1.8	-2.4			
							2020	1,489																			
							2021	2,258																			
							2022	843																			
							2023	2,147																			
							2024	1,459																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Elmidae (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	5,333	-	A	AB	AB	AB	B	AB	AB	-	Baseline	ns	ns	ns	-1.9	ns	ns	ns	2.2	nc
							2019	2,573																	2.2	3.1	nc
							2020	2,268																	2.4	2.4	ns
							2021	3,828																	ns	ns	ns
							2022	1,517																	4.2	3.1	ns
							2023	4,261																	ns	1.9	ns
							2024	1,859																	ns	2.3	ns
						EDC-U	2007	2,295	A	B	AB	nc	B	AB	AB	AB	Baseline	-2.2	ns	nc	-2.4	ns	ns	ns	ns		nc
							2018	31.2																	-1.8	-1.8	nc
							2019	391																	-2.5	-2.1	nc
							2020	-																	nc	nc	nc
							2021	22.7																	ns	ns	ns
							2022	495																	ns	ns	ns
							2023	120																	ns	1.8	ns
							2024	523																	ns	ns	ns
					Exposed	HAC-R1	2007	2,219	A	D	CD	D	BCD	ABC	AB	A	Baseline	-4.0	-3.4	-4.0	-2.7	ns	ns	ns		nc	nc
							2018	0																		ns	nc
							2019	2.06																		ns	nc
							2020	0																		ns	1.9
							2021	10.4																		ns	ns
							2022	83.7																		ns	ns
							2023	112																		1.8	ns
							2024	866																		ns	ns
						HAC-U (HAC-R2)[f]	2007	2,219	A	B	B	B	B	A	A	A	Baseline	-4.0	-3.0	-3.0	-2.5	ns	ns	ns			nc
							2018	0																			nc
							2019	5.71																			nc
							2020	5.71																			ns
							2021	18.2																			ns
							2022	1,572																			-1.9
							2023	3,619																			ns
							2024	5,187																			ns
						HAC-R3	2007	2,219	A	-	-	B	AB	B	A	A	Baseline	nc	nc	-2.1	ns	-2.0	ns	ns			
							2020	35.3																			
							2021	131																			
							2022	43.6																			
							2023	2,162																			
							2024	2,971																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Non-Chironomidae Diptera (#/m²)	log10(x+1)	-	-	<0.001	Reference	FPC-R3	2018	51.8	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-2.2	2.1	nc
							2019	31.9																	2.3	2.9	nc
							2020	126																	ns	2.4	ns
							2021	111																	ns	ns	ns
							2022	131																	ns	ns	ns
							2023	227																	ns	ns	ns
							2024	173																	ns	ns	ns
						EDC-U	2007	251	A	AB	AB	nc	AB	AB	B	AB	Baseline	ns	ns	nc	ns	ns	-1.9	ns	ns		nc
							2018	38.1																	-2.0	2.4	nc
							2019	161																	ns	1.8	nc
							2020	-																	nc	nc	nc
							2021	23.8																	ns	ns	ns
							2022	32.1																	2.3	2.1	ns
							2023	18.1																	1.7	2.6	ns
							2024	110																	ns	ns	ns
					Exposed	HAC-R1	2007	338	A	C	A	A	BC	A	AB	AB	Baseline	-3.6	ns	ns	-2.3	ns	ns	ns		nc	nc
							2018	1.41																		4.4	nc
							2019	827																		ns	nc
							2020	418																		ns	ns
							2021	13.8																		1.8	ns
							2022	780																		ns	-2.0
							2023	192																		ns	ns
							2024	84.5																		ns	ns
						HAC-U (HAC-R2)[f]	2007	338	AB	AB	AB	A	B	AB	AB	AB	Baseline	ns	ns	ns	ns	ns	ns	ns			nc
							2018	1,020																			nc
							2019	1,835																			nc
							2020	3,327																			-2.0
							2021	183																			ns
							2022	586																			-1.7
							2023	664																			-2.2
							2024	393																			ns
						HAC-R3	2007	338	A	-	-	A	A	A	A	A	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	209																			
							2021	67.6																			
							2022	51.5																			
							2023	31.1																			
							2024	77.4																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Oligochaeta (#/m²)	log10(x+1)	-	-	0.008	Reference	FPC-R3	2018	393	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	ns	1.5	nc
							2019	209																	ns	ns	nc
							2020	250																	ns	ns	ns
							2021	496																	ns	ns	-2.3
							2022	224																	ns	ns	ns
							2023	48.9																	ns	ns	ns
							2024	19.5																	1.9	ns	ns
						EDC-U	2007	27.4	A	A	A	nc	A	A	A	A	Baseline	ns	ns	nc	ns	ns	ns	ns	1.5		nc
							2018	143																	ns	2.1	nc
							2019	428																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	310																	ns	ns	-2.1
							2022	405																	ns	ns	-1.7
							2023	138																	ns	ns	ns
							2024	242																	ns	ns	ns
					Exposed	HAC-R1	2007	468	A	A	A	A	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns		ns	nc
							2018	646																		ns	nc
							2019	348																		ns	nc
							2020	676																		ns	ns
							2021	43.6																		ns	ns
							2022	110																		ns	ns
							2023	443																		ns	-1.9
							2024	777																		ns	ns
						HAC-U (HAC-R2)[f]	2007	468	AB	A	AB	B	B	B	B	AB	Baseline	ns	ns	ns	ns	ns	ns	ns			nc
							2018	6,933																			nc
							2019	758																			nc
							2020	78.8																			ns
							2021	43.5																			ns
							2022	110																			ns
							2023	117																			ns
							2024	369																			ns
						HAC-R3	2007	468	A	-	-	AB	B	B	B	AB	Baseline	nc	nc	ns	-2.3	-1.8	-1.9	ns			
							2020	139																			
							2021	5.19																			
							2022	15.0																			
							2023	12.6																			
							2024	137																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Ephemeroptera (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	5.53	-	B	A	A	A	A	A	A	-	Baseline	5.9	9.0	7.4	12	11	12	-1.0	-0.98	nc
							2019	27.9																	ns	ns	nc
							2020	39.4																	-8.9	-6.1	ns
							2021	33.5																	ns	ns	ns
							2022	51.0																	-12	-9.8	ns
							2023	45.5																	-8.4	-10	ns
							2024	51.4																	-13	-13	-8.1
						EDC-U	2007	39.7	A	D	AB	nc	CD	BC	ABC	CD	Baseline	-9.2	ns	nc	-5.3	-5.0	ns	-7.1	ns		nc
							2018	4.97																	ns	ns	nc
							2019	36.0																	ns	-5.2	nc
							2020	-																	nc	nc	nc
							2021	19.6																	ns	7.7	ns
							2022	21.0																	-4.0	ns	ns
							2023	28.2																	-3.9	-5.6	ns
							2024	12.7																	-2.7	-2.8	ns
						HAC-R1	2007	41.3	A	C	AB	C	AB	C	BC	C	Baseline	-10	ns	-9.4	ns	-9.4	-7.3	-10		nc	nc
							2018	1.64																		ns	nc
							2019	23.6																		ns	nc
							2020	5.68																		2.9	6.4
							2021	23.1																		6.7	ns
							2022	5.75																		ns	5.4
							2023	13.6																		ns	4.8
							2024	2.42																		ns	4.8
						HAC-U (HAC-R2)[f]	2007	41.3	A	D	B	B	A	BC	BCD	CD	Baseline	-10	-6.6	-6.6	ns	-7.2	-9.1	-10			nc
					Exposed		2018	1.81																			nc
							2019	16.3																			nc
							2020	16.5																			ns
							2021	48.6																			-8.2
							2022	13.9																			3.3
							2023	7.07																			6.5
							2024	2.03																			4.9
						HAC-R3	2007	41.3	A	-	-	AB	AB	AB	AB	B	Baseline	nc	nc	ns	ns	ns	ns	-5.5			
							2020	29.9																			
							2021	17.4																			
							2022	26.3																			
							2023	31.6																			
							2024	20.7																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Plecoptera (%)[g]	rank	<0.001	0.216	0.130	Reference	FPC-R3	2018	7.45	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-300	-300	nc
							2019	11.9																	-480	-480	nc
							2020	16.4																	-659	-659	-611
							2021	11.5																	-462	-462	-384
							2022	23.4																	-940	-940	-916
							2023	13.5																	-544	-544	-508
							2024	14.7																	-590	-590	-546
						EDC-U	2007	8.05	A	A	AB	nc	AB	A	B	A	Baseline	ns	ns	nc	ns	ns	-288	ns	ns		nc
							2018	11.2																	-452	-452	nc
							2019	5.71																	-230	-230	nc
							2020	-																	nc	nc	nc
							2021	2.64																	-106	-106	ns
							2022	10.1																	-406	-406	-382
							2023	0.890																	-36	-36	ns
							2024	4.59																	-184	-184	-140
					Exposed	HAC-R1	2007	7.57	A	B	B	B	B	B	B	B	Baseline	-305	-305	-305	-305	-305	-305	-305		nc	nc
							2018	0																		ns	nc
							2019	0																		ns	nc
							2020	0																		ns	48
							2021	0																		ns	78
							2022	0																		ns	24
							2023	0																		ns	37
							2024	0																		ns	45
						HAC-U (HAC-R2)[f]	2007	7.57	A	B	B	B	B	B	B	B	Baseline	-305	-305	-305	-305	-305	-305	-305			nc
							2018	0																			nc
							2019	0																			nc
							2020	0																			48
							2021	0																			78
							2022	0																			24
							2023	0																			37
							2024	0																			45
						HAC-R3	2007	7.57	A	-	-	B	B	B	B	B	Baseline	nc	nc	-257	-227	-281	-268	-260			
							2020	1.19																			
							2021	1.93																			
							2022	0.585																			
							2023	0.912																			
							2024	1.11																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Trichoptera (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	1.02	-	C	C	BC	ABC	ABC	A	AB	-	Baseline	ns	ns	ns	ns	2.3	1.4	5.4	4.4	nc
							2019	0.633																	9.6	9.3	nc
							2020	1.53																	3.2	11	18
							2021	1.77																	1.6	9.8	20
							2022	3.47																	5.8	10	26
							2023	6.98																	ns	ns	ns
							2024	4.71																	ns	ns	ns
						EDC-U	2007	8.13	AB	CD	D	nc	BCD	ABC	BCD	A	Baseline	-2.7	-3.0	nc	ns	ns	ns	ns	ns		nc
							2018	1.07																	5.4	4.4	nc
							2019	0.317																	9.7	9.4	nc
							2020	-																	nc	nc	nc
							2021	1.67																	1.7	9.8	20
							2022	8.93																	3.7	8.0	24
							2023	0.593																	5.6	6.5	7.3
							2024	5.77																	-1.2	-1.5	ns
					Exposed	HAC-R1	2007	4.40	CD	ABC	A	BCD	ABCD	AB	ABCD	D	Baseline	ns	8.1	ns	ns	5.4	ns	ns		nc	nc
							2018	15.0																		ns	nc
							2019	25.2																		ns	nc
							2020	9.70																		7.9	15
							2021	5.93																		8.2	18
							2022	18.4																		ns	ns
							2023	15.0																		ns	ns
							2024	2.72																		ns	ns
						HAC-U (HAC-R2)[f]	2007	4.40	CD	BC	AB	AB	A	A	ABC	D	Baseline	ns	7.8	10.0	8.8	9.8	ns	ns			nc
							2018	12.3																			nc
							2019	24.5																			nc
							2020	30.1																			ns
							2021	27.0																			ns
							2022	29.5																			ns
							2023	17.2																			ns
							2024	1.97																			5.0
						HAC-R3	2007	4.40	C	-	-	A	A	AB	BC	C	Baseline	nc	nc	17	19	26	ns	ns			
							2020	48.3																			
							2021	53.2																			
							2022	70.0																			
							2023	19.4																			
							2024	14.9																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
EPT (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	13.3	-	C	BC	AB	BC	A	AB	AB	-	Baseline	ns	8.6	ns	12	10	11	ns	ns	nc
							2019	40.8																	ns	ns	nc
							2020	61.1																	-8.0	ns	ns
							2021	52.5																	ns	4.2	6.5
							2022	78.2																	-9.6	-6.2	ns
							2023	70.7																	-7.6	-8.5	ns
							2024	73.7																	-12	-12	-6.5
						EDC-U	2007	65.4	A	D	AB	nc	CD	ABC	AB	BCD	Baseline	-8.6	ns	nc	-7.3	ns	ns	-5.1	ns		nc
							2018	17.9																	ns	ns	nc
							2019	45.0																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	25.1																	ns	9.1	11
							2022	42.0																	ns	ns	9.4
							2023	48.7																	ns	ns	ns
							2024	37.0																	-5.6	-5.8	ns
						HAC-R1	2007	54.0	A	CD	AB	CD	BC	CD	CD	D	Baseline	-6.6	ns	-6.7	-4.3	-5.2	-4.6	-8.7		ns	nc
							2018	17.2																		ns	nc
							2019	48.7																		ns	nc
							2020	17.0																		6.1	12
							2021	30.3																		8.2	10
							2022	25.4																		ns	12
							2023	28.5																		ns	2.1
							2024	5.74																		ns	5.8
					Exposed	HAC-U (HAC-R2)[f]	2007	54.0	AB	D	BC	AB	A	BC	CD	D	Baseline	-7.2	ns	ns	ns	ns	-5.5	-8.9			nc
							2018	14.0																			nc
							2019	40.9																			nc
							2020	51.0																			5.6
							2021	75.5																			ns
							2022	43.7																			9.1
							2023	23.5																			3.0
							2024	4.73																			6.0
						HAC-R3	2007	54.0	BC	-	-	AB	AB	A	CD	D	Baseline	nc	nc	ns	ns	7.3	ns	-2.9			
							2020	81.8																			
							2021	88.3																			
							2022	94.2																			
							2023	40.1																			
							2024	37.9																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

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[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Arachnida (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	1.41	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	5.5	-1.3	nc
							2019	6.11																	ns	-5.3	nc
							2020	4.89																	34	ns	-4.1
							2021	1.77																	27	ns	-1.6
							2022	2.27																	ns	ns	-2.0
							2023	3.93																	ns	ns	ns
							2024	2.91																	ns	ns	-2.0
						EDC-U	2007	5.98	A	A	A	nc	A	A	A	A	Baseline	ns	ns	nc	ns	ns	ns	ns	ns		nc
							2018	18.5																	ns	-16	nc
							2019	7.52																	ns	-6.6	nc
							2020	-																	nc	nc	nc
							2021	12.0																	ns	-9.9	-11
							2022	14.8																	-9.6	-11	-13
							2023	13.3																	-6.5	-9.8	-11
							2024	5.81																	ns	ns	-4.6
					Exposed	HAC-R1	2007	14.9	BC	BC	BC	A	AB	C	C	C	Baseline	ns	ns	25	ns	ns	ns	ns		nc	nc
							2018	7.61																		-6.8	nc
							2019	11.9																		-10	nc
							2020	43.5																		-37	-38
							2021	32.2																		-28	-29
							2022	4.01																		ns	-3.6
							2023	6.09																		-3.4	-4.6
							2024	7.25																		ns	-5.9
						HAC-U (HAC-R2)[f]	2007	14.9	A	D	D	CD	CD	BC	BC	AB	Baseline	-13	-13	-12	-12	-11	-11	ns			nc
							2018	0																			nc
							2019	0.155																			nc
							2020	1.87																			ns
							2021	0.901																			ns
							2022	2.67																			-2.4
							2023	2.30																			ns
							2024	4.78																			-3.7
						HAC-R3	2007	14.9	A	-	-	B	B	B	B	B	Baseline	nc	nc	-13	-13	-13	-12	-13			
							2020	0.295																			
							2021	0																			
							2022	0																			
							2023	0.912																			
							2024	0.608																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Chironomidae (%)	none	-	-	<0.001	Reference	FPC-R3	2018	51.8	-	A	AB	BCD	ABC	D	CD	D	-	Baseline	ns	-3.1	ns	-4.4	-3.4	-4.1	ns	ns	nc
							2019	38.4																	ns	ns	nc
							2020	22.1																	ns	ns	ns
							2021	35.3																	ns	-2.1	-2.1
							2022	9.46																	5.5	2.8	ns
							2023	19.1																	3.6	3.2	ns
							2024	12.6																	4.0	3.0	ns
						EDC-U	2007	24.9	B	A	AB	nc	A	B	B	AB	Baseline	2.2	ns	nc	2.1	ns	ns	ns	ns		nc
							2018	46.4																	1.6	1.7	nc
							2019	29.9																	ns	1.6	nc
							2020	-																	nc	nc	nc
							2021	45.3																	-2.3	-3.1	-3.1
							2022	19.3																	4.5	1.8	ns
							2023	26.2																	2.8	2.5	ns
							2024	36.2																	ns	ns	-2.0
					Exposed	HAC-R1	2007	21.6	C	A	BC	C	C	A	A	AB	Baseline	4.2	ns	ns	ns	4.2	3.3	3.0			nc
							2018	62.2																			nc
							2019	33.7																			nc
							2020	32.2																			-2.2
							2021	23.1																			ns
							2022	62.2																			-2.7	-5.8
							2023	53.5																			ns	-3.5
							2024	50.7																			ns	-3.5
						HAC-U (HAC-R2)[f]	2007	21.6	CD	A	AB	BCD	D	BC	AB	B	Baseline	4.3	2.5	ns	ns	ns	2.9	2.0			nc
							2018	62.7																			nc
							2019	45.4																			nc
							2020	32.1																			-2.2
							2021	15.4																			ns
							2022	36.4																			-3.2
							2023	49.8																			-3.1
							2024	41.2																			-2.5
						HAC-R3	2007	21.6	A	-	-	A	A	A	A	A	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	11.4																			
							2021	15.4																			
							2022	6.07																			
							2023	20.0																			
							2024	17.5																			

P-value < 0.1.
Magnitude of Difference (MOD) < -2.
Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: **Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024**

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Elmidae (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	1.72	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-2.1	-2.1	nc
							2019	1.73																	-2.1	-2.1	nc
							2020	2.29																	-2.8	ns	ns
							2021	0.284																	ns	ns	ns
							2022	1.30																	ns	4.4	ns
							2023	2.67																	ns	9.2	18
							2024	4.60																	ns	22	33
						EDC-U	2007	4.92	A	B	AB	nc	B	AB	AB	A	Baseline	-4.3	ns	nc	-4.9	ns	ns	ns	ns		nc
							2018	1.42																	-1.7	-1.7	nc
							2019	2.87																	-3.5	-3.5	nc
							2020	-																	nc	nc	nc
							2021	0.877																	ns	ns	ns
							2022	2.61																	-2.6	ns	ns
							2023	0.890																	ns	11	20
							2024	8.41																	ns	ns	ns
						HAC-R1	2007	6.10	A	C	BC	C	BC	BC	B	A	Baseline	-7.4	-7.4	-7.4	-7.1	-6.9	-4.9	ns			nc	nc
							2018	0																		ns	nc
							2019	0																		ns	nc
							2020	0																		ns	2.0
							2021	0.312																		ns	ns
							2022	0.461																		5.5	ns
							2023	2.11																		9.9	18
							2024	8.60																		ns	ns
					Exposed	HAC-U (HAC-R2)[f]	2007	6.10	A	B	B	B	B	A	A	A	Baseline	-7.4	-7.4	-7.4	-7.1	ns	ns	ns			nc
							2018	0																			nc
							2019	0																			nc
							2020	0																			ns
							2021	0.313																			ns
							2022	4.93																			-3.8
							2023	10.2																			ns
							2024	23.0																			ns
						HAC-R3	2007	6.10	A	-	-	B	B	B	A	A	Baseline	nc	nc	-5.4	-6.7	-5.2	ns	ns			
							2020	1.68																			
							2021	0.613																			
							2022	1.83																			
							2023	17.0																			
							2024	31.9																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Non-Chironomidae Diptera (%)	rank	-	-	0.003	Reference	FPC-R3	2018	0.820	-	A	A	A	A	A	A	A	-	Baseline	ns	ns	ns	ns	ns	ns	-1.7	ns	nc
							2019	0.926																	ns	7.3	nc
							2020	1.09																	ns	16	ns
							2021	0.902																	ns	ns	ns
							2022	0.744																	ns	ns	ns
							2023	1.53																	ns	ns	ns
							2024	0.872																	ns	ns	ns
						EDC-U	2007	0.522	A	A	A	nc	A	A	A	A	Baseline	ns	ns	nc	ns	ns	ns	ns	ns		nc
							2018	1.28																	-2.7	ns	nc
							2019	1.20																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	0.877																	ns	ns	ns
							2022	0.397																	3.6	3.3	ns
							2023	0.316																	ns	3.4	ns
							2024	1.07																	ns	ns	ns
					Exposed	HAC-R1	2007	0.927	AB	B	A	A	B	A	AB	A	Baseline	ns	ns	ns	ns	ns	ns	ns		nc	nc
							2018	0																		6.1	nc
							2019	1.79																		ns	nc
							2020	1.23																		15	ns
							2021	0.282																		3.2	ns
							2022	2.08																		ns	-3.1
							2023	0.937																		ns	ns
							2024	1.88																		ns	ns
						HAC-U (HAC-R2)[f]	2007	0.927	B	AB	AB	A	AB	AB	AB	AB	Baseline	ns	ns	16	ns	ns	ns	ns			nc
							2018	2.88																			nc
							2019	4.37																			nc
							2020	8.41																			ns
							2021	1.76																			ns
							2022	1.94																			ns
							2023	1.92																			-2.6
							2024	1.88																			ns
						HAC-R3	2007	0.927	A	-	-	A	A	A	A	A	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	1.57																			
							2021	0.730																			
							2022	0.601																			
							2023	0.676																			
							2024	0.958																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas													Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Oligochaeta (%)	rank	-	-	<0.001	Reference	FPC-R3	2018	4.83	-	A	A	AB	A	AB	B	B	-	Baseline	ns	ns	ns	ns	-5.1	-5.1	ns	ns	nc
							2019	2.57																	ns	ns	nc
							2020	2.54																	ns	-2.5	ns
							2021	8.62																	ns	-9.1	-9.8
							2022	1.24																	ns	ns	ns
							2023	0.333																	ns	ns	ns
							2024	0.287																	9.4	ns	ns
						EDC-U	2007	0.283	B	A	A	nc	A	AB	AB	AB	Baseline	4.9	5.1	nc	7.3	ns	ns	ns	1.5		nc
							2018	4.62																	ns	ns	nc
							2019	4.76																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	6.73																	-6.6	-6.9	-7.6
							2022	2.28																	ns	-2.2	-2.2
							2023	1.27																	ns	ns	ns
							2024	1.31																	ns	ns	ns
					Exposed	HAC-R1	2007	1.63	AB	AB	B	AB	B	B	AB	A	Baseline	ns	ns	ns	ns	ns	ns	ns		nc	nc
							2018	2.96																		ns	nc
							2019	1.06																		ns	nc
							2020	1.74																		ns	ns
							2021	0.938																		ns	ns
							2022	0.896																		ns	ns
							2023	2.00																		ns	-1.9
							2024	8.57																		ns	ns
						HAC-U (HAC-R2)[f]	2007	1.63	BC	A	AB	C	C	C	BC	BC	Baseline	18	ns	ns	ns	ns	ns	ns			nc
							2018	17.6																			nc
							2019	7.82																			nc
							2020	0.309																			ns
							2021	0.601																			ns
							2022	0.357																			ns
							2023	0.719																			ns
							2024	1.57																			ns
						HAC-R3	2007	1.63	AB	-	-	A	B	AB	AB	A	Baseline	nc	nc	ns	ns	ns	ns	ns			
							2020	3.14																			
							2021	0																			
							2022	0.300																			
							2023	0.323																			
							2024	1.85																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas													Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
CA1 (29.0%)	rank	-	-	<0.001	Reference	FPC-R3	2018	-1.31	-	B	AB	AB	AB	AB	A	A	-	Baseline	ns	ns	ns	ns	3.0	4.6	14	15	nc
							2019	-1.21																	13	14	nc
							2020	-1.11																	13	14	10
							2021	-1.05																	11	12	8.8
							2022	-1.05																	13	12	9.6
							2023	-0.898																	9.9	11	8.3
							2024	-0.667																	8.7	9.0	5.4
						EDC-U	2007	-0.664	A	A	A	nc	A	A	A	A	Baseline	ns	ns	ns	ns	ns	ns	ns	ns		nc
							2018	-0.578																	9.1	9.9	nc
							2019	-0.738																	9.9	11	nc
							2020	-																	nc	nc	nc
							2021	-0.597																	7.5	9.0	5.5
							2022	-0.743																	10	9.6	7.4
							2023	-0.705																	8.5	9.4	6.9
							2024	-0.809																	9.7	10	6.4
					Exposed	HAC-R1	2007	-0.711	C	AB	A	A	B	AB	AB	AB	Baseline	10	9.7	9.8	8.3	10	8.5	9.0		ns	nc
							2018	0.677																		0.89	nc
							2019	0.627																		ns	nc
							2020	0.641																		ns	-2.2
							2021	0.442																		ns	ns
							2022	0.699																		ns	-3.0
							2023	0.472																		ns	-1.6
							2024	0.540																		ns	-3.3
						HAC-U (HAC-R2)[f]	2007	-0.711	D	A	AB	AB	BC	BC	C	BC	Baseline	11	10	11	9.8	9.4	9.4	9.3			nc
							2018	0.800																			nc
							2019	0.749																			nc
							2020	0.773																			-3.1
							2021	0.652																			-3.5
							2022	0.588																			-2.3
							2023	0.596																			-2.5
							2024	0.581																			-3.6
						HAC-R3	2007	-0.711	B	-	-	A	A	A	A	A	Baseline	nc	nc	7.6	6.4	7.1	6.9	5.7			
							2020	0.340																			
							2021	0.171																			
							2022	0.276																			
							2023	0.250																			
							2024	0.0764																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area*, *Year*, and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
CA2 (10.4%)	none	-	-	<0.001	Reference	FPC-R3	2018	-0.242	-	B	AB	AB	AB	AB	AB	A	-	Baseline	ns	ns	ns	ns	ns	1.8	-2.3	-1.7	nc
							2019	-0.166																	ns	ns	nc
							2020	-0.0362																	ns	ns	3.7
							2021	-0.146																	ns	3.0	5.7
							2022	0.100																	ns	ns	4.5
							2023	0.0639																	-1.9	ns	ns
							2024	0.212																	-4.0	-3.4	ns
						EDC-U	2007	0.340	A	D	AB	nc	D	A	CD	BC	Baseline	-5.5	ns	nc	-5.3	ns	-4.5	-3.2	ns		nc
							2018	-1.03																	ns	ns	nc
							2019	-0.0304																	ns	ns	nc
							2020	-																	nc	nc	nc
							2021	-0.996																	5.0	6.4	9.1
							2022	0.141																	ns	ns	4.3
							2023	-0.784																	ns	3.0	4.8
							2024	-0.460																	ns	ns	ns
					Exposed	HAC-R1	2007	0.388	A	C	BC	B	A	A	BC	C	Baseline	-4.8	-3.0	-2.8	ns	ns	-3.2	-4.7			nc
							2018	-0.811																			nc
							2019	-0.370																			nc
							2020	-0.311																			4.8
							2021	0.256																			4.1
							2022	0.206																			4.0
							2023	-0.407																			3.3
							2024	-0.801																			2.9
						HAC-U (HAC-R2)[f]	2007	0.388	AB	D	C	ABC	A	AB	BC	D	Baseline	-4.2	-2.0	ns	ns	ns	ns	-4.1			nc
							2018	-0.660																			nc
							2019	-0.104																			nc
							2020	0.338																			2.2
							2021	0.605																			2.8
							2022	0.406																			3.2
							2023	-0.0369																			1.8
							2024	-0.642																			2.3
						HAC-R3	2007	0.388	B	-	-	A	A	A	B	C	Baseline	nc	nc	2.0	3.6	3.3	ns	-1.8			
							2020	0.899																			
							2021	1.30																			
							2022	1.22																			
							2023	0.422																			
							2024	-0.0728																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
CA3 (7.9%)	rank	-	-	<0.001	Reference	FPC-R3	2018	0.0621	-	CD	BCD	ABC	D	AB	AB	A	-	Baseline	ns	ns	ns	2.3	2.0	2.6	4.1	6.8	nc
							2019	0.180																	3.1	5.9	nc
							2020	0.404																	ns	ns	-4.3
							2021	-0.0650																	ns	ns	ns
							2022	0.406																	-2.8	-5.2	-5.7
							2023	0.361																	-5.4	-6.9	-6.4
							2024	0.448																	-6.8	-8.3	-7.3
						EDC-U	2007	0.505	A	B	B	nc	C	B	C	C	Baseline	-5.4	-4.1	nc	-7.7	-2.6	-7.6	-8.2	-1.8		nc
							2018	-0.287																	6.5	9.2	nc
							2019	-0.0975																	5.0	7.8	nc
							2020	-																	nc	nc	nc
							2021	-0.627																	4.3	5.3	ns
							2022	0.128																	ns	-3.3	-3.8
							2023	-0.614																	ns	ns	ns
							2024	-0.694																	ns	ns	ns
					Exposed	HAC-R1	2007	0.243	AB	A	A	B	B	B	C	C	Baseline	ns	ns	ns	ns	ns	-4.6	-5.4		ns	nc
							2018	0.662																		ns	nc
							2019	0.634																		ns	nc
							2020	0.0627																		ns	ns
							2021	-0.000426																		ns	-2.9
							2022	-0.00837																		-2.4	-2.9
							2023	-0.433																		ns	ns
							2024	-0.545																		ns	ns
						HAC-U (HAC-R2)[f]	2007	0.243	BC	A	AB	C	C	D	D	D	Baseline	5.5	ns	ns	ns	-4.1	-6.1	-6.9			nc
							2018	1.06																			nc
							2019	1.04																			nc
							2020	0.159																			-2.6
							2021	0.155																			-3.9
							2022	-0.358																			ns
							2023	-0.646																			ns
							2024	-0.773																			ns
						HAC-R3	2007	0.243	A	-	-	B	BC	BC	BC	C	Baseline	nc	nc	-3.2	-4.5	-4.6	-5.6	-5.9			
							2020	-0.224																			
							2021	-0.420																			
							2022	-0.435																			
							2023	-0.570																			
							2024	-0.615																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas													Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Dry Weight Benthic Biomass (g/m² DW)	rank	-	-	0.002	Reference	FPC-R3	2018	1.17	-	AB	B	B	B	AB	AB	A	-	Baseline	ns	ns	ns	ns	ns	ns	ns	ns	nc
							2019	0.992																	2.3	3.3	nc
							2020	0.696																	3.0	3.7	ns
							2021	1.29																	ns	ns	ns
							2022	2.64																	ns	ns	ns
							2023	2.20																	ns	ns	ns
							2024	8.34																	ns	ns	-8.3
						EDC-U	2018	0.177	-	A	A	nc	A	A	A	A	-	Baseline	ns	nc	ns	ns	ns	ns	ns	ns		nc
							2019	0.462																	2.9	3.8	nc
							2020	-																	nc	nc	nc
							2021	0.376																	1.8	2.7	2.1
							2022	1.12																	ns	ns	ns
							2023	0.342																	1.4	2.4	2.6
							2024	2.14																	ns	ns	ns
					Exposed	HAC-R1	2018	0.910	-	B	A	A	AB	AB	AB	AB	-	Baseline	2.5	2.8	ns	ns	ns	ns		ns	nc
							2019	3.07																		ns	nc
							2020	3.33																		ns	-3.1
							2021	1.98																		ns	ns
							2022	2.43																		ns	ns
							2023	1.55																		ns	ns
							2024	1.34																		ns	ns
						HAC-U (HAC-R2)[f]	2018	0.910	-	B	AB	AB	AB	A	AB	AB	-	Baseline	ns	ns	ns	2.9	ns	ns			nc
							2019	3.88																			nc
							2020	3.97																			-3.8
							2021	2.80																			ns
							2022	3.52																			ns
							2023	2.43																			ns
							2024	2.37																			ns
						HAC-R3	2020	3.97	-	-	-	A	A	A	A	A	-	-	-	Baseline	ns	ns	ns	ns			
							2021	2.20																			
							2022	1.53																			
							2023	2.63																			
							2024	0.960																			

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.1: Statistical Comparisons of Benthic Invertebrate Community Metrics for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Endpoint	Transformation	2-Way ANOVA P-values			Type	Area	Year[a]	MCT[b]	Temporal Contrasts Within Areas														Spatial Comparison Within Years[c,e]		
									Pairwise Comparisons Between Years								MOD Relative to Baseline[c]										
		Area	Year	Area x Year					2007 (Pre-breach)[d]	2018	2019	2020	2021	2022	2023	2024	2007 (Pre-breach)	2018	2019	2020	2021	2022	2023	2024	HAC-R1	HAC-U (HAC-R2)[f]	HAC-R3
Wet Weight Benthic Biomass (g/m² WW)	rank	-	-	<0.001	Reference	FPC-R3	2018	11.6	-	AB	BC	BC	BC	C	AB	A	-	Baseline	ns	ns	ns	-4.8	ns	ns	ns	ns	nc
							2019	5.00																		8.3	12	nc
							2020	3.61																		4.8	8.4	ns
							2021	5.22																		ns	ns	ns
							2022	1.39																		ns	ns	ns
							2023	9.69																		ns	ns	ns
							2024	39.7																		ns	ns	-17
						EDC-U	2018	1.37	-	AB	A	nc	AB	B	AB	A	-	Baseline	ns	nc	ns	ns	ns	ns	ns			nc
							2019	2.50																		9.5	13	nc
							2020	-																		nc	nc	nc
							2021	1.98																		3.3	6.2	3.4
							2022	0.359																		ns	ns	ns
							2023	2.46																		ns	3.7	ns
							2024	8.27																		ns	ns	ns
					Exposed	HAC-R1	2018	6.29	-	BC	A	A	AB	C	AB	AB	-	Baseline	8.6	4.4	ns	ns	ns	ns			ns	nc
							2019	22.5																				ns	nc
							2020	13.8																				ns	-5.3
							2021	8.97																				ns	ns
							2022	0.555																				ns	ns
							2023	8.23																				ns	ns
							2024	5.48																				ns	ns
						HAC-U (HAC-R2)[f]	2018	6.29	-	A	A	A	A	B	A	A	-	Baseline	ns	ns	ns	-2.6	ns	ns				nc
							2019	29.7																					nc
							2020	21.2																					-8.8
							2021	15.0																					ns
							2022	0.790																					ns
							2023	10.3																					ns
							2024	10.3																					ns
						HAC-R3	2020	21.2	-	-	-	AB	A	B	A	A	-	-	-	Baseline	ns	ns	ns	ns				
							2021	9.22																					
							2022	0.370																					
							2023	12.0																					
							2024	4.09																					

P-value < 0.1.

Magnitude of Difference (MOD) < -2.

Magnitude of Difference (MOD) > 2.

Notes: "-" = no data available. nc = no comparison. ns = non-significance. nm = Contrast MODs could not be calculated because the Median Absolute Deviation (MAD) = 0. " - " = no value. EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. Reference area EDC-U was not sampled in 2020 due to habitat differences (in water depth and flow) relative to the remediated areas HAC-R1, HAC-U (HAC-R2), and HAC-R3. Monitoring at area HAC-R3 was initiated in 2020. See Section 4.3 for details.

[a] Data from 2007 were used in the analyses to compare post-breach (2018 to 2024) to pre-breach conditions (2007). Post-breach data from HAC-R1, HAC-U (HAC-R2), and HAC-R3 were compared to pre-breach data from UHC, and post-breach data from EDC-U were compared to pre-breach data from UER.

[b] MCT = Measure of Central Tendency, which is the mean, geometric mean, or median depending on if analysis was conducted on untransformed, log10-transformed, or rank-transformed data.

[c] Magnitude of difference (MOD) calculated for two-way Analysis of Variance (ANOVA) as (Exposed Mean - Reference Mean)/SD (or [Mean - Baseline Mean]/SD for temporal comparisons) on the transformed scale, where SD was the pooled standard deviation of the model residuals. MOD calculated for Kruskal-Wallis (i.e., rank-transformed data) as (Exposed Median - Reference Median)/MAD, where MAD was the pooled median absolute deviation.

[d] Pairwise contrasts of post-breach (2018 to 2024) data from HAC-R1, HAC-U (HAC-R2), HAC-R3 against pre-breach (2007) data from UHC are indicated with an * in Figure F.3.1.

[e] Spatial pairwise contrasts between HAC-R1, HAC-U (HAC-R2), and HAC-R3 in 2007 were not calculated because UHC in 2007 was used to represent pre-breach data for all three areas HAC-R1, HAC-U (HAC-R2), and HAC-R3.

[f] HAC-R2 is the alternate name used for the HAC-U sampling area for Habitat Remediation Working Group (HRWG) reporting.

[g] The two-way ANOVA (*Area* , *Year* , and *Area x Year* terms) was conducted with UHC (2007) considered as a separate area, while the temporal *post hoc* comparisons were conducted with UHC (2007) considered to be the same area as upper Hazeltine Creek areas (HAC-R1, HAC-U (HAC-R2), and HAC-R3 (see Section 4.3.3.2 for details). This difference in treatment of UHC (2007) data is the reason that *post hoc* comparisons were reported for Plecoptera (%) although the 2-way ANOVA was not significant (p > 0.1).

Table F.3.2: Taxon Scores from Correspondence Analysis (CA) of Benthic Invertebrate Community Results for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Phylum	Class	Order	Family	Taxa	CA1 (29.0%)	CA2 (10.4%)	CA3 (7.9%)
Annelida	Clitellata	Tubificida	Naididae	*Nais*	0.614	-0.534	0.492
				Tubificinae	-1.18	-1.23	-0.684
Arthropoda	Arachnida	-	-	Arachnida	-0.251	-0.387	-0.108
Arthropoda	Insecta	Coleoptera	Elmidae	Elmidae	-0.267	-0.0167	-0.965
				Optioservus	-0.219	-0.0376	-1.06
		Diptera	Chironomidae	*Corynoneura*	-0.550	-0.397	0.235
				Eukiefferiella	-0.334	0.683	0.235
				Micropsectra	-0.350	0.0513	-0.126
				Microtendipes	0.419	-1.59	-0.533
				Orthocladius complex	0.217	-0.551	0.351
				Parametriocnemus	0.595	-0.0409	-0.356
				Pentaneura	0.825	1.13	-0.596
				Polypedilum	-0.786	0.0980	-0.272
				Rheocricotopus	-1.61	-0.0232	-0.0995
				Rheotanytarsus	0.725	0.0392	-0.0229
				Synorthocladius	0.418	-0.476	0.374
				Tanytarsus	0.539	-0.741	-0.0587
				Thienemanniella	-0.636	0.212	0.926
				Thienemannimyia	0.181	-0.179	-0.0981
				Tvetenia	0.195	0.390	1.01
			Simuliidae	Simuliidae	0.669	0.196	0.906
			Tipulidae	*Antocha*	0.760	0.550	-0.540
		Ephemeroptera	Baetidae	*Baetis*	0.0128	0.836	0.278
				Diphetor hageni	-0.244	1.03	-0.148
			Heptageniidae	Heptageniidae	-1.01	0.301	-0.386
			Leptophlebiidae	Leptophlebiidae	-0.200	-0.0792	-0.0265
		Plecoptera	Capniidae	Capniidae	-1.40	-0.125	0.199
			Chloroperlidae	*Sweltsa*	-1.79	-0.0688	0.290
			Nemouridae	*Zapada*	-1.36	0.920	0.536
		Trichoptera	Hydropsychidae	*Cheumatopsyche*	0.956	0.255	0.269
				Hydropsyche	0.793	0.738	0.727
				Hydropsychidae	0.728	0.396	0.179
			Hydroptilidae	*Hydroptila*	0.970	-0.936	0.795
			Lepidostomatidae	Lepidostomatidae	0.463	1.14	-1.19
Mollusca	Bivalvia	Sphaeriida	Sphaeriidae	Sphaeriidae	-1.66	-0.221	0.768
	Gastropoda	Lymnaeida	Lymnaeidae	Lymnaeidae	0.845	-0.0735	-1.05
			Planorbidae	Planorbidae	0.951	-0.652	-0.285

Notes: Correspondence Analysis was conducted using ln(x+1)-transformed density benthic invertebrate results at the Lowest Practicable Level (LPL). "-" no applicable data. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

Table F.3.3: Spearman's Rank Correlation Relationships Between Benthic Invertebrate Community Metrics and Supporting Measures for the Upper Hazeltine Creek (HAC-R1, HAC-U [HAC-R2], HAC-R3; Exposed), Frypan Creek (FPC-R3; Reference), and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2007 to 2024

Benthic Invertebrate Community Endpoint	Correlation Parameter	Mean Water Depth (cm)	Mean Water Velocity (m/s)	Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (%)	pH	Specific Conductivity (µS/cm)	Median Substrate Size (cm)
Density (#/m²)	Correlation Coefficient	0.208	0.427	0.174	0.354	0.376	0.289	0.23	0.132
	Sig. (2-tailed)	0.007	<0.001	0.026	<0.001	<0.001	<0.001	0.003	0.102
Richness (# of taxa)	Correlation Coefficient	-0.175	-0.182	-0.176	-0.0643	-0.109	-0.267	-0.167	-0.0286
	Sig. (2-tailed)	0.024	0.019	0.024	0.414	0.167	<0.001	0.033	0.724
Simpson's Evenness	Correlation Coefficient	0.0757	0.0395	-0.0818	-0.118	-0.132	-0.0461	0.00524	-0.00582
	Sig. (2-tailed)	0.334	0.614	0.298	0.131	0.092	0.558	0.947	0.943
Simpson's Diversity	Correlation Coefficient	-0.0255	-0.0609	-0.151	-0.105	-0.14	-0.173	-0.0517	-0.0209
	Sig. (2-tailed)	0.745	0.437	0.054	0.183	0.075	0.027	0.512	0.796
Ephemeroptera (#/m²)	Correlation Coefficient	-0.311	0.412	-0.0896	0.0144	-0.0164	-0.146	-0.0665	-0.086
	Sig. (2-tailed)	<0.001	<0.001	0.254	0.854	0.835	0.062	0.399	0.287
Plecoptera (#/m²)	Correlation Coefficient	-0.793	-0.349	-0.58	-0.239	-0.398	-0.66	-0.572	-0.0717
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.375
Trichoptera (#/m²)	Correlation Coefficient	0.353	0.571	0.319	0.388	0.465	0.5	0.488	0.0846
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.295
EPT (#/m²)	Correlation Coefficient	-0.137	0.512	-0.00705	0.172	0.159	0.0638	0.0772	-0.0205
	Sig. (2-tailed)	0.078	<0.001	0.929	0.028	0.042	0.417	0.327	0.8
Arachnida (#/m²)	Correlation Coefficient	0.0616	-0.119	0.00422	0.00115	-0.00343	-0.105	-0.306	0.202
	Sig. (2-tailed)	0.432	0.128	0.957	0.988	0.965	0.179	<0.001	0.012
Chironomidae (#/m²)	Correlation Coefficient	0.343	0.224	0.201	0.272	0.306	0.28	0.168	0.138
	Sig. (2-tailed)	<0.001	0.004	0.01	<0.001	<0.001	<0.001	0.032	0.088
Elmidae (#/m²)	Correlation Coefficient	0.0652	-0.0137	-0.0271	0.0943	0.0874	-0.0421	0.0946	0.036
	Sig. (2-tailed)	0.405	0.862	0.73	0.23	0.266	0.593	0.23	0.656
Non-Chironomidae Diptera (#/m²)	Correlation Coefficient	0.281	0.432	0.167	0.239	0.259	0.267	0.248	-0.0767
	Sig. (2-tailed)	<0.001	<0.001	0.033	0.002	<0.001	<0.001	0.001	0.343
Oligochaeta (#/m²)	Correlation Coefficient	0.0805	-0.0772	0.00195	0.0209	-0.00164	0.00489	-0.0222	0.0583
	Sig. (2-tailed)	0.304	0.324	0.98	0.79	0.983	0.95	0.779	0.471
Ephemeroptera (%)	Correlation Coefficient	-0.527	0.112	-0.251	-0.178	-0.244	-0.376	-0.24	-0.145
	Sig. (2-tailed)	<0.001	0.151	0.001	0.023	0.002	<0.001	0.002	0.071
Plecoptera (%)	Correlation Coefficient	-0.768	-0.411	-0.594	-0.325	-0.476	-0.665	-0.609	-0.084
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.298
Trichoptera (%)	Correlation Coefficient	0.366	0.556	0.359	0.325	0.424	0.504	0.539	0.0391
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.629
EPT (%)	Correlation Coefficient	-0.398	0.278	-0.209	-0.0414	-0.0948	-0.182	-0.0879	-0.15
	Sig. (2-tailed)	<0.001	<0.001	0.007	0.599	0.227	0.019	0.265	0.063
Arachnida (%)	Correlation Coefficient	-0.0509	-0.366	-0.101	-0.192	-0.217	-0.26	-0.455	0.167
	Sig. (2-tailed)	0.516	<0.001	0.197	0.014	0.005	<0.001	<0.001	0.038
Chironomidae (%)	Correlation Coefficient	0.355	-0.173	0.137	0.018	0.0514	0.163	0.0167	0.147
	Sig. (2-tailed)	<0.001	0.026	0.08	0.819	0.513	0.037	0.832	0.067
Elmidae (%)	Correlation Coefficient	0.0329	-0.125	-0.0745	-0.00589	-0.0195	-0.116	0.0646	-0.0023
	Sig. (2-tailed)	0.675	0.111	0.343	0.94	0.804	0.138	0.413	0.977
Non-Chironomidae Diptera (%)	Correlation Coefficient	0.265	0.282	0.092	0.0466	0.0579	0.171	0.143	-0.172
	Sig. (2-tailed)	<0.001	<0.001	0.241	0.554	0.462	0.029	0.068	0.033
Oligochaeta (%)	Correlation Coefficient	-0.0241	-0.296	-0.11	-0.148	-0.186	-0.14	-0.148	0.0422
	Sig. (2-tailed)	0.758	<0.001	0.16	0.058	0.017	0.074	0.059	0.602
CA1 (29%)	Correlation Coefficient	0.721	0.514	0.565	0.387	0.53	0.691	0.634	0.0847
	Sig. (2-tailed)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.295
CA2 (10.4%)	Correlation Coefficient	-0.0644	0.462	0.0651	0.279	0.281	0.169	0.172	-0.133
	Sig. (2-tailed)	0.411	<0.001	0.407	<0.001	<0.001	0.03	0.028	0.099
CA3 (7.9%)	Correlation Coefficient	-0.326	0.147	-0.263	0.141	0.0424	-0.0963	-0.197	-0.0222
	Sig. (2-tailed)	<0.001	0.059	<0.001	0.071	0.59	0.22	0.012	0.784
Dry Weight Benthic Biomass (g/m² DW)	Correlation Coefficient	0.181	0.353	0.196	0.105	0.182	0.227	0.246	-0.0194
	Sig. (2-tailed)	0.025	<0.001	0.015	0.196	0.024	0.005	0.002	0.811
Wet Weight Benthic Biomass (g/m² WW)	Correlation Coefficient	0.0102	0.216	0.0804	0.098	0.119	0.0977	0.263	-0.184
	Sig. (2-tailed)	0.9	0.007	0.323	0.228	0.142	0.23	0.001	0.023

Significant correlation; p-value <0.00625 (p <0.05, Bonferroni corrected for 8 independent variables).

Notes: EPT = Ephemeroptera, Plecoptera, Trichoptera. DW = dry weight. WW = wet weight. #/m^2 = number per square metre. g/m^2 = grams per square metre. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting.

APPENDIX F.4
PERIPHYTON AND BENTHIC INVERTEBRATE TISSUE QUALITY

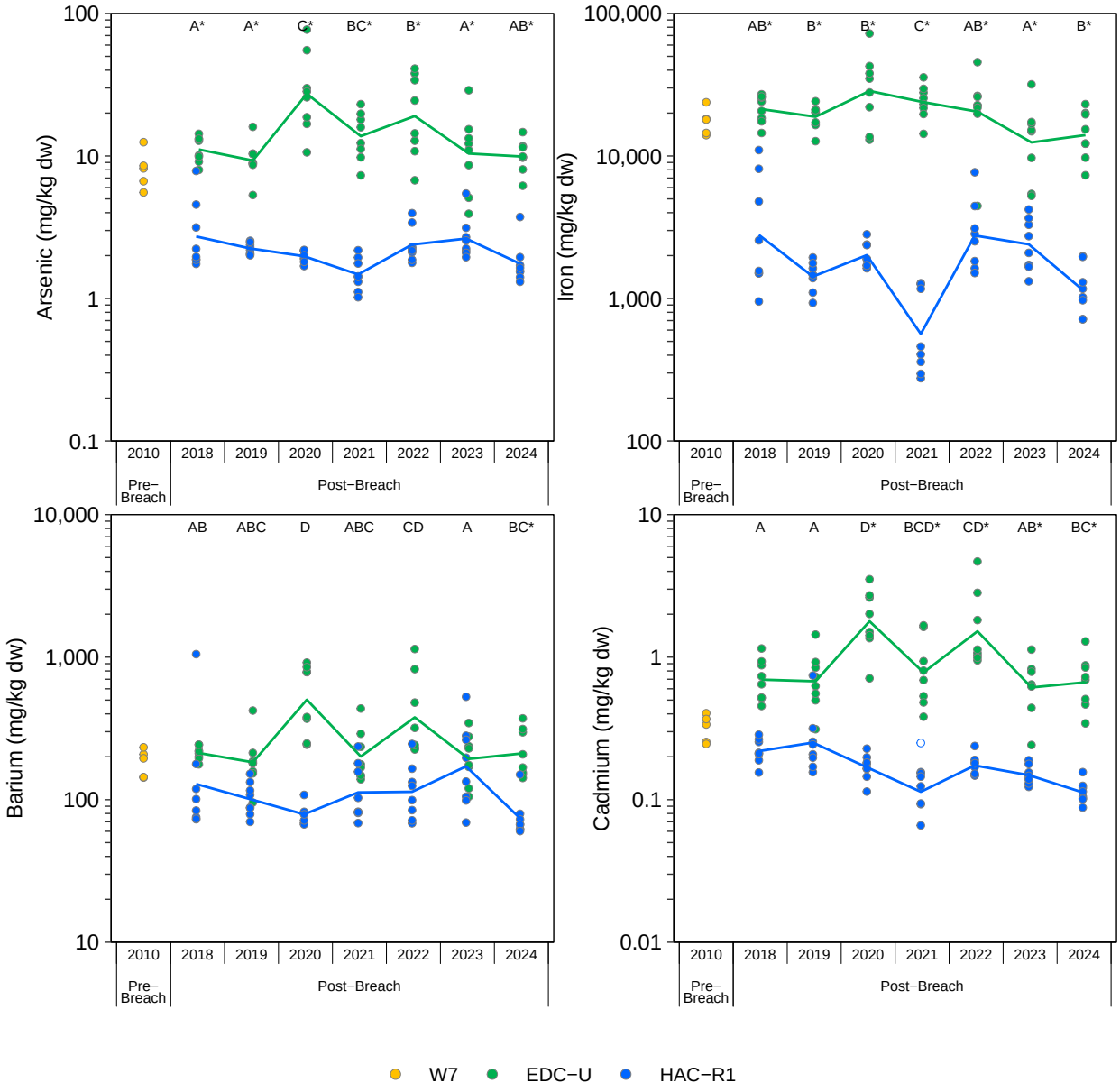

Figure F.4.1: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

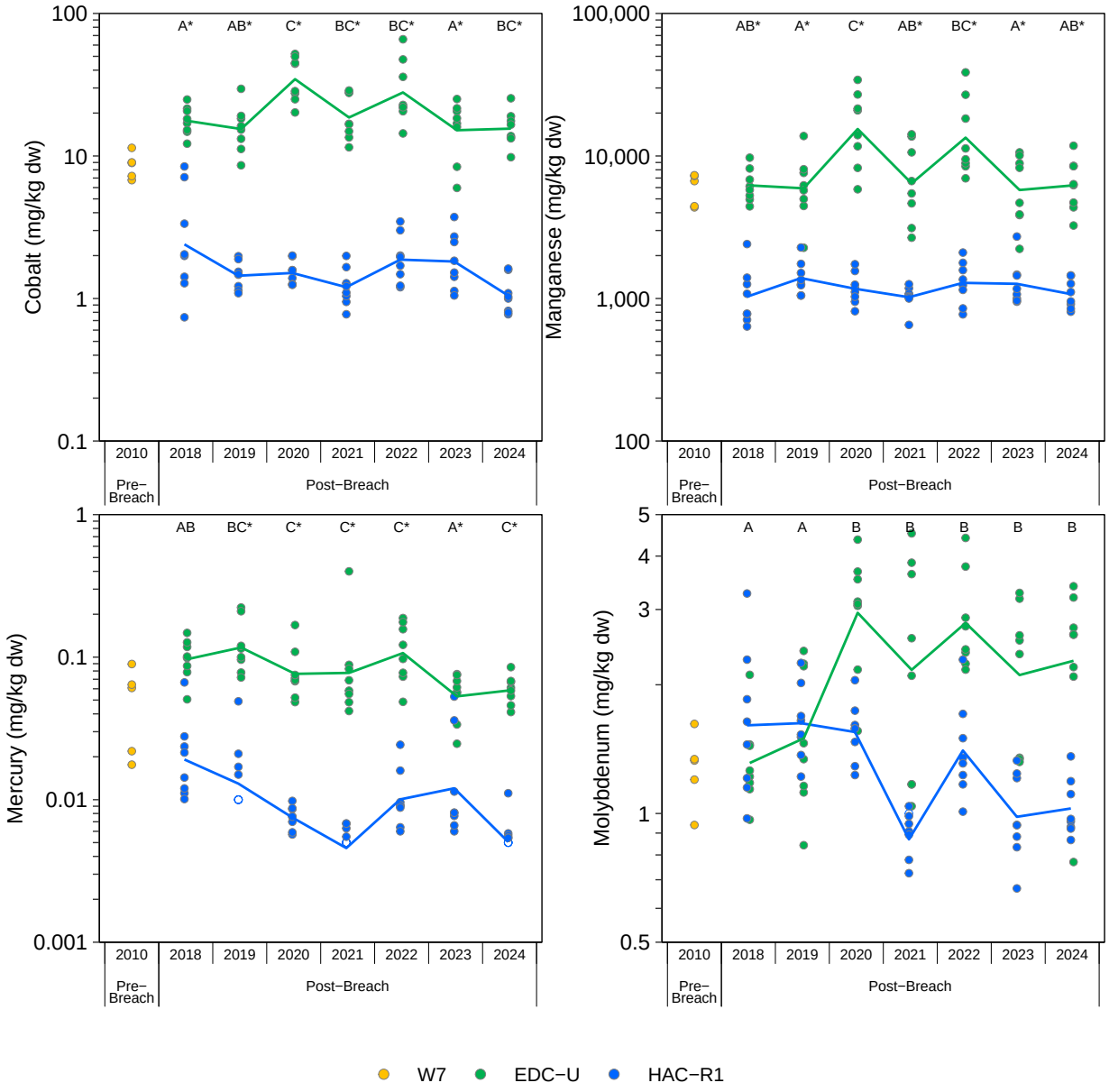

Figure F.4.1: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

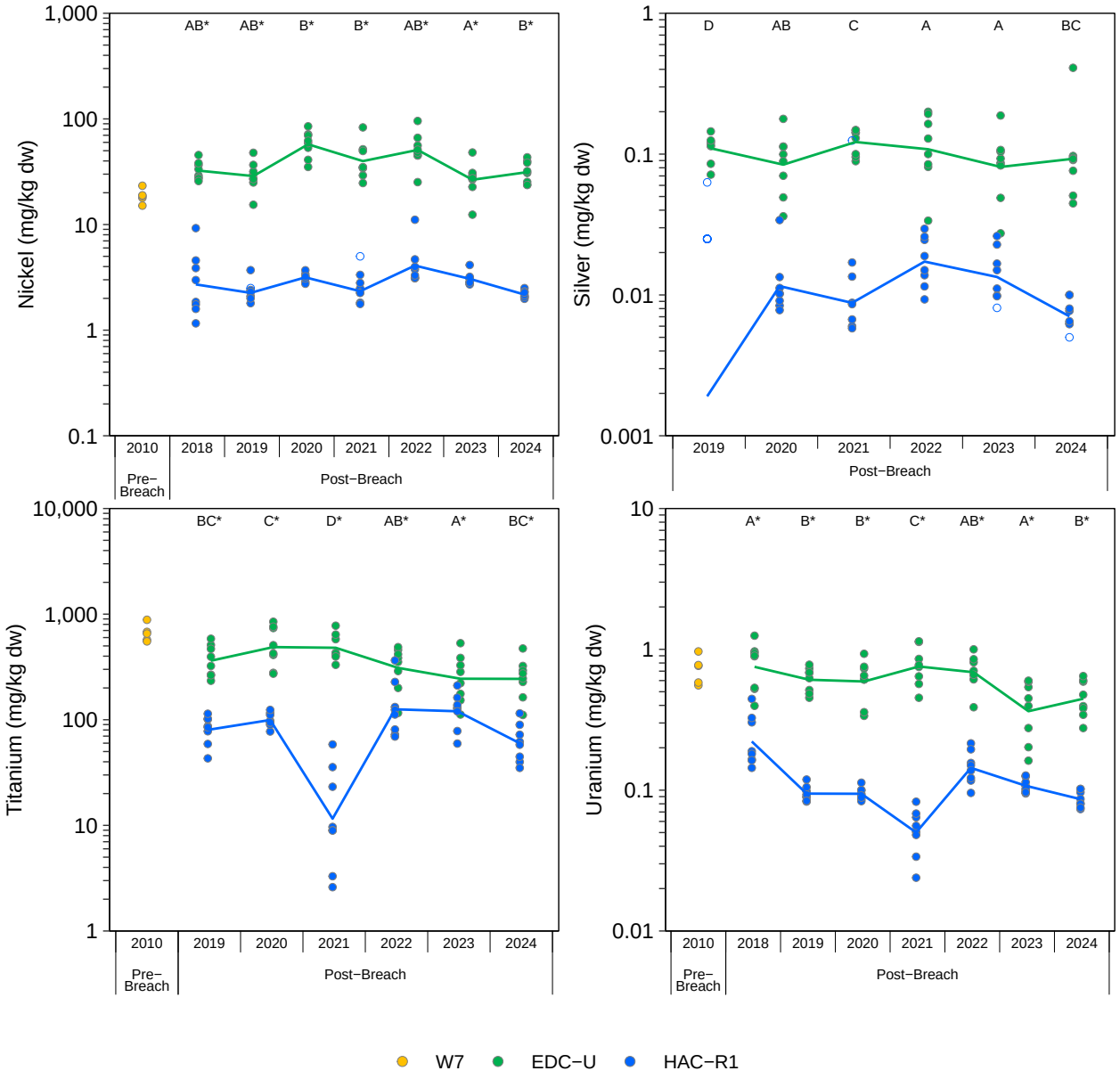

Figure F.4.1: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

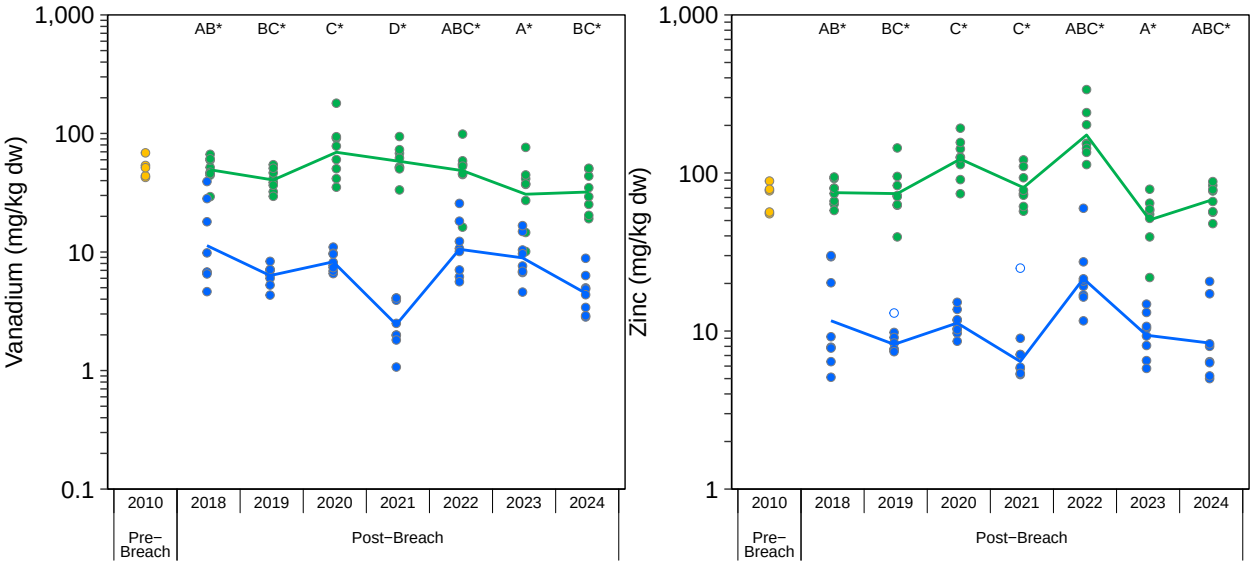

Figure F.4.1: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

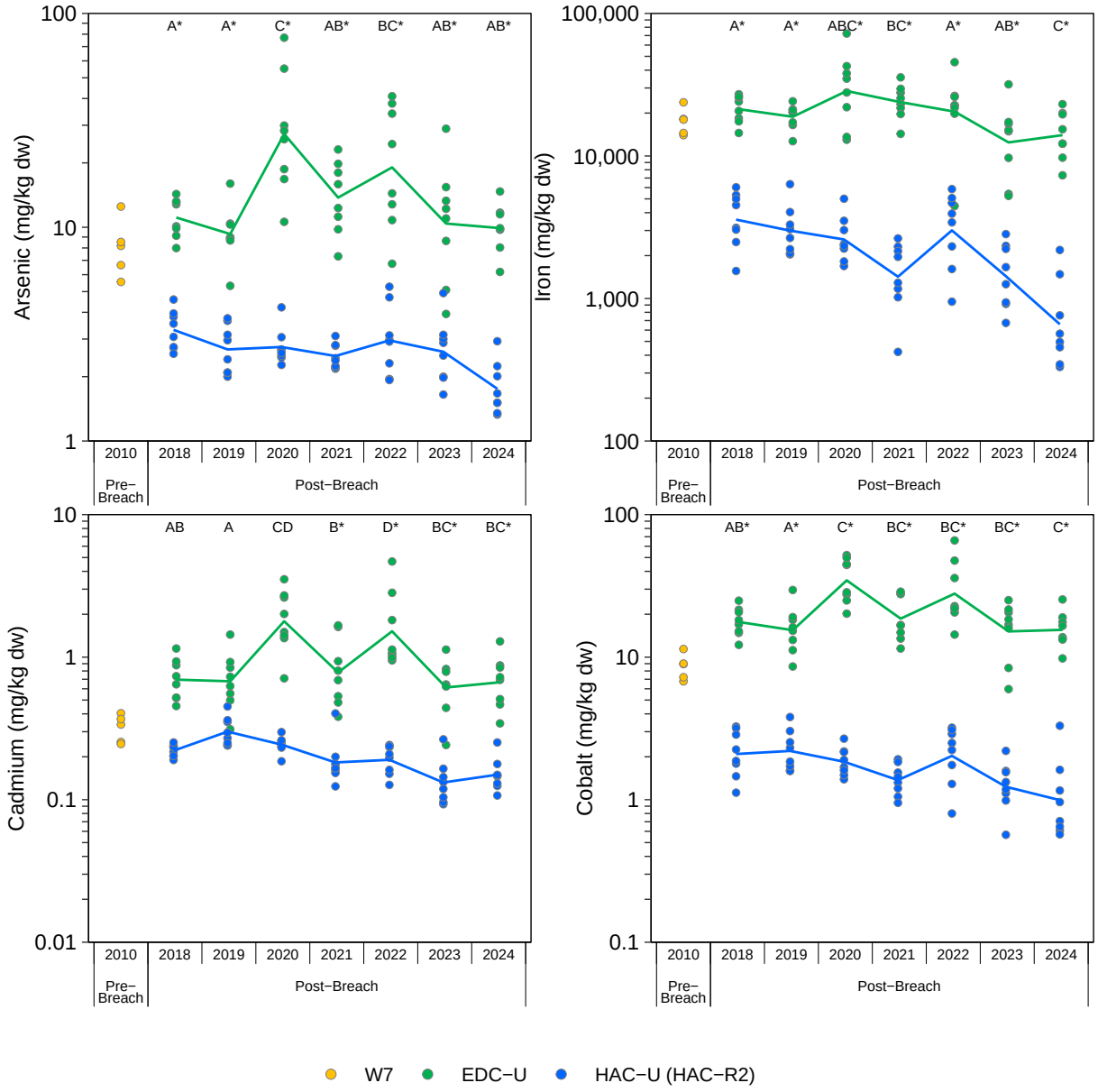

Figure F.4.2: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

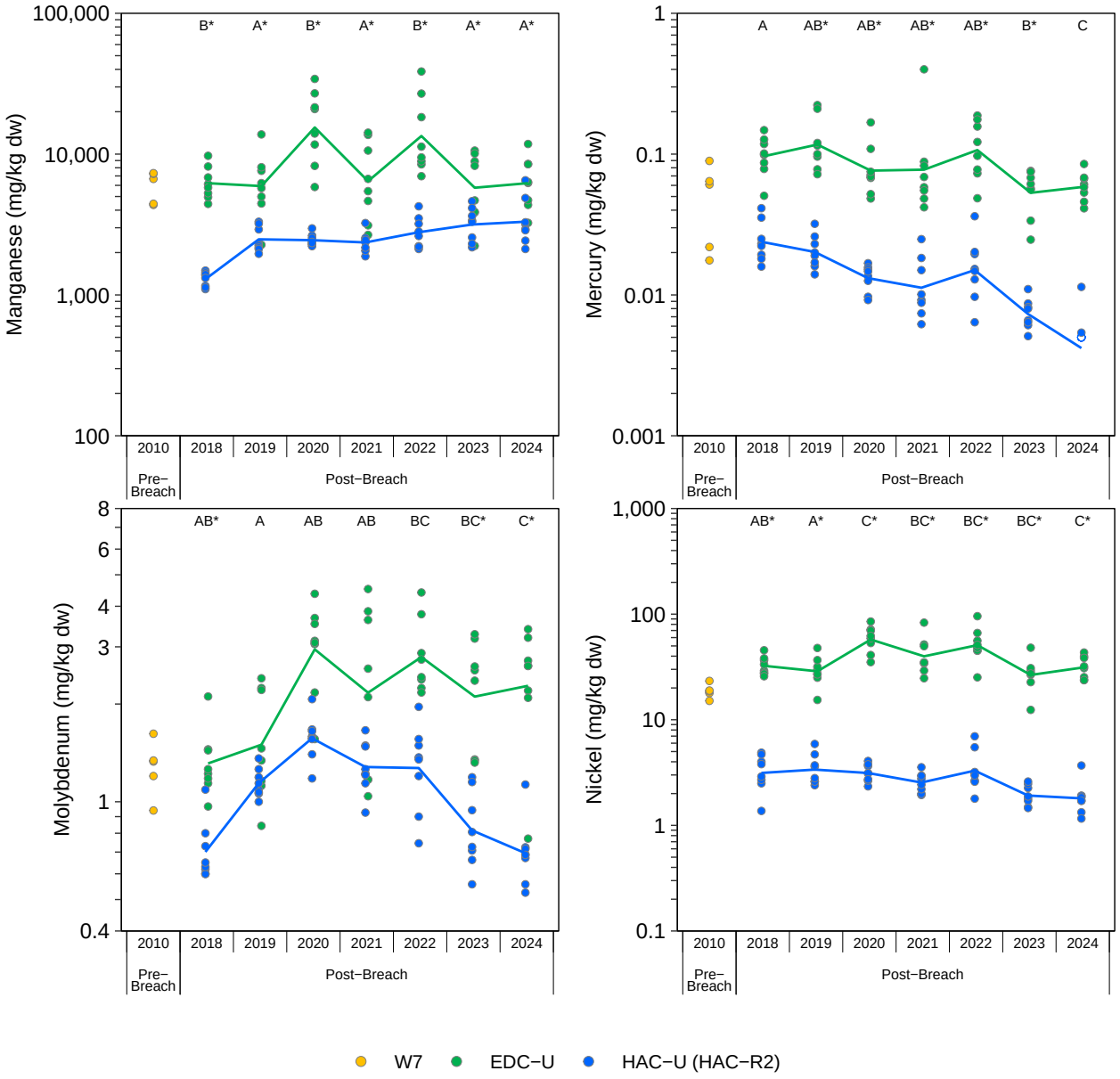

Figure F.4.2: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

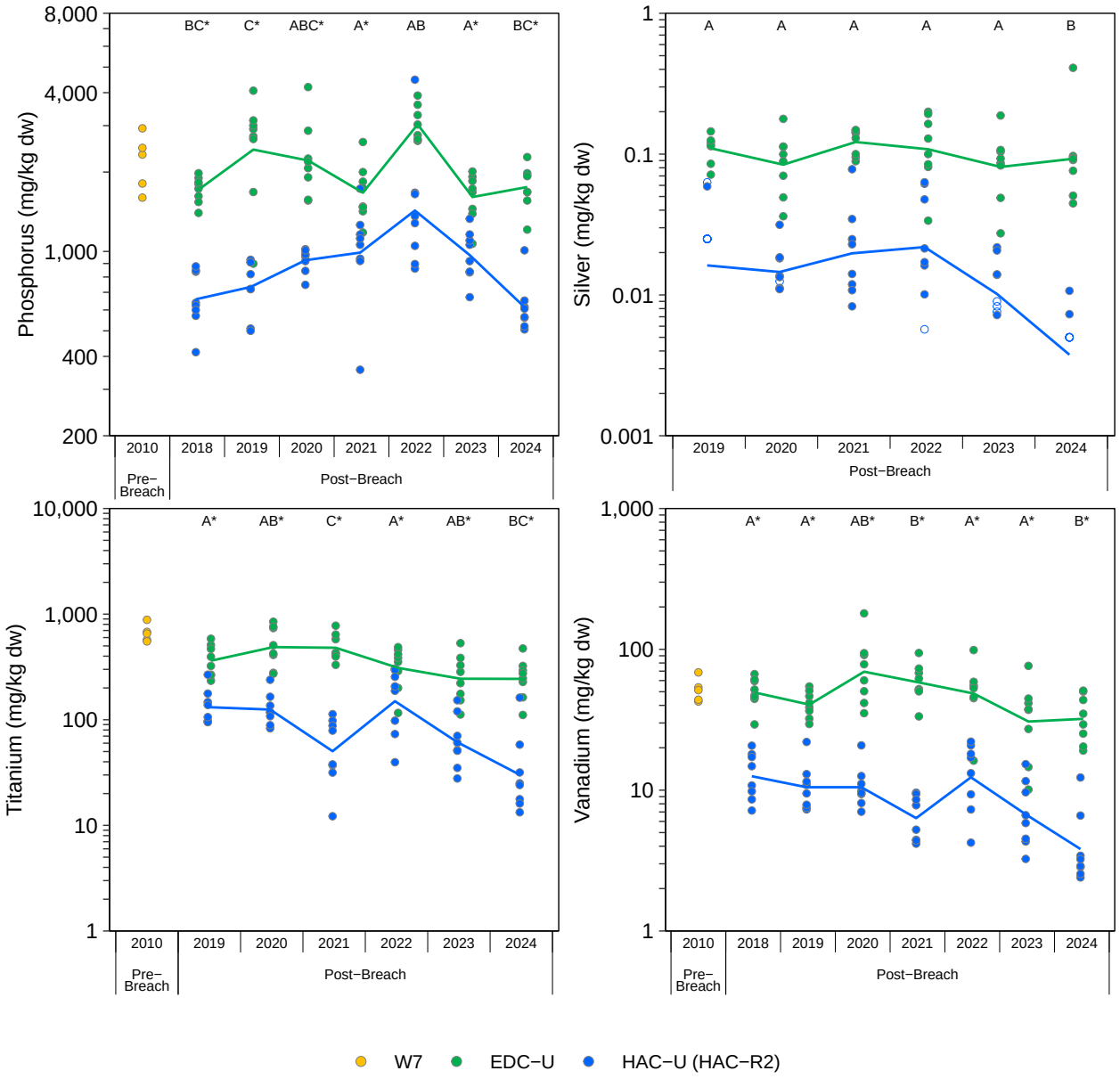

Figure F.4.2: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

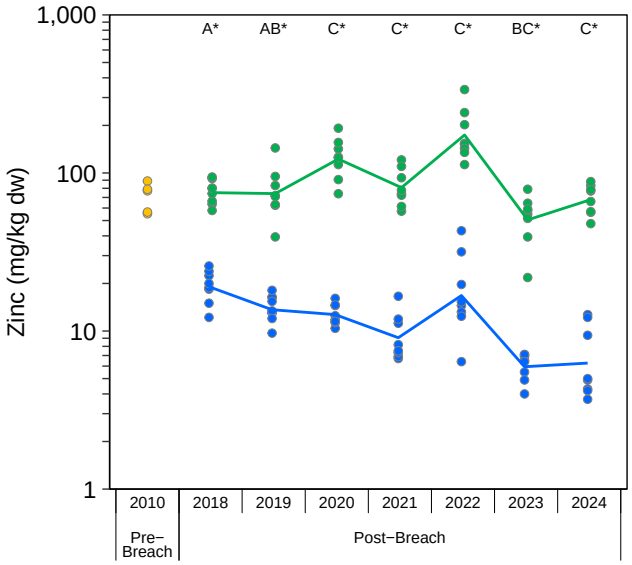

Figure F.4.2: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

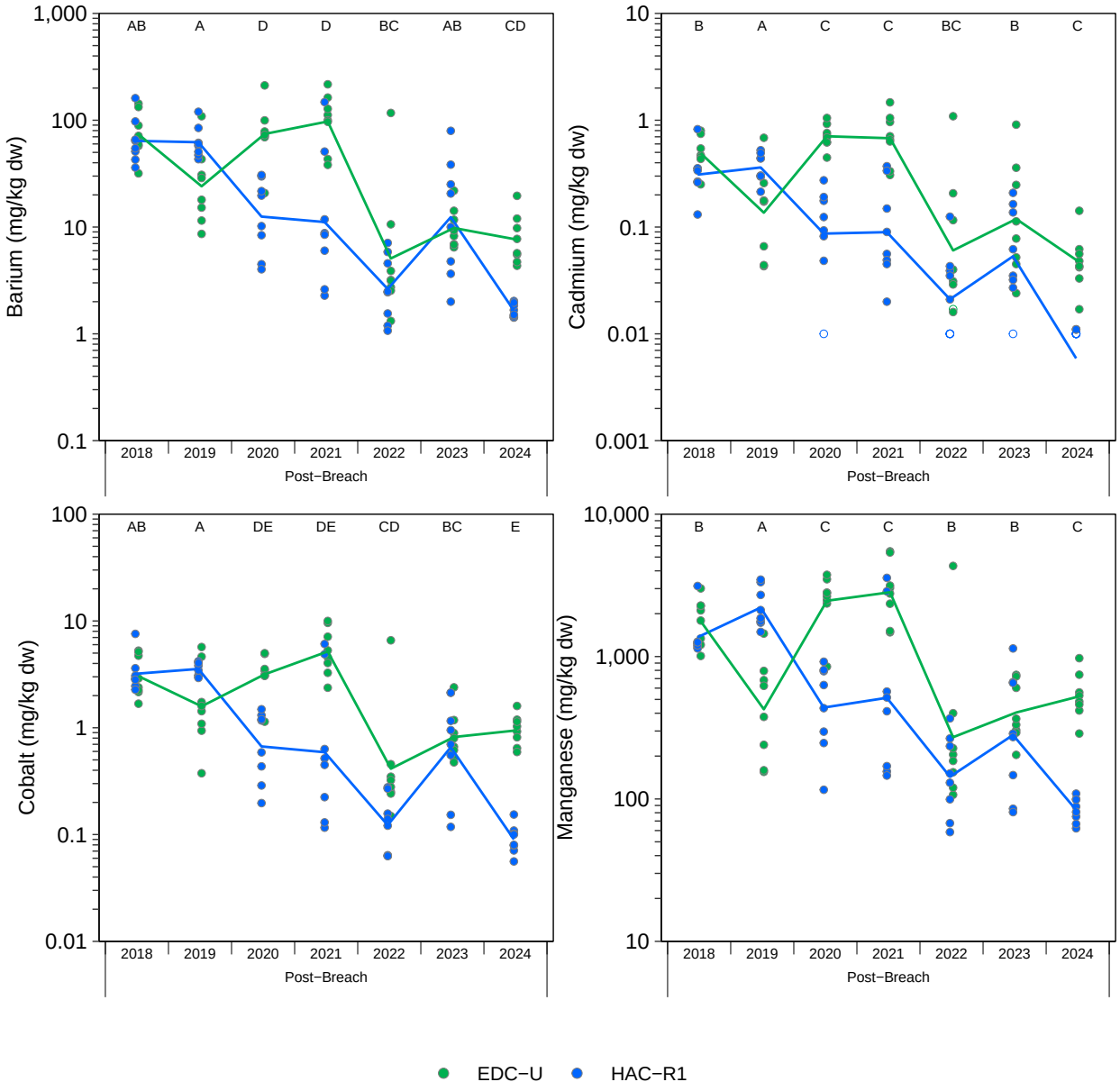

Figure F.4.3: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

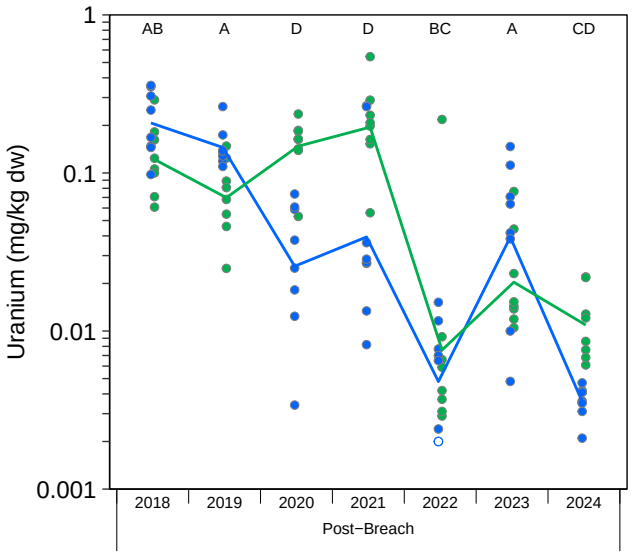

Figure F.4.3: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

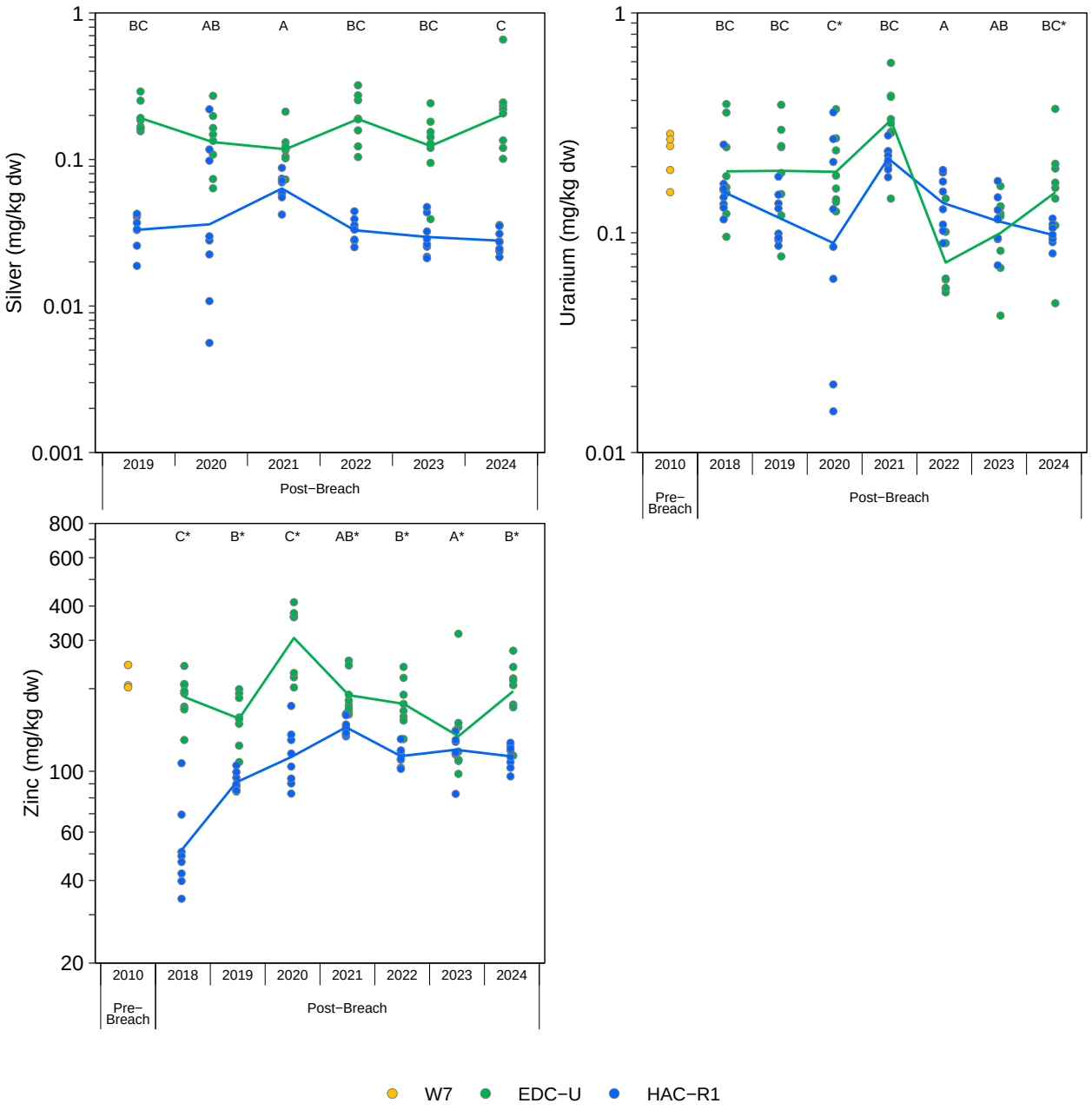

Figure F.4.4: Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC− R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least− squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

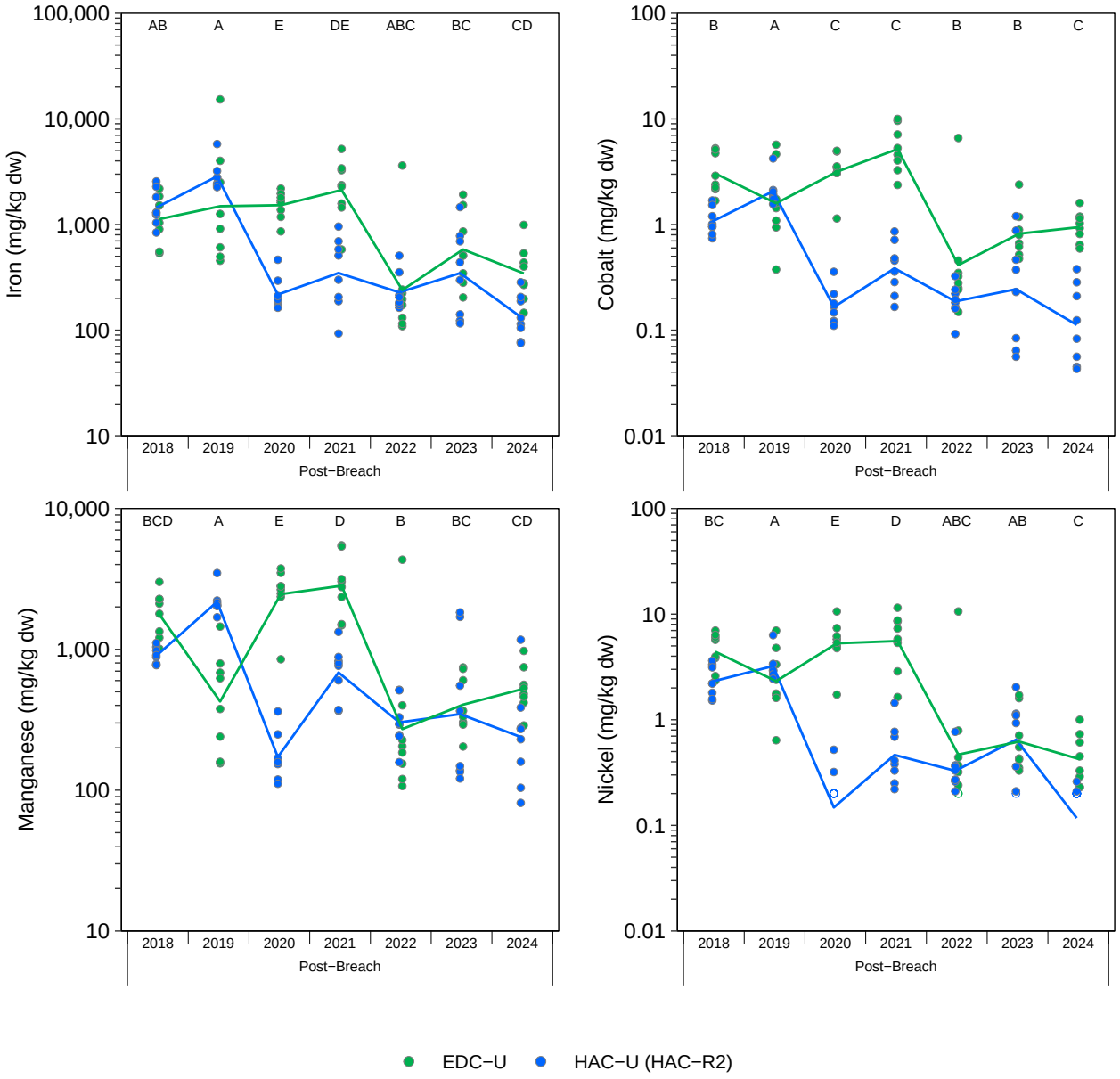

Figure F.4.5: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

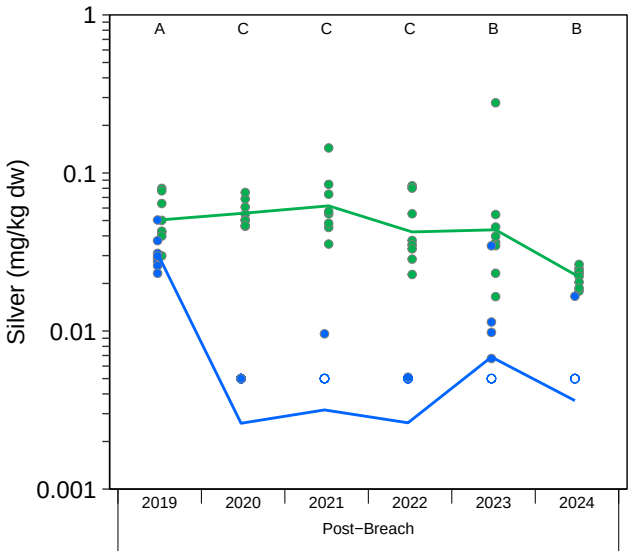

Figure F.4.5: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

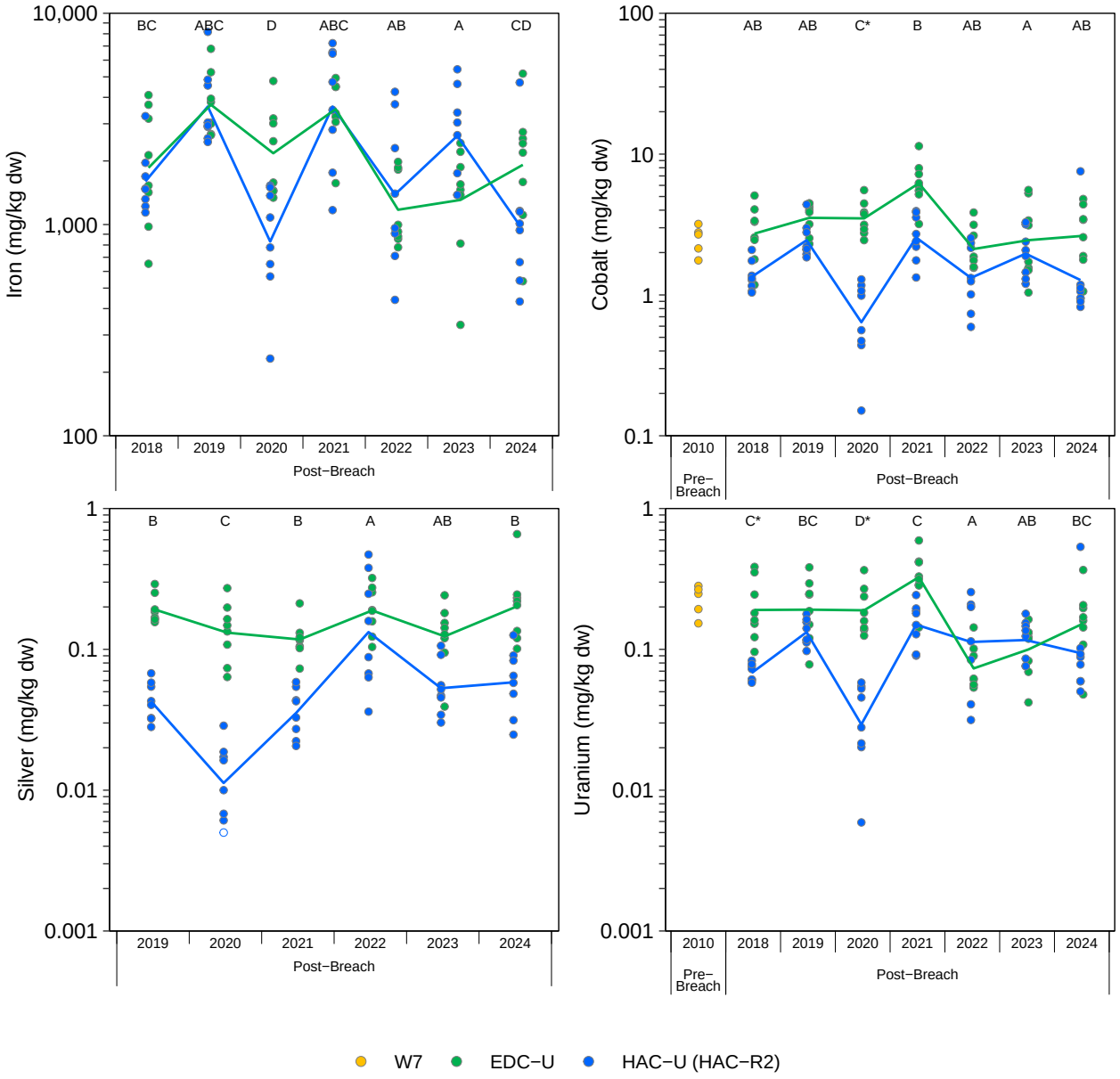

Figure F.4.6: Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

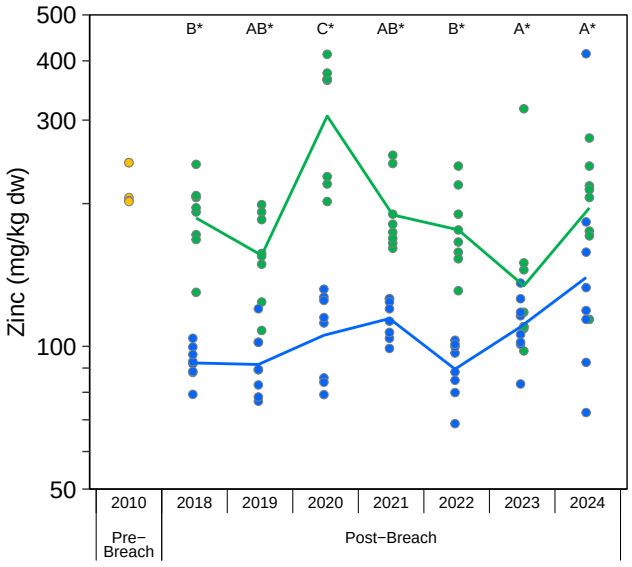

Figure F.4.6: Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

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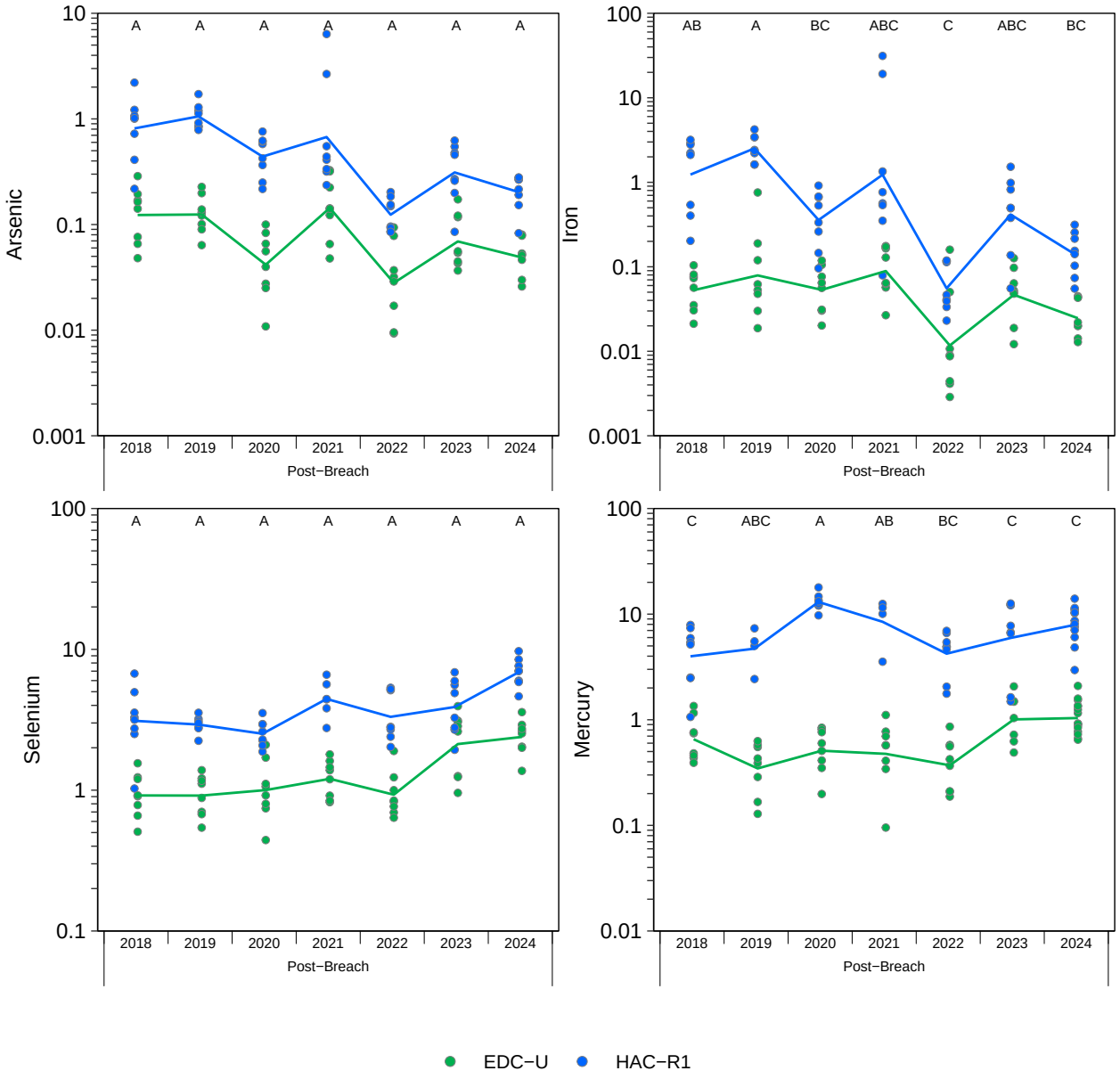

Figure F.4.7: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

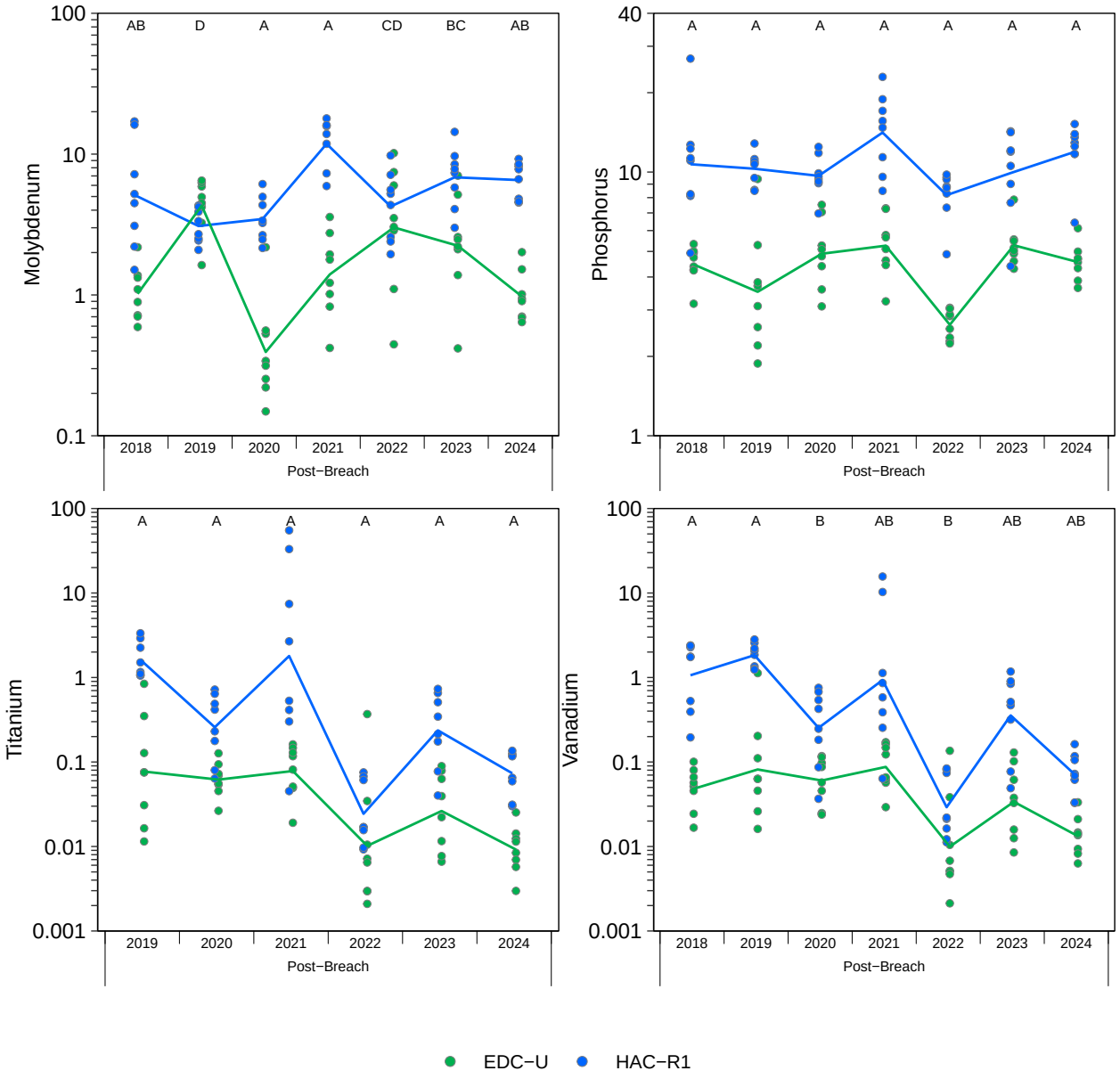

Figure F.4.7: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

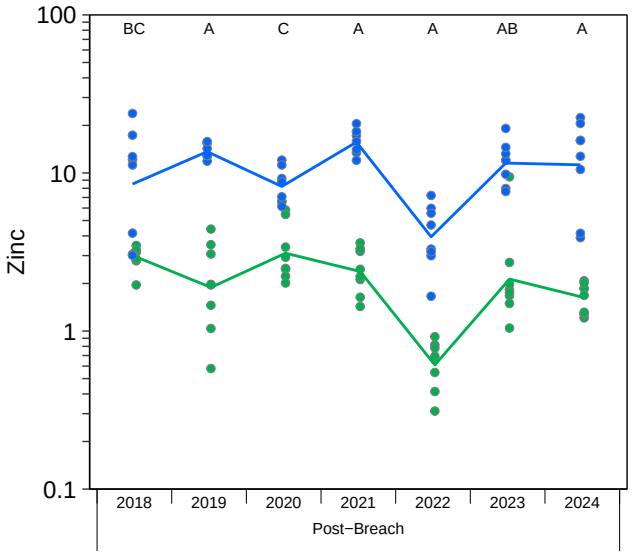

Figure F.4.7: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

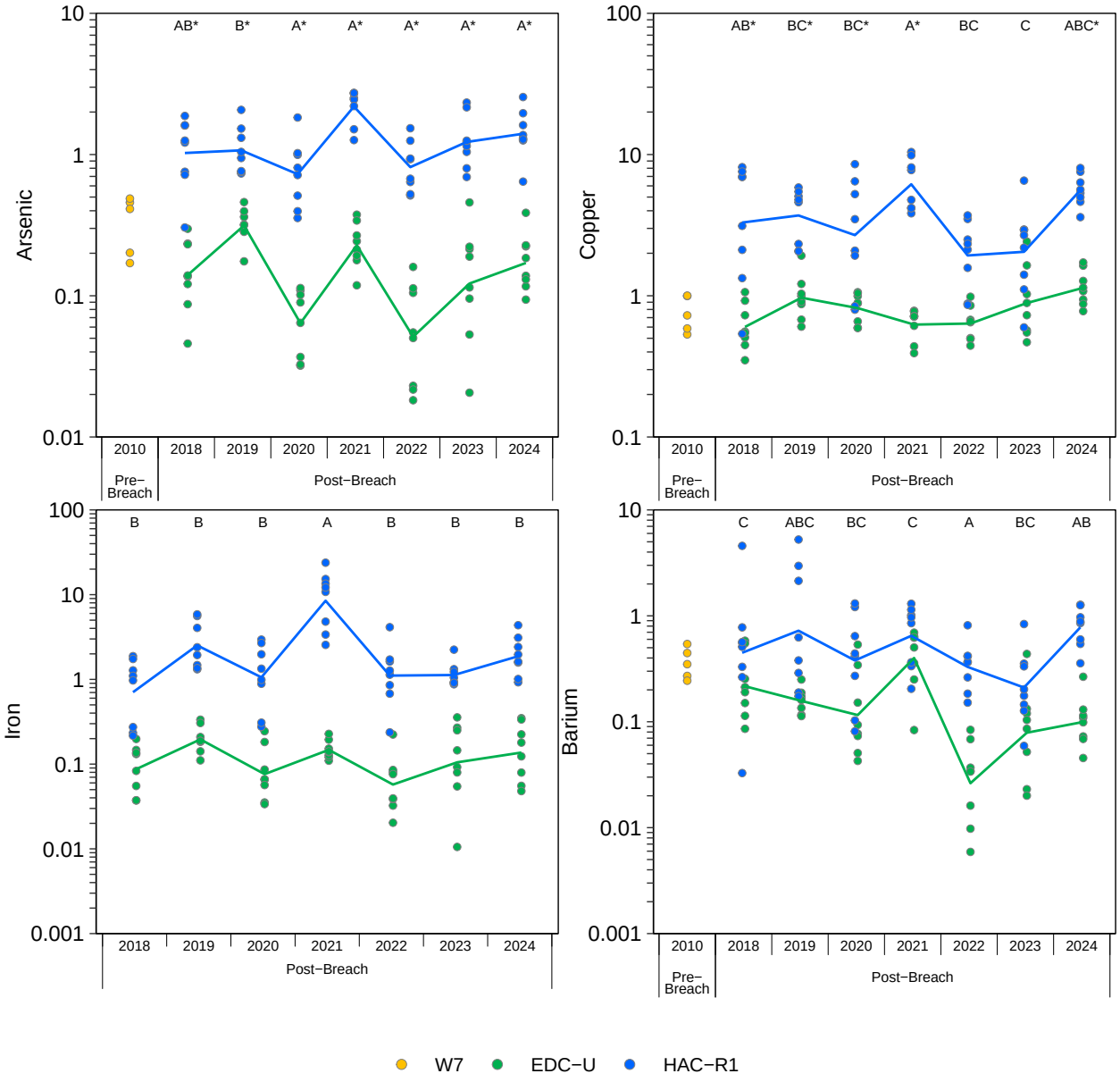

Figure F.4.8: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

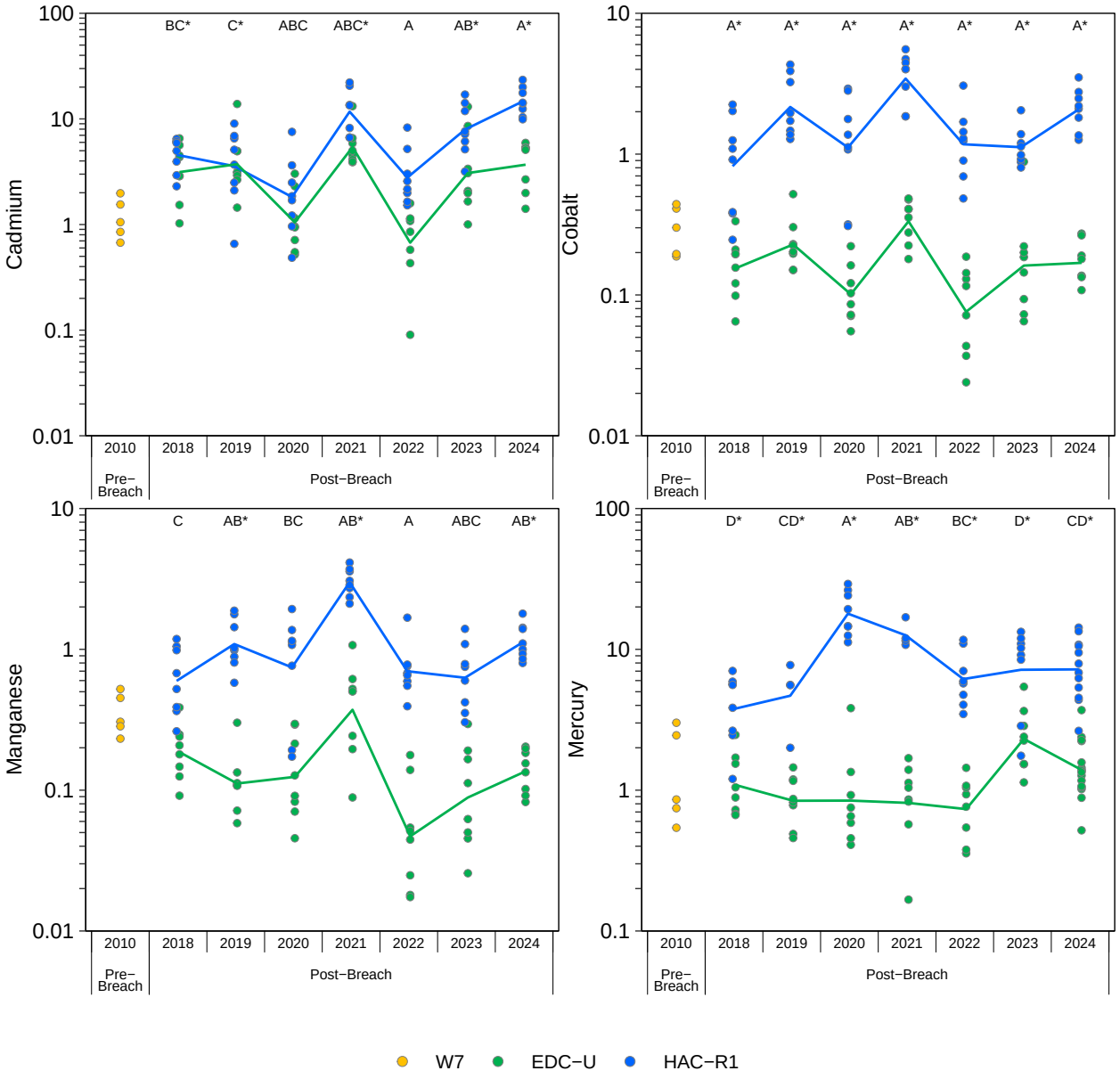

Figure F.4.8: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

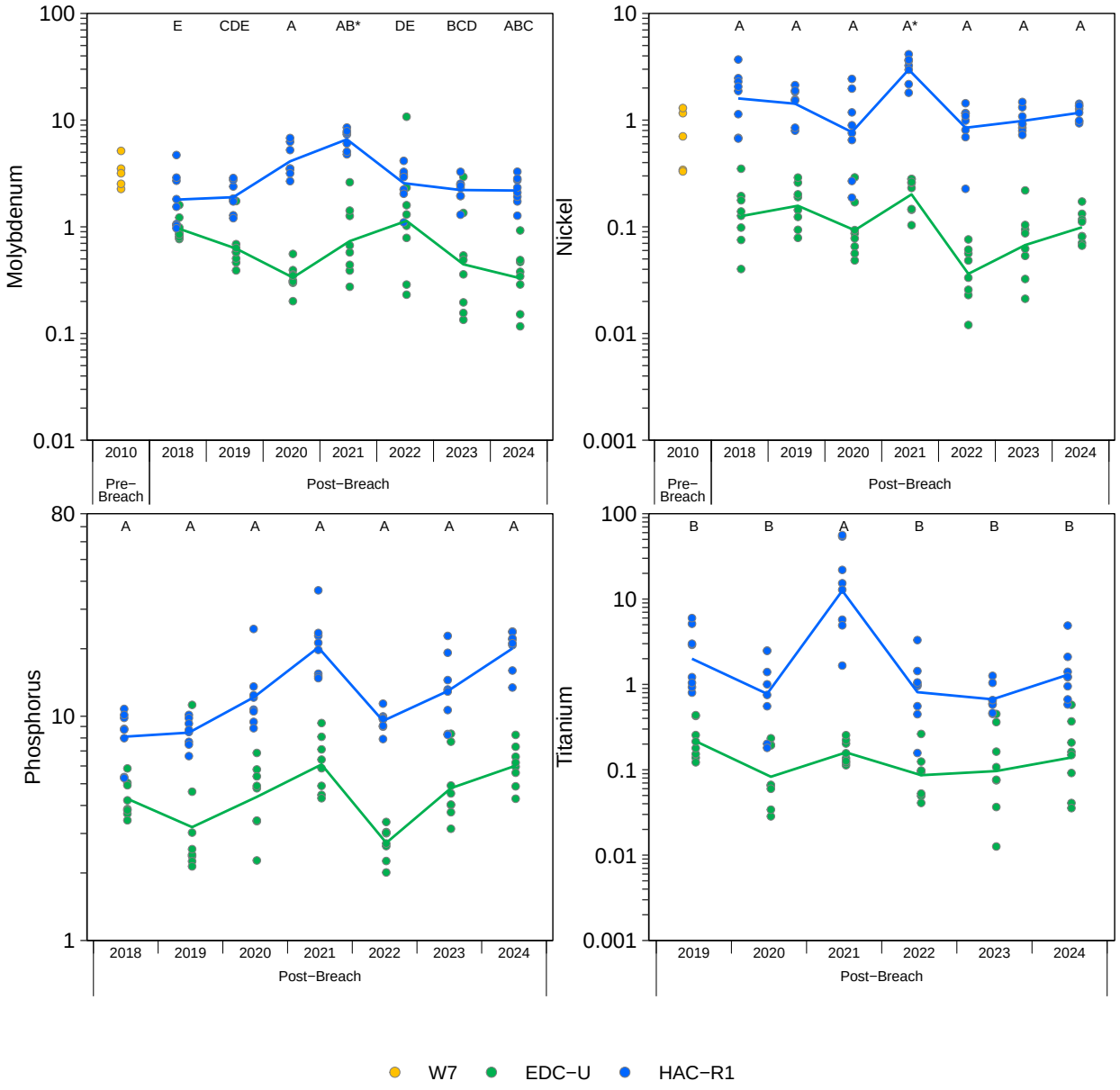

Figure F.4.8: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

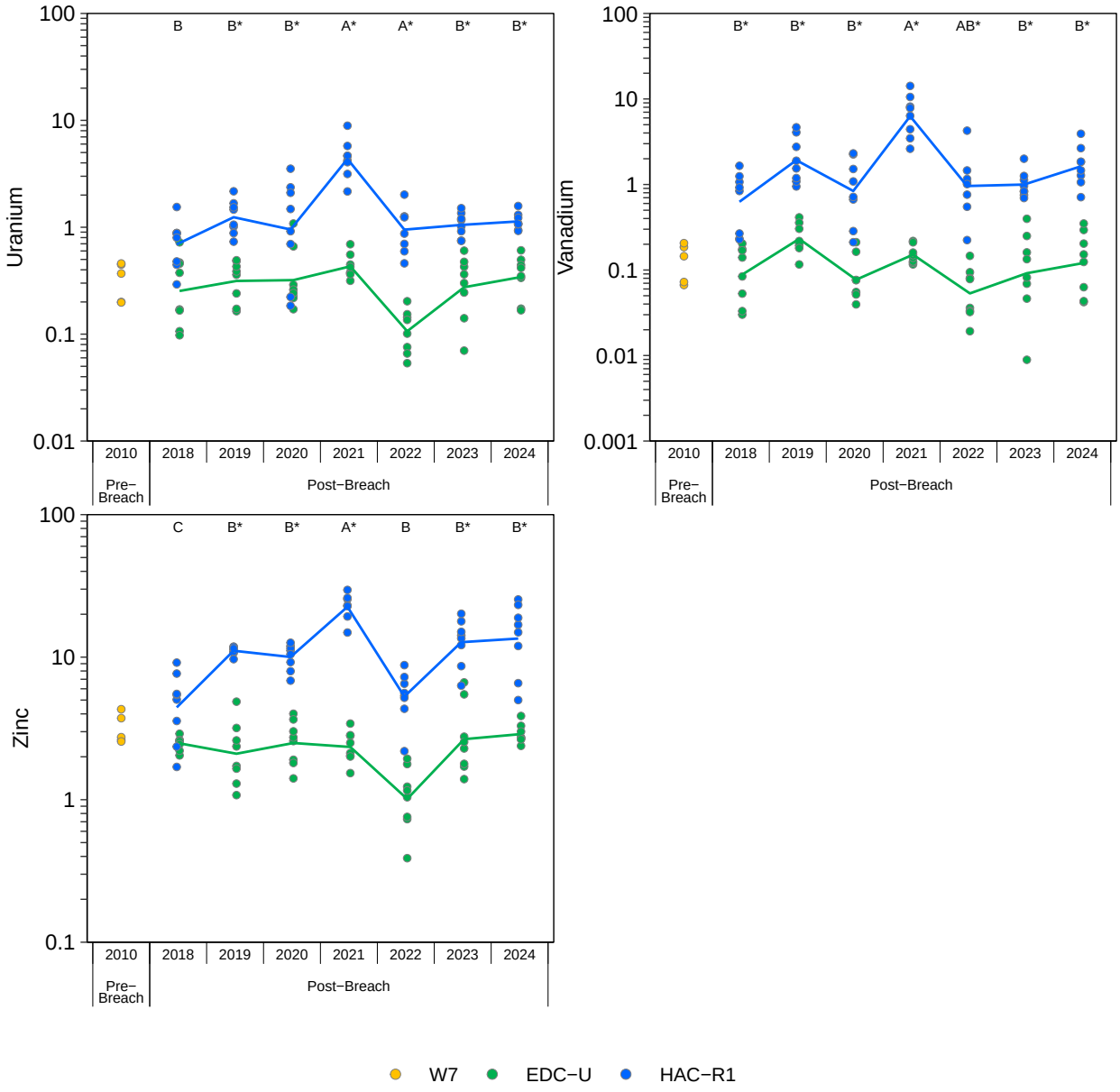

Figure F.4.8: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−R1; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre−breach equivalent of HAC−R1. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

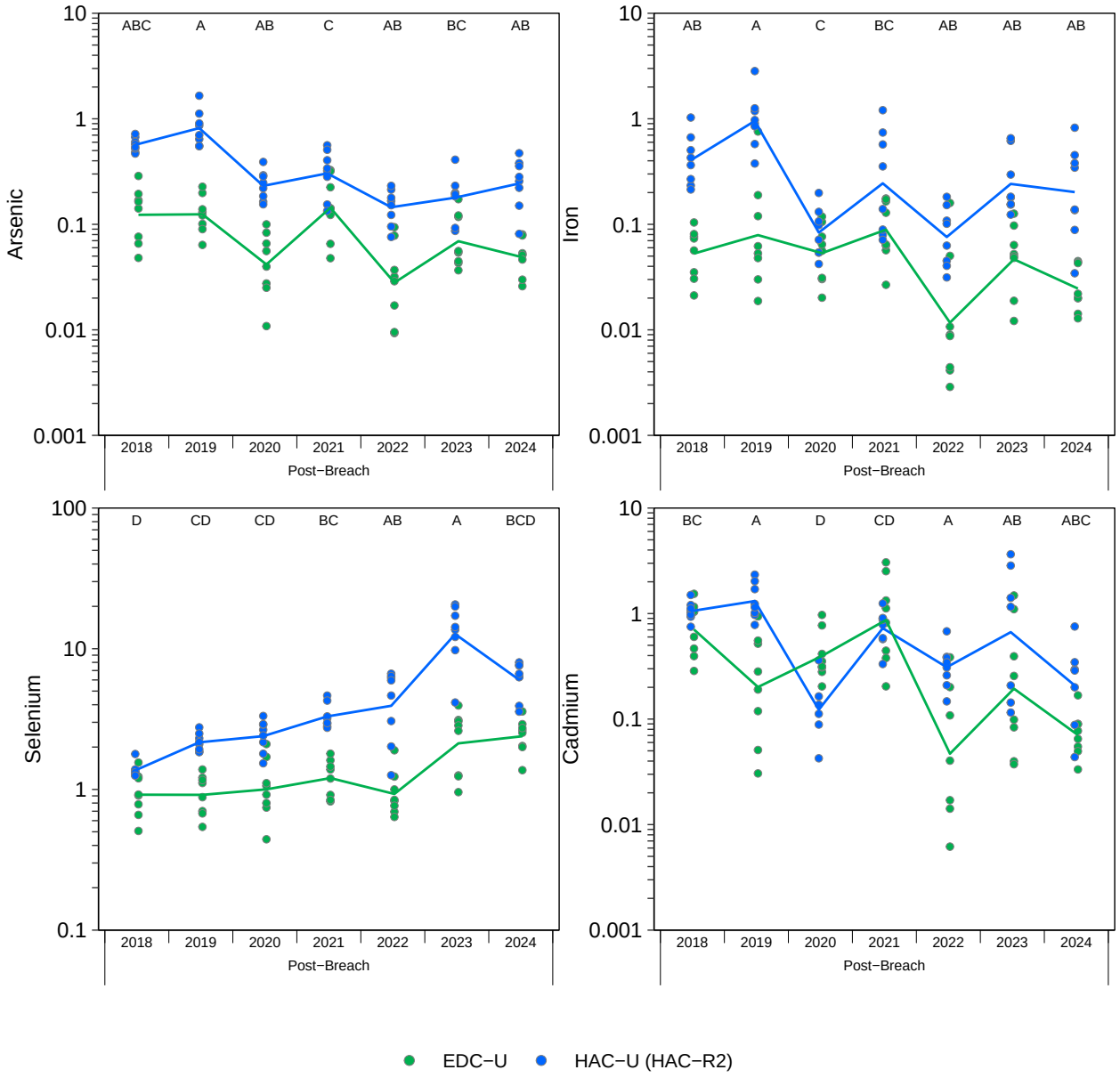

Figure F.4.9: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

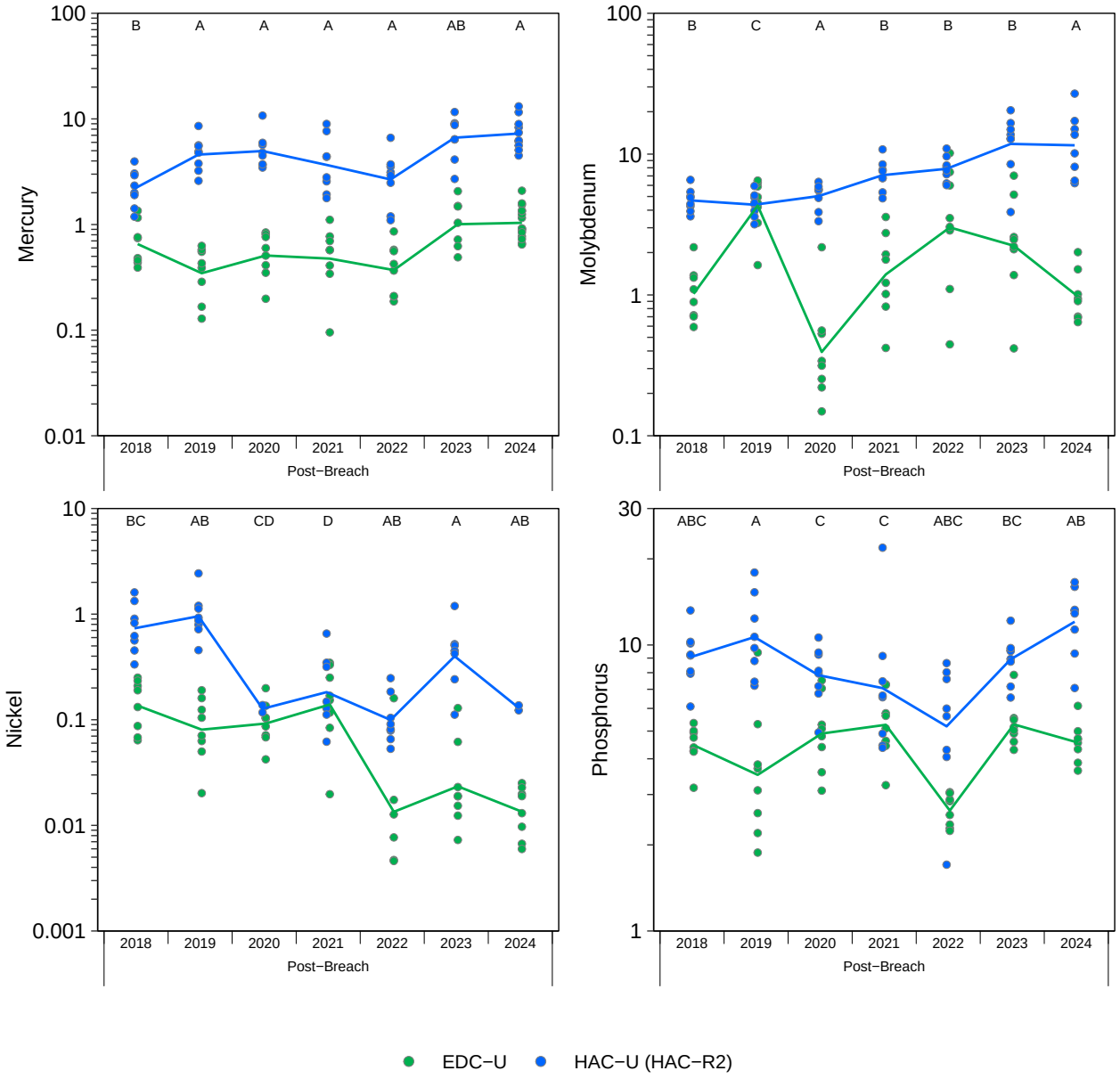

Figure F.4.9: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

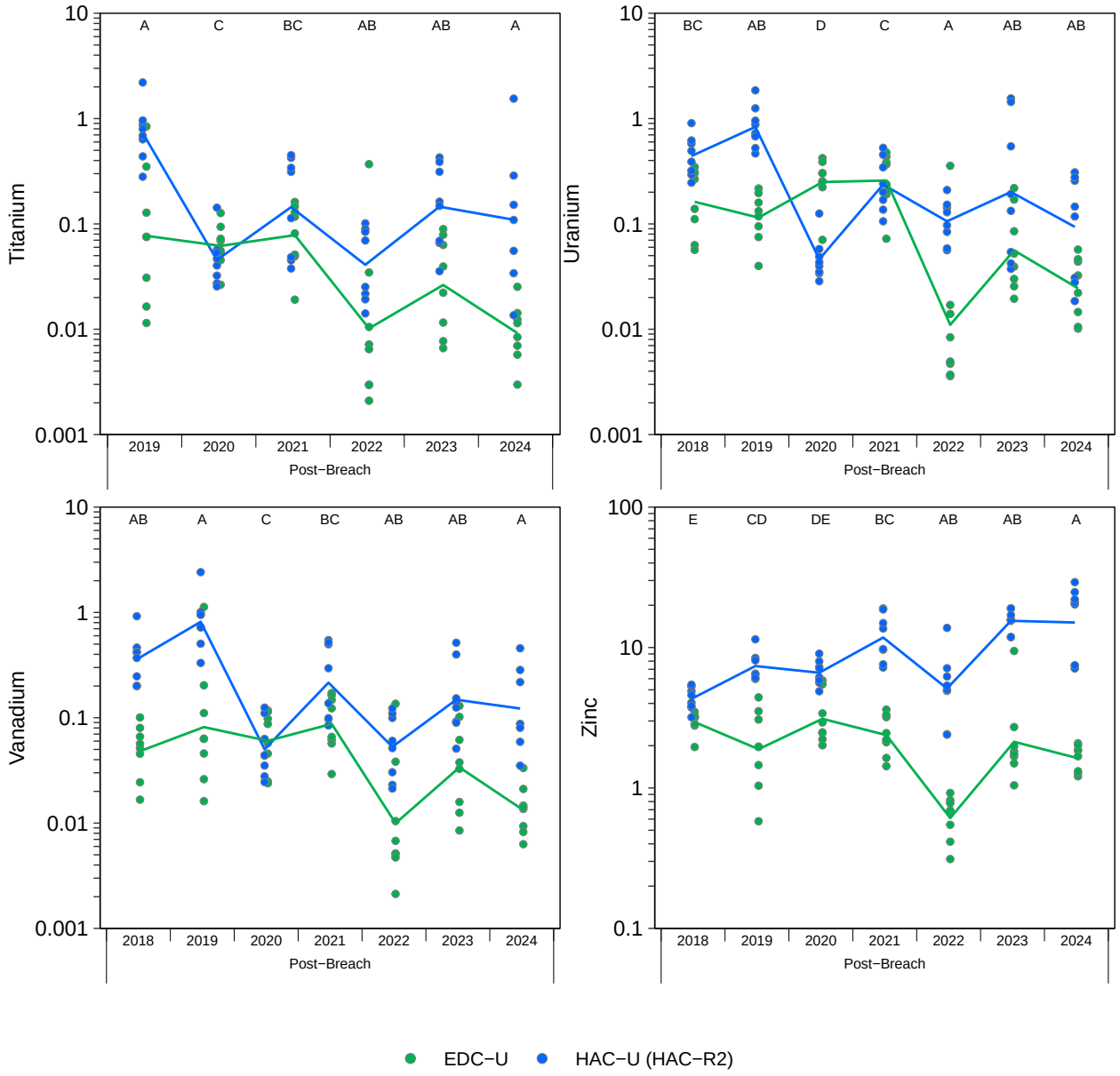

Figure F.4.9: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

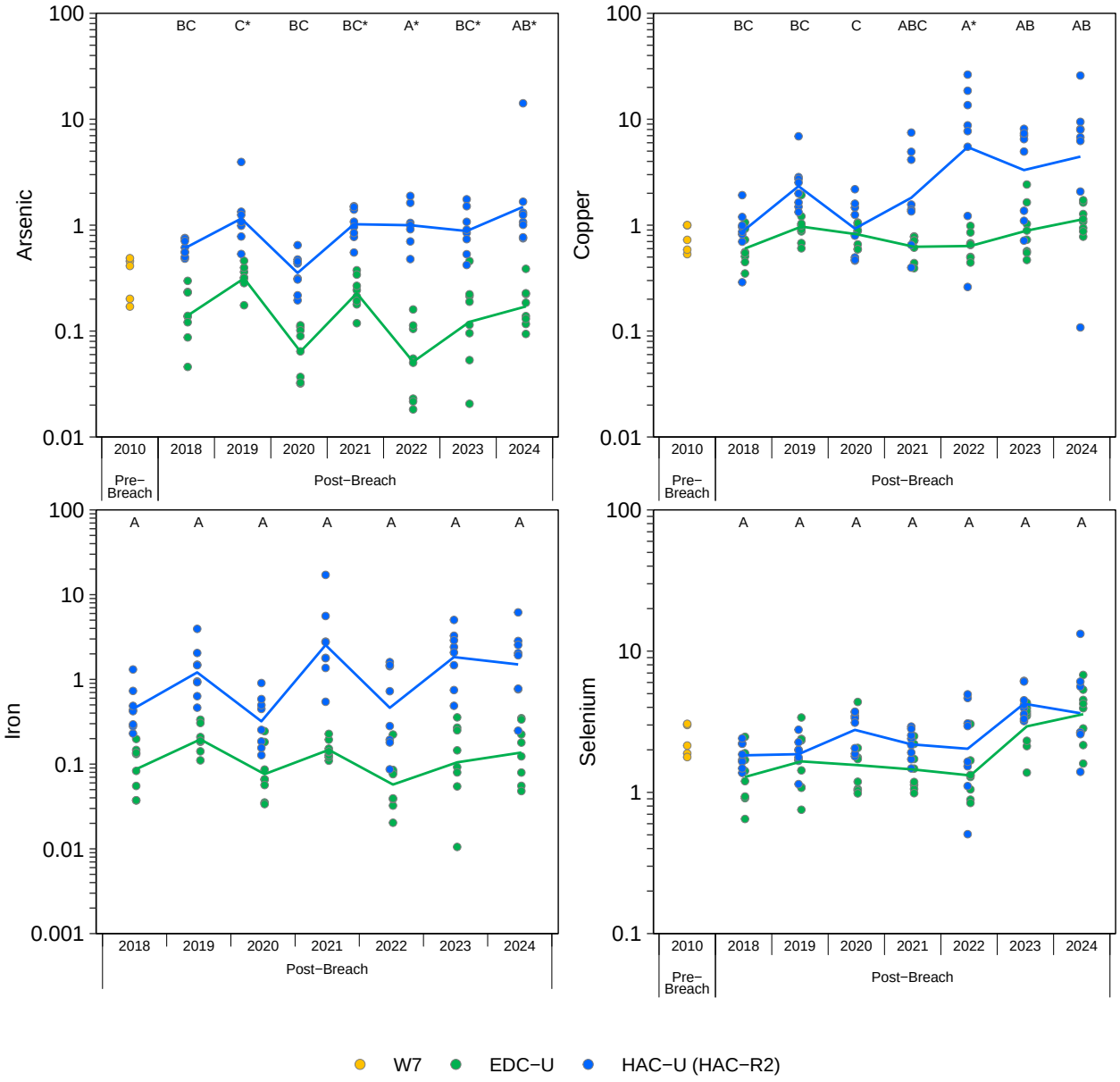

Figure F.4.10: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre− breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least −squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

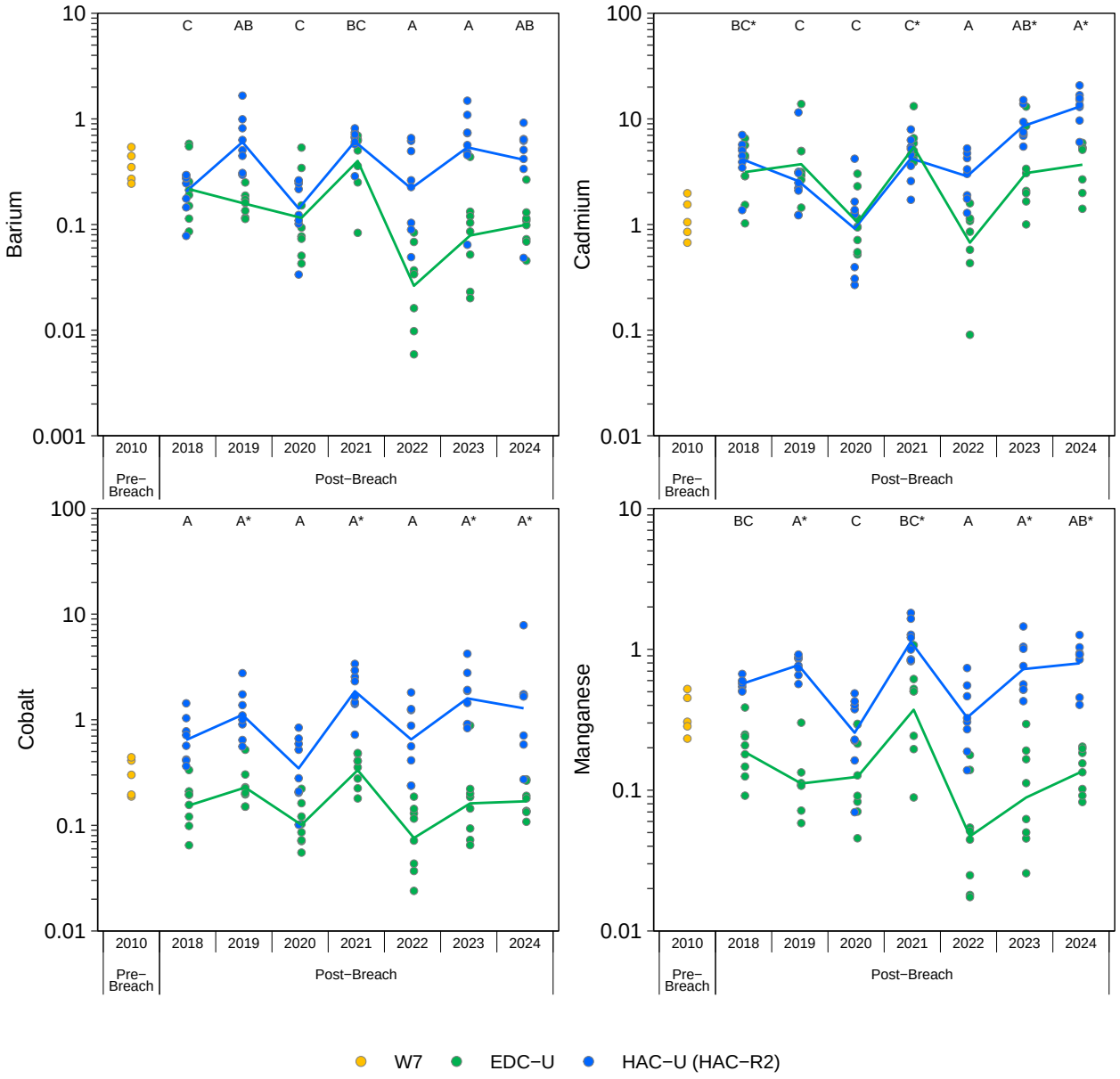

Figure F.4.10: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre− breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least −squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

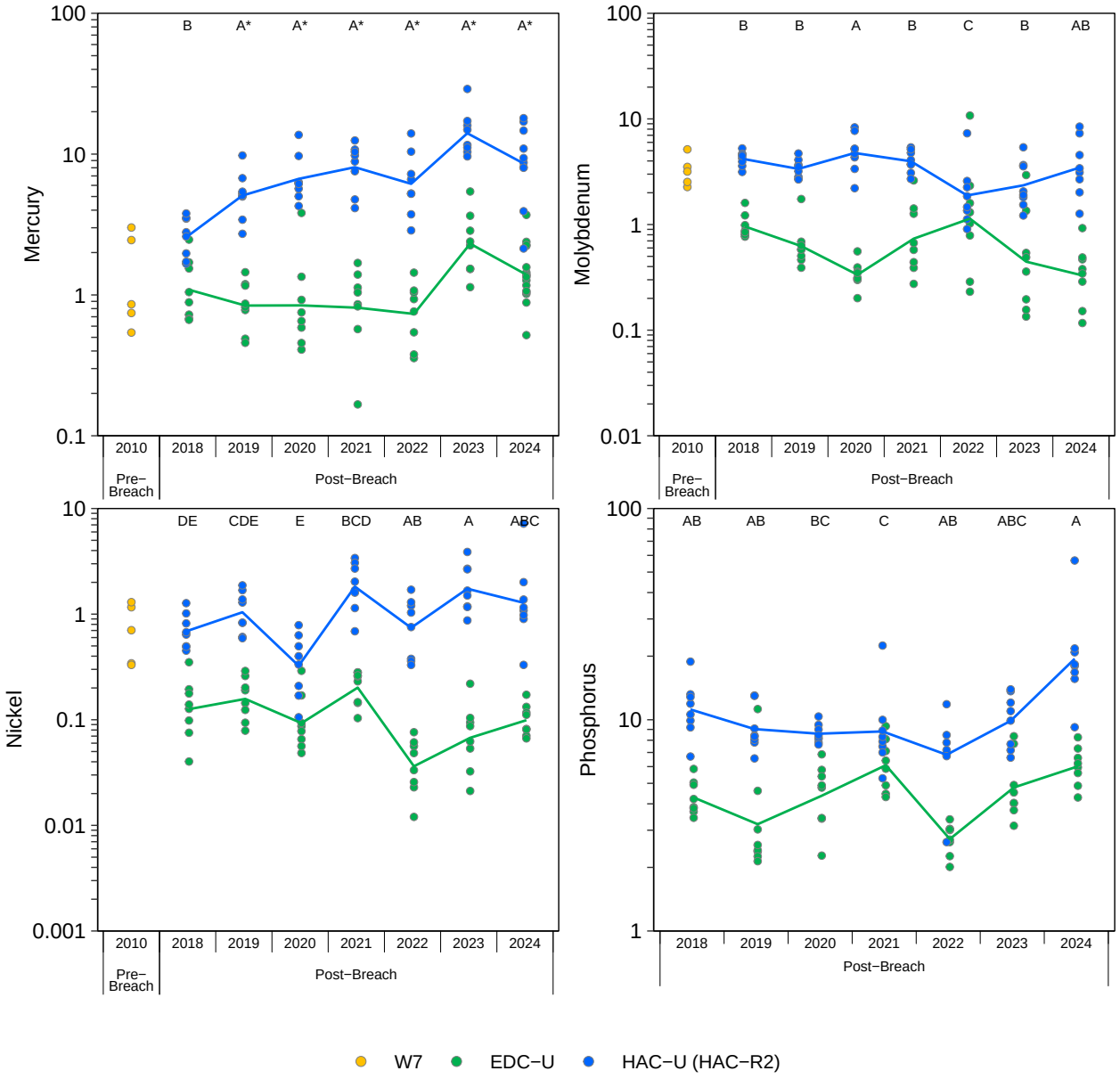

Figure F.4.10: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre− breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least −squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

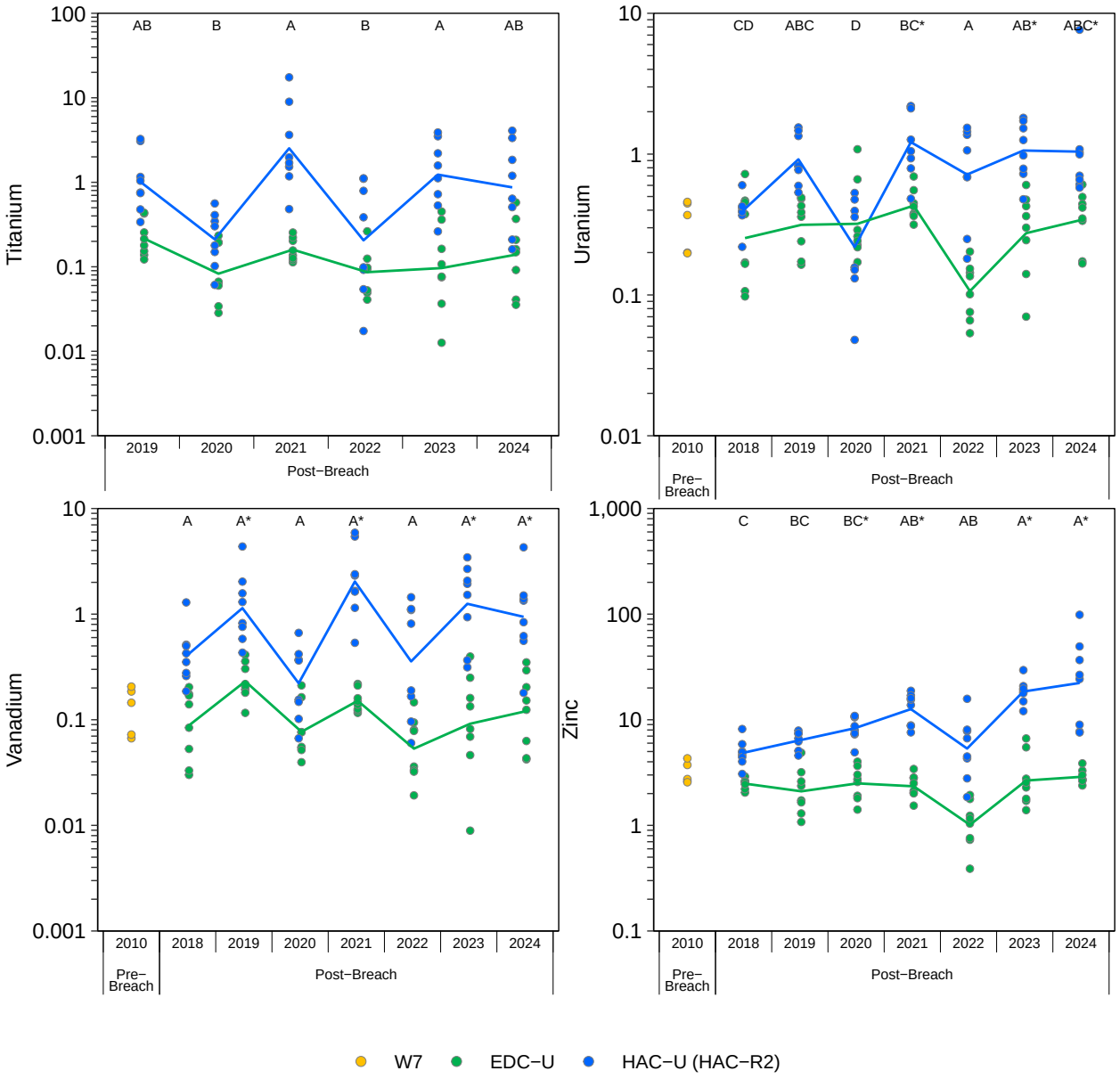

Figure F.4.10: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Upper Hazeltine Creek (HAC−U [HAC−R2]; Exposed) and Upper Edney Creek (EDC−U; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference areas and blue represents exposed areas. W7 (2010) is the pre− breach equivalent of HAC−U (HAC−R2). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least −squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

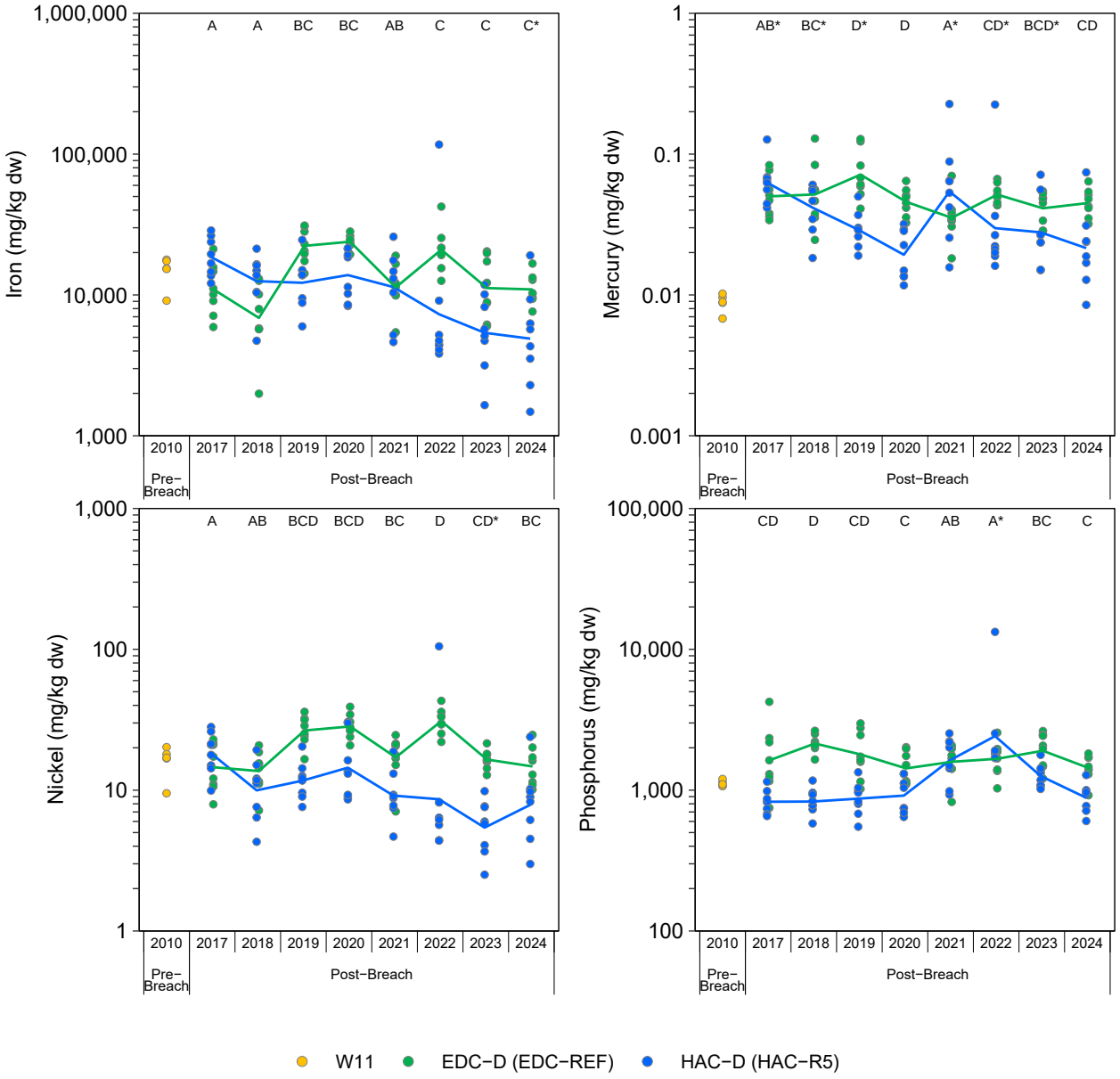

Figure F.4.11: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC− D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre−breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

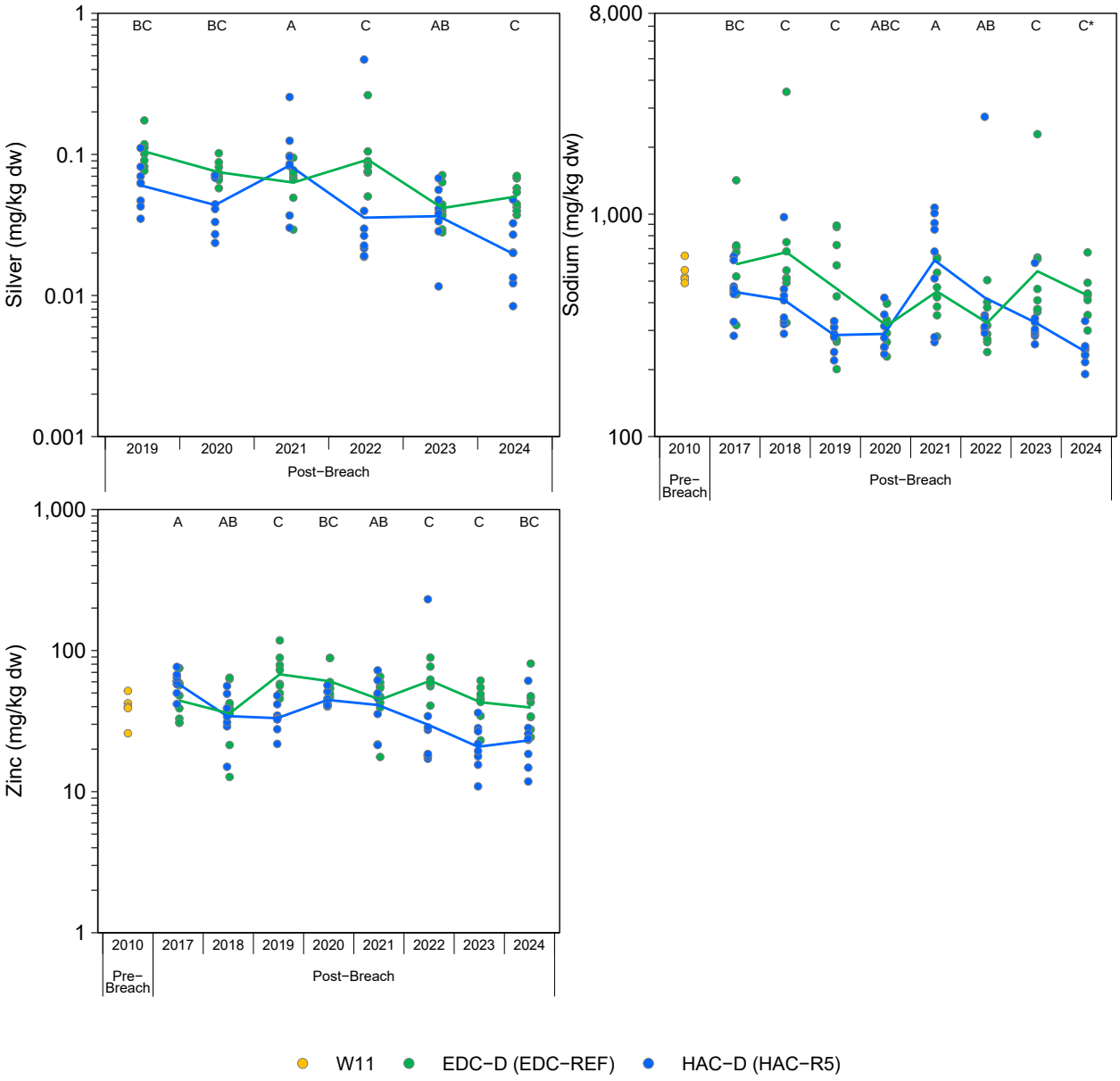

Figure F.4.11: Periphyton Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC− D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre−breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

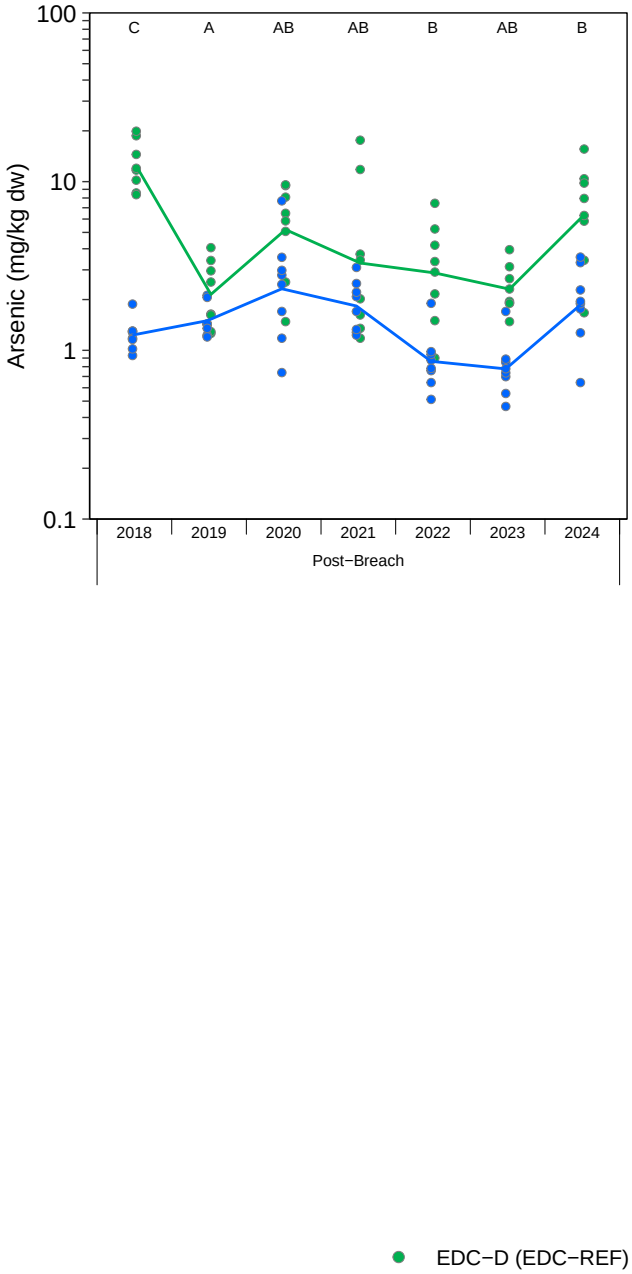

Figure F.4.12: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC− D [EDC−REF]; Reference) Monitoring Areas, 2018 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

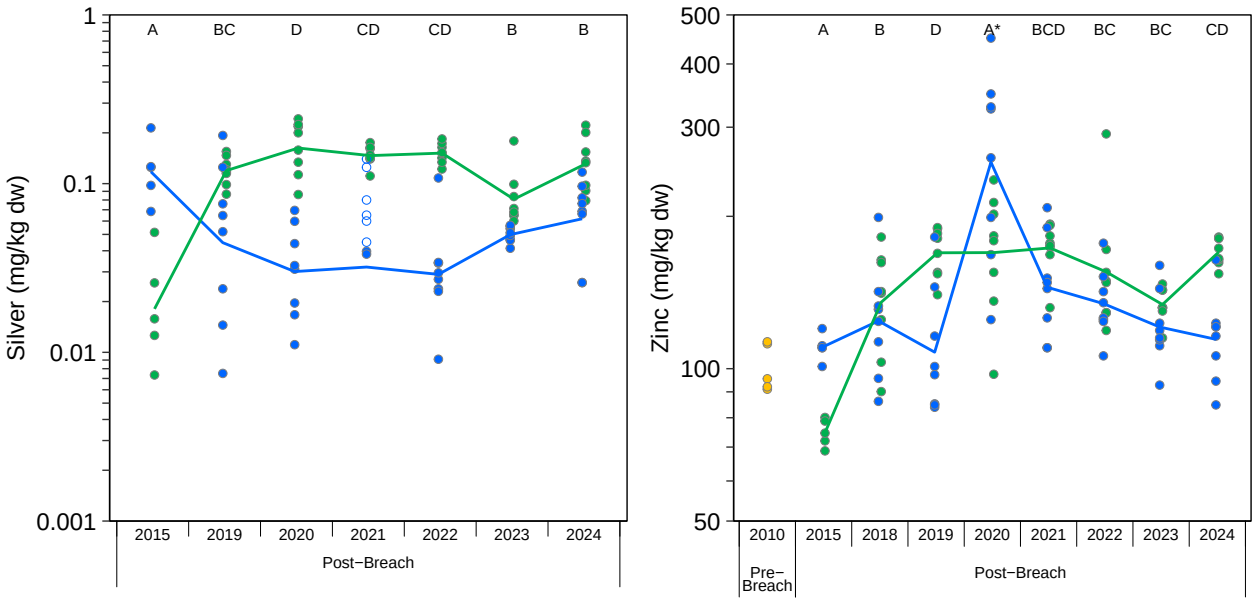

Figure F.4.13: Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre−breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) from pre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

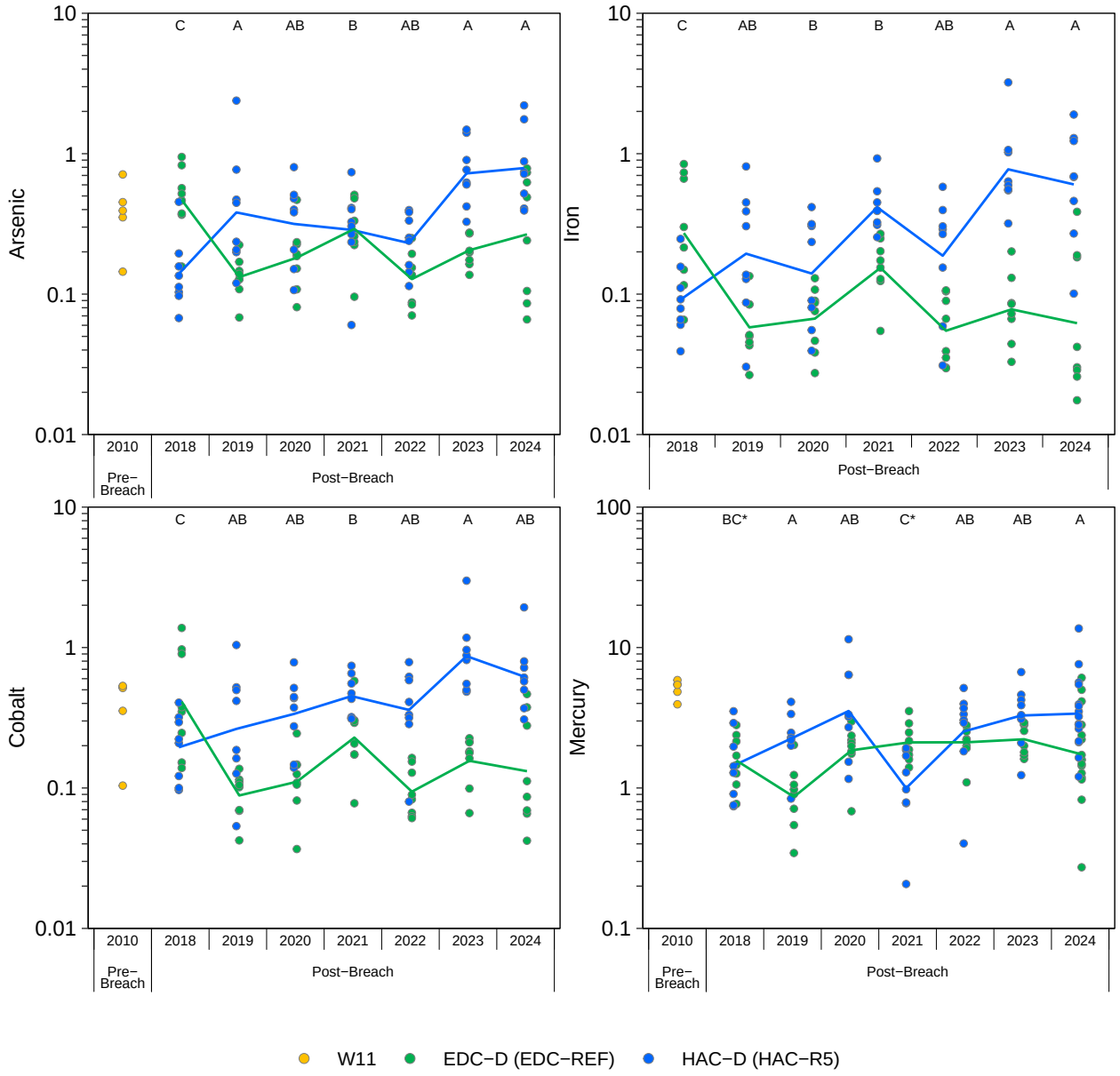

Figure F.4.14: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre− breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) frompre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

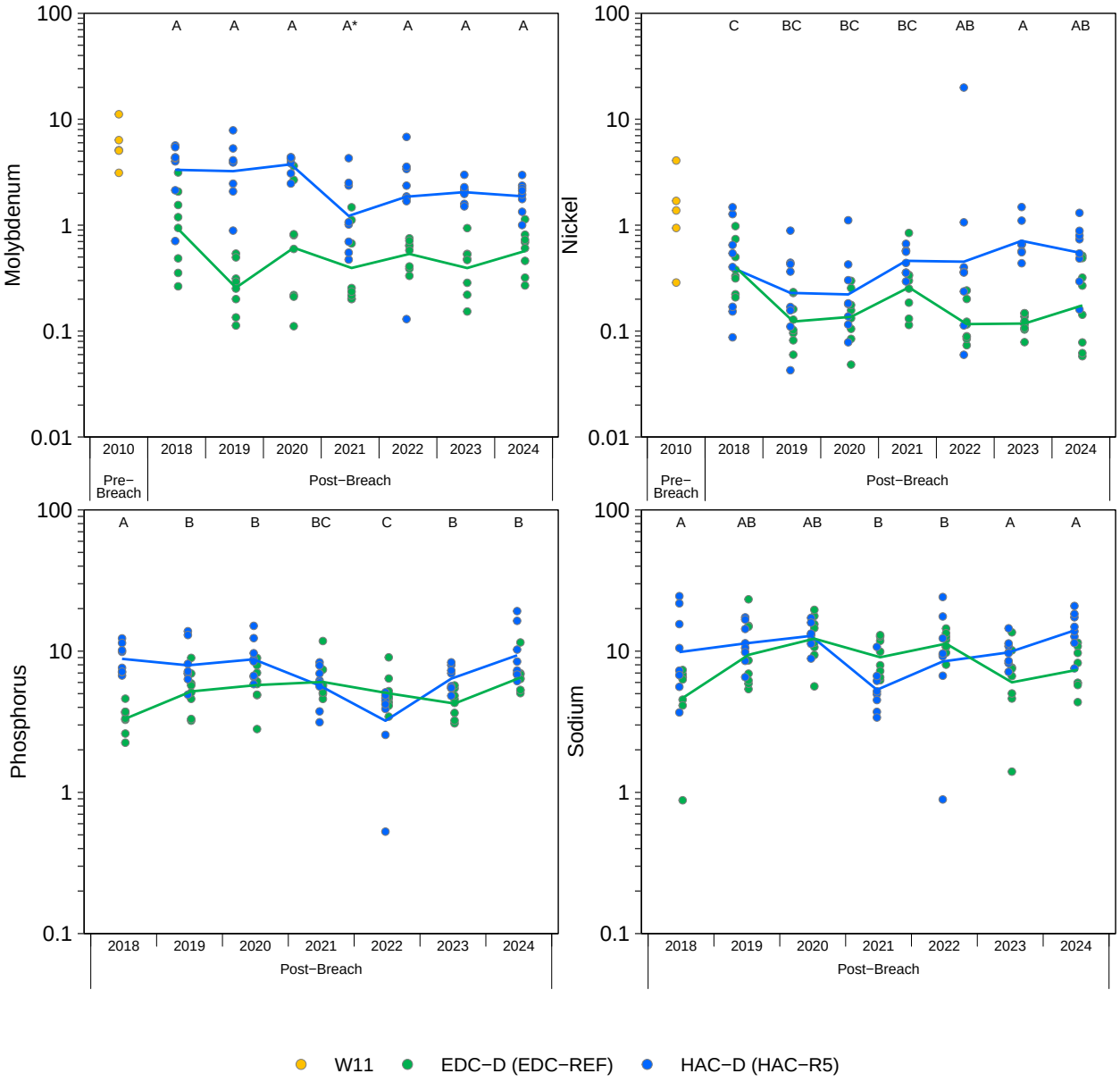

Figure F.4.14: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre− breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) frompre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

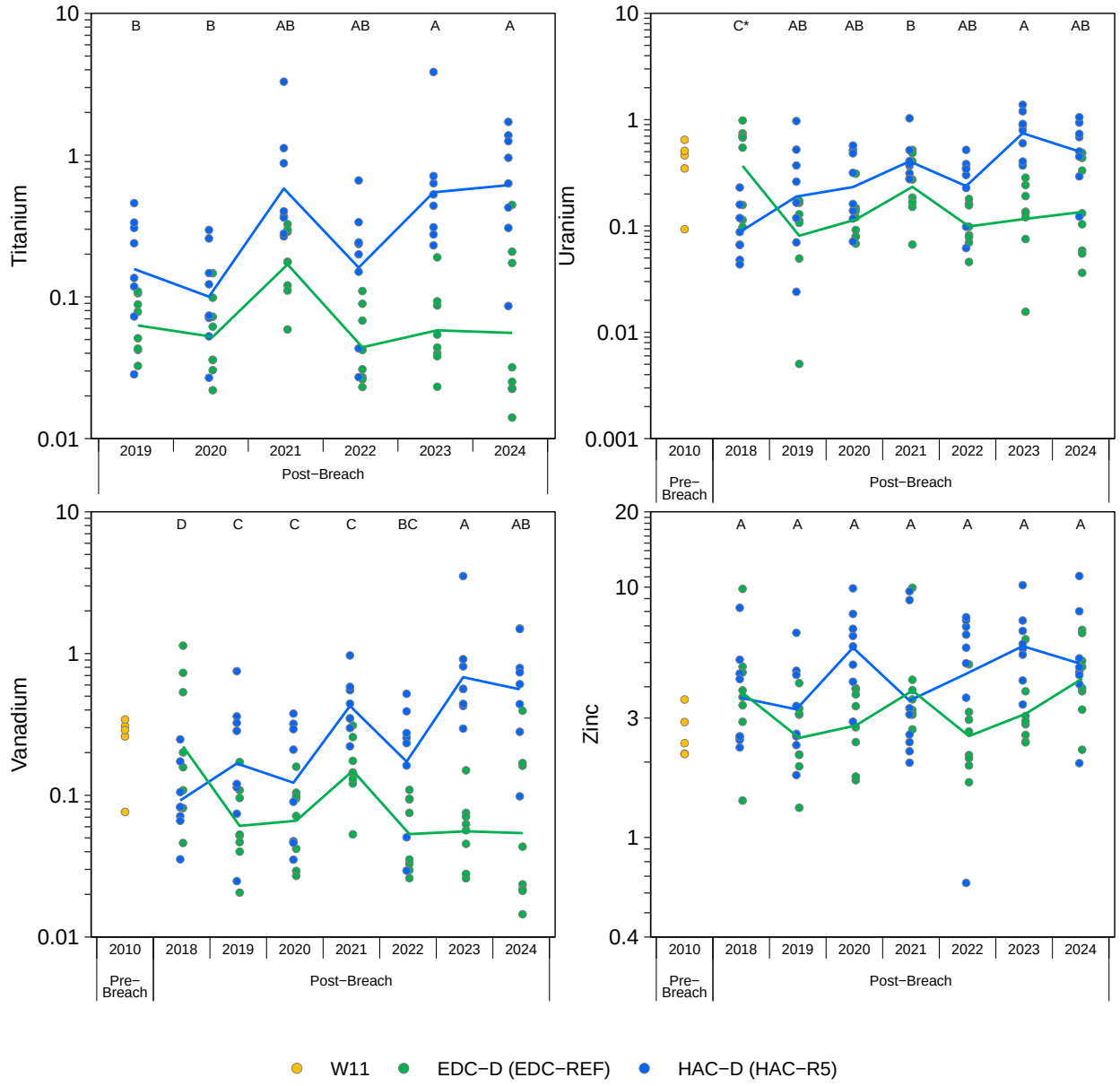

Figure F.4.14: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2010 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. W11 (2010) is the pre− breach equivalent of HAC−D (HAC−R5). Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Letters with a * designate years where the post−breach result differed significantly (p−value < 0.05) frompre−breach (2010) conditions. Only years with results from both reference and exposed areas are plotted.

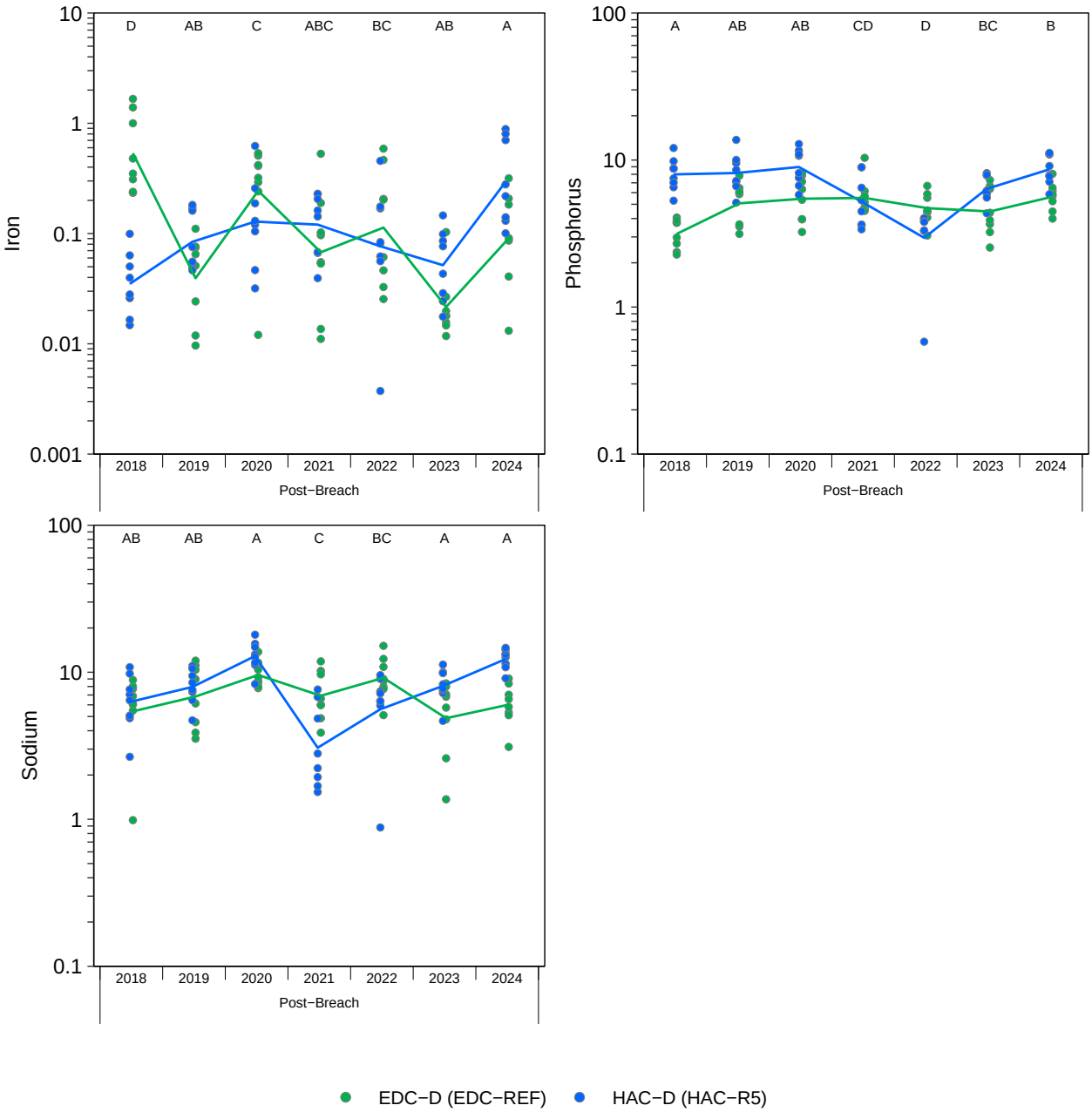

Figure F.4.15: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Hazeltine Creek (HAC−D [HAC−R5]; Exposed) and Lower Edney Creek (EDC−D [EDC−REF]; Reference) Monitoring Areas, 2018 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

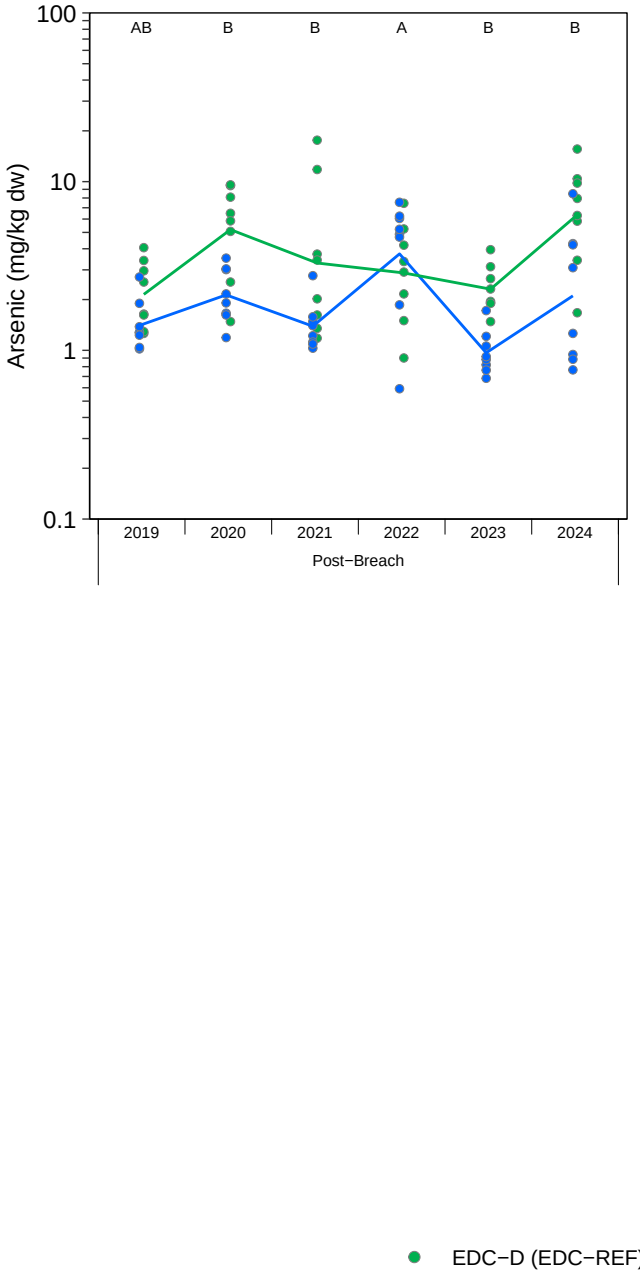

Figure F.4.16: Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed − Reference Difference and a Significant Area x Year Effect for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC−REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: mg/kg dw = milligrams per kilogram dry weight, <LRL = lower than the laboratory reporting limit. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log−normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

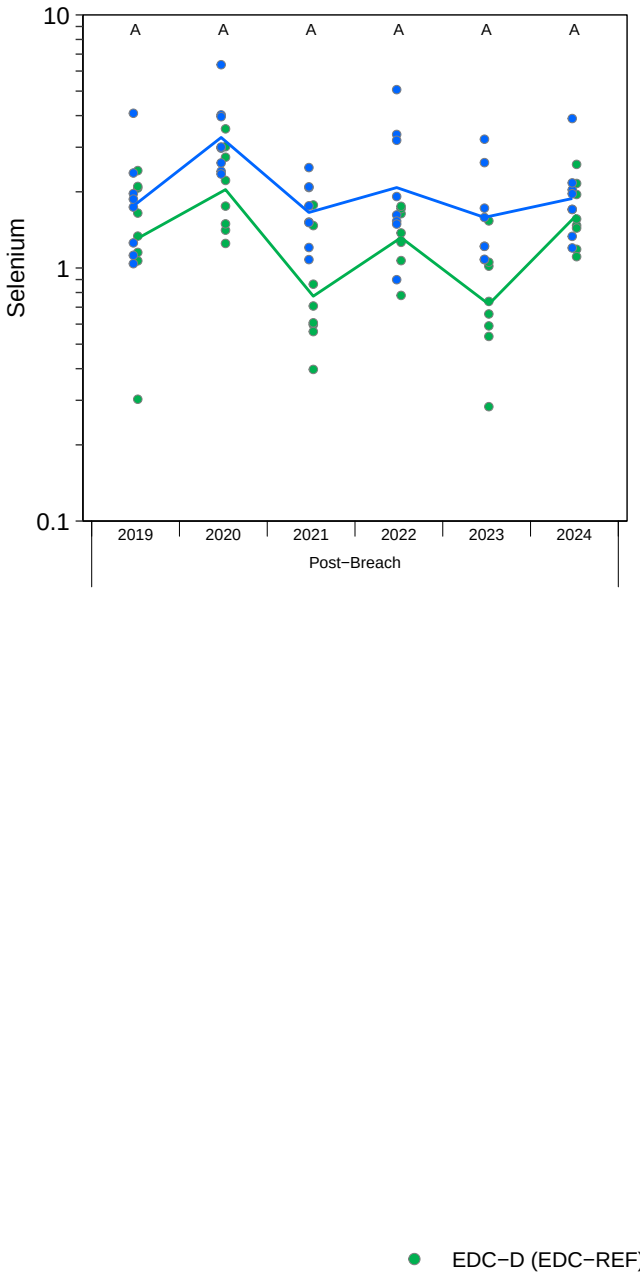

Figure F.4.17: Trophic Transfer Factors for Caddisfly Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC−REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

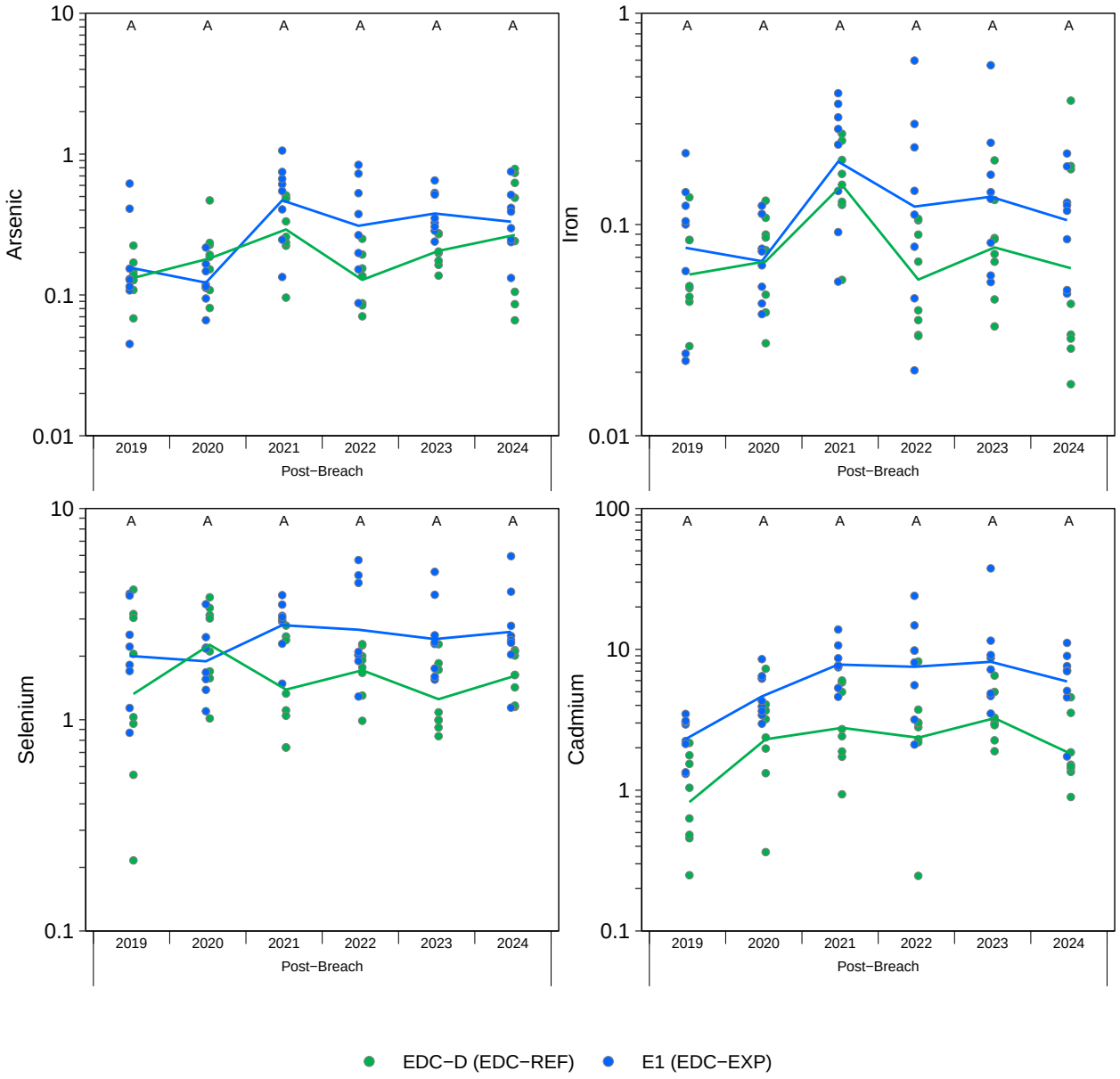

Figure F.4.18: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC−REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

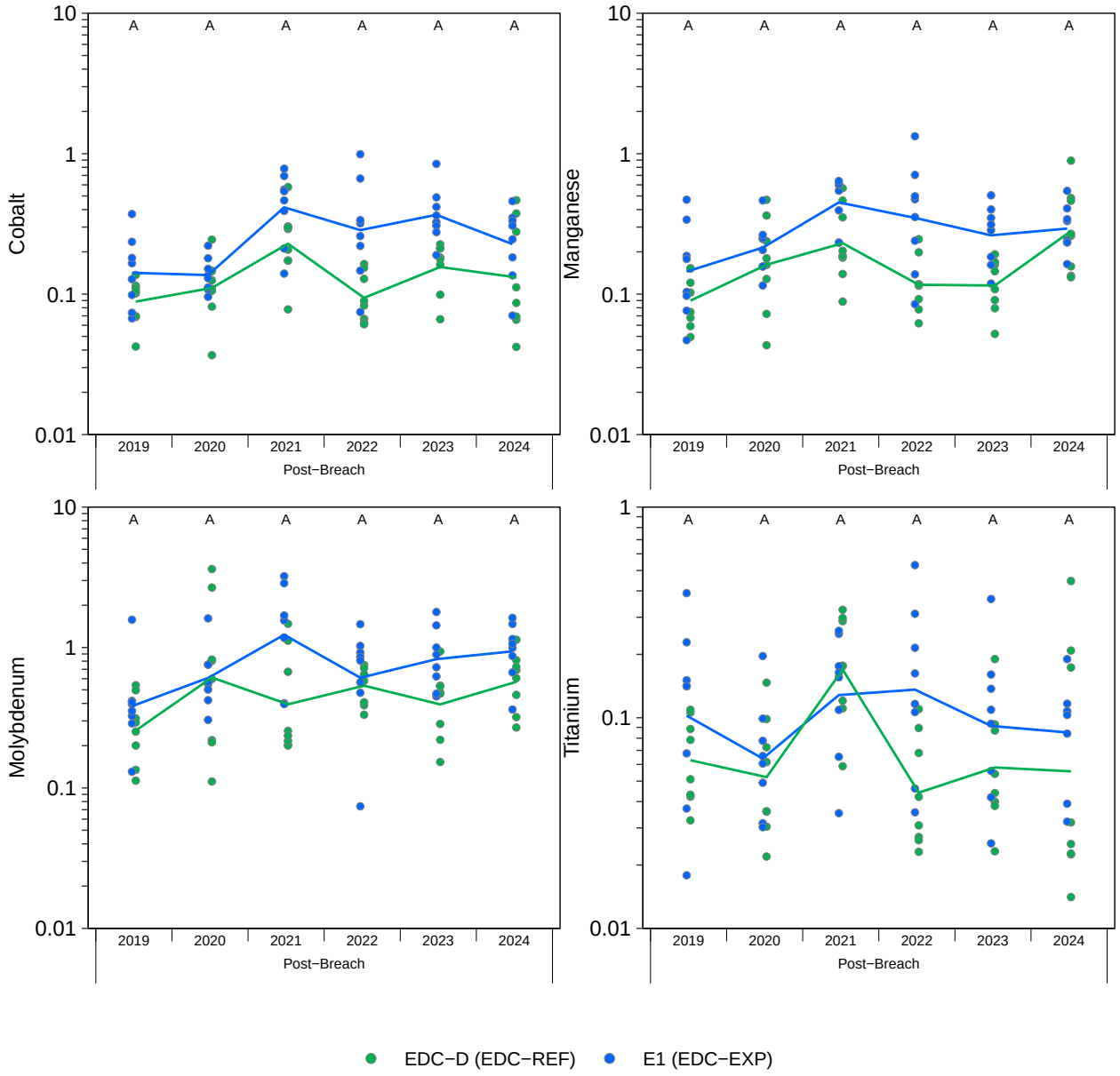

Figure F.4.18: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC−REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

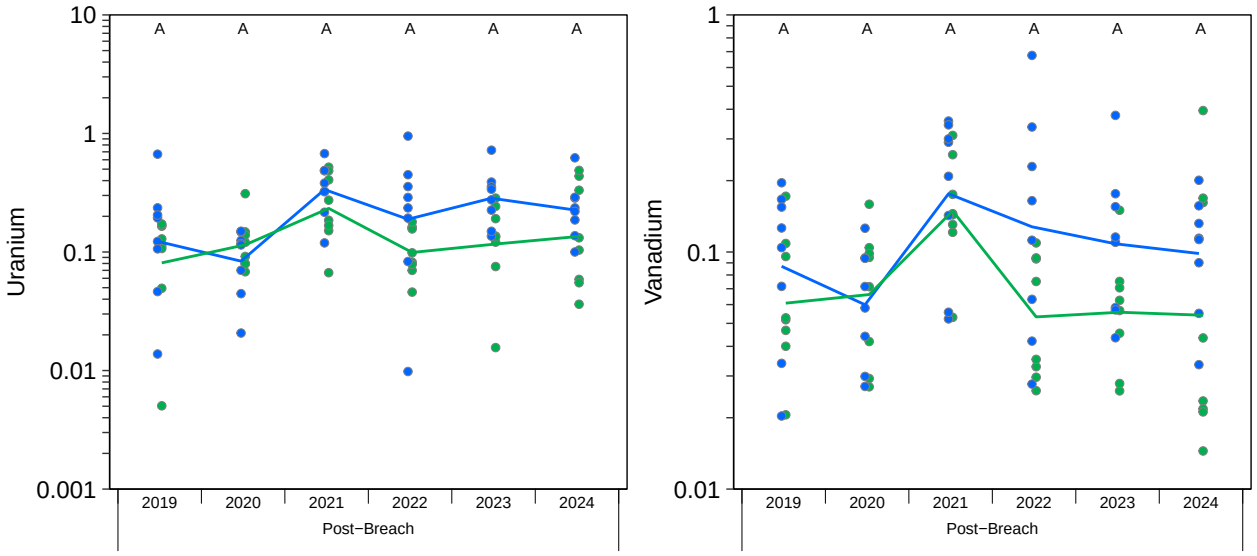

Figure F.4.18: Trophic Transfer Factors for Composite−Taxa Benthic Invertebrate Tissue Primary and Secondary Analyte Concentrations with a Significant Positive Exposed − Reference Difference for the Lower Edney Creek (E1 [EDC−EXP; Exposed]; EDC−D [EDC−REF; Reference]) Monitoring Areas, 2019 to 2024

Notes: Trophic Transfer Factors (TTFs) were not calculated for analytes with results reported below the laboratory reporting limit (<LRL). EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Green represents reference areas and blue represents exposed areas. Data are not available for all years within the date range identified, only years with available data are displayed and these are analyte−dependent. Concentrations <LRL are plotted as open symbols at the LRL and the open symbol represents one or more values reported <LRL. Individual samples are plotted and lines join the least−squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two−way ANOVA with factors Area and Year. Years that share a letter (e.g., A,B,C) have ratios of concentrations (Exposed:Reference) that do not differ significantly (p−value < 0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (Exposed:Reference). Only years with results from both reference and exposed areas are plotted.

Table F.4.1: Statistical Comparisons of Exposed - Reference Relative Differences of Periphyton Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-R1 Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	0.010	<0.001	B	BC	BC	C	B	A	BC	baseline	ns	ns	-72	ns	144	ns	-80	-89	-88	-94	-79	-52	-88
Antimony	MLE	0.003	0.003	0.394	A	A	A	A	A	A	A	baseline	ns									-17			
Arsenic	MLE	<0.001	0.002	<0.001	A	A	C	BC	B	A	AB	baseline	ns	-70	-56	-49	ns	ns	-75	-76	-93	-89	-87	-75	-82
Barium	MLE	<0.001	0.057	<0.001	AB	ABC	D	ABC	CD	A	BC	baseline	ns	-74	ns	-50	ns	ns	-39	-45	-84	-44	-70	ns	-65
Beryllium	MLE	<0.001	<0.001	<0.001	AB	CD	CD	D	BC	A	C	baseline	-52	-65	-74	ns	ns	-48	-75	-88	-91	-94	-84	-62	-87
Bismuth	MLE	<0.001	<0.001	0.169	A	A	A	A	A	A	A	baseline	ns									-91			
Boron	MLE	<0.001	0.009	<0.001	C	B	A	AB	AB	C	C	baseline	259	610	471	591	ns	ns	236	1,105	2,281	1,815	2,219	455	500
Cadmium	MLE	<0.001	<0.001	<0.001	A	A	D	BCD	CD	AB	BC	baseline	ns	-70	-54	-64	ns	-46	-68	-63	-91	-85	-89	-76	-83
Calcium	MLE	<0.001	0.202	<0.001	C	A	AB	AB	AB	AB	B	baseline	56	35	48	41	39	23	1,561	2,495	2,138	2,364	2,236	2,207	1,945
Cesium	MLE	<0.001	<0.001	<0.001	AB	B	AB	C	B	A	B	baseline	ns	ns	-80	ns	ns	ns	-51	-61	-54	-90	-66	ns	-68
Chromium	MLE	<0.001	<0.001	<0.001	B	BC	B	C	B	A	B	baseline	ns	ns	-83	ns	184	ns	-93	-97	-96	-99	-93	-80	-95
Cobalt	MLE	<0.001	<0.001	<0.001	A	AB	C	BC	BC	A	BC	baseline	ns	-68	-53	-51	ns	-50	-86	-91	-96	-94	-93	-88	-93
Copper	MLE	<0.001	<0.001	0.008	AB	ABC	BC	C	AB	A	BC	baseline	ns	ns	-57	ns	ns	ns	80	ns	ns	ns	64	115	ns
Iron	MLE	<0.001	<0.001	<0.001	AB	B	B	C	AB	A	B	baseline	ns	ns	-82	ns	ns	ns	-87	-92	-93	-98	-86	-81	-92
Lead	MLE	<0.001	<0.001	<0.001	A	B	B	C	AB	A	B	baseline	-54	-66	-87	ns	ns	-55	-76	-89	-92	-97	-85	-72	-89
Lithium	MLE	<0.001	<0.001	0.001	AB	E	CD	D	ABC	A	BCD	baseline	**-94**	-53	-67	ns	ns	ns	-72	**ns**	-87	-91	-77	-59	-84
Magnesium	MLE	<0.001	0.050	0.009	B	B	B	B	AB	A	B	baseline	ns	ns	ns	ns	80	ns	-50	-39	-40	-51	-31	ns	-42
Manganese	MLE	<0.001	<0.001	<0.001	AB	A	C	AB	BC	A	AB	baseline	ns	-54	ns	ns	ns	ns	-83	-77	-92	-84	-90	-78	-83
Mercury	MLE	<0.001	<0.001	0.002	AB	BC	C	C	C	A	C	baseline	ns	-50	-70	-52	ns	-56	-80	-89	-90	-94	-91	-77	-91
Molybdenum	MLE	<0.001	0.005	<0.001	A	A	B	B	B	B	B	baseline	ns	-57	-67	-59	-62	-63	ns	ns	-47	-60	-50	-53	-55
Nickel	MLE	<0.001	<0.001	0.026	AB	AB	B	B	AB	A	B	baseline	ns	ns	ns	ns	ns	ns	-92	-92	-95	-94	-92	-88	-93
Phosphorus	MLE	<0.001	<0.001	0.051	A	A	A	A	A	A	A	baseline	ns									-65			
Potassium	MLE	0.579	<0.001	<0.001	B	A	A	B	B	B	B	baseline	71	89	ns	ns	ns	ns	ns	60	77	ns	ns	-27	ns
Rubidium	MLE	<0.001	<0.001	<0.001	C	AB	A	D	C	BC	C	baseline	46	74	-48	ns	ns	ns	-61	-43	-32	-80	-66	-57	-65
Selenium	MLE	<0.001	0.007	<0.001	C	BC	B	B	B	A	A	baseline	ns	77	66	65	269	182	60	105	183	166	164	490	352
Silver	MLE	<0.001	0.076	0.019	-	D	AB	C	A	A	BC	-	baseline	**691**	**316**	**819**	**855**	**339**	**-**	**ns**	-86	-93	-84	-83	-92
Sodium	MLE	0.228	<0.001	<0.001	AB	C	BC	C	A	AB	AB	baseline	-40	ns	-38	ns	ns	ns	ns	-43	ns	-40	42	ns	ns
Strontium	MLE	<0.001	<0.001	0.012	AB	A	A	C	AB	C	ABC	BC	baseline	ns	-21	ns	-24	ns	ns	599	682	449	608	431	539	509
Tellurium	MLE	<0.001	0.208	0.061	<LRL	<LRL	A	A	A	<LRL	<LRL	<LRL	<LRL	baseline	ns			<LRL	<LRL	<LRL	<LRL	40			<LRL	<LRL
Thallium	MLE	<0.001	<0.001	0.004	AB	D	C	C	BC	A	BC	baseline	**-78**	-46	-51	ns	ns	ns	-93	**ns**	-96	-96	-95	-92	-95
Tin	MLE	<0.001	<0.001	<0.001	AB	C	B	C	<LRL	A	<LRL	baseline	**-94**	ns	**-96**	<LRL	ns	<LRL	ns	**ns**	-60	**ns**	<LRL	ns	<LRL
Titanium	MLE	<0.001	<0.001	<0.001	-	BC	C	D	AB	A	BC	-	baseline	ns	-89	ns	122	ns	-	-78	-80	-98	-59	-51	-75
Uranium	MLE	<0.001	<0.001	<0.001	A	B	B	C	AB	A	B	baseline	-47	-46	-78	ns	ns	-34	-70	-84	-84	-93	-79	-70	-81
Vanadium	MLE	<0.001	<0.001	<0.001	AB	BC	C	D	ABC	A	BC	baseline	ns	-48	-82	ns	ns	ns	-77	-84	-88	-96	-78	-71	-86
Zinc	MLE	<0.001	<0.001	0.015	AB	BC	C	C	ABC	A	ABC	baseline	ns	-41	-49	ns	ns	ns	-85	-89	-91	-92	-88	-81	-88
Zirconium	MLE	<0.001	<0.001	<0.001	A	B	AB	C	A	A	B	baseline	-47	ns	**-99**	ns	ns	-53	-74	-86	-84	**ns**	-76	-74	-88

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis (i.e., data from HAC-R1 in 2017 were excluded). Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-R1:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-R1:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.2: Statistical Comparisons of Periphyton Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) Monitoring Area in Post-Breach Years (2017 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]							
			Post-Breach Period							
			2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	-69.1	-86.7	-93.4	-93.1	-96.5	-89.4	-86.4	-95.5
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	<0.001	ns	-65.8	-71.8	-75.2	-81.5	-70.0	-67.0	-78.0
Barium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	-59.1
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	ns	ns	ns	-46.5	-63.9	-44.9	-52.9	-64.4
Calcium	MLE	<0.001	1,207	1,383	1,678	1,694	1,687	1,725	1,490	1,541
Cesium	MLE	-	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	ns	-93.3	-96.2	-95.1	-95.3	-83.4	-79.9	-97.1
Cobalt	MLE	<0.001	ns	-71.9	-83.0	-82.3	-85.9	-78.0	-78.7	-87.7
Copper	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	-58.1
Iron	MLE	<0.001	ns	-83.9	-91.8	-88.4	-96.8	-84.1	-86.2	-93.4
Lead	MLE	<0.001	-62.6	-79.2	-93.1	-94.5	-95.8	-90.4	-90.4	-94.9
Lithium	MLE	<0.001	ns	-74.8	<LRL	-91.3	-93.1	-86.6	-87.9	-93.1
Magnesium	MLE	<0.001	ns	-50.3	-49.1	-49.5	-54.1	-46.2	-47.8	-58.0
Manganese	MLE	<0.001	-83.8	-82.4	-76.2	-80.0	-82.6	-78.0	-78.3	-81.6
Mercury	MLE	<0.001	ns	ns	-70.0	-82.3	-89.4	-76.2	-71.6	-88.2
Molybdenum	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Nickel	MLE	<0.001	ns	-85.4	-88.0	-83.0	-87.5	-78.0	-83.5	-88.3
Phosphorus	MLE	<0.001	-54.7	-71.8	-64.5	-65.4	-73.4	-60.9	-63.0	-71.6
Potassium	MLE	<0.001	-52.2	-45.5	ns	ns	-49.8	ns	-36.2	ns
Rubidium	MLE	-	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	-72.0	-78.3	-74.2	-67.4	-68.1	-58.6	-57.8	-64.8
Silver	MLE	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	ns	ns	ns	ns	-52.0	ns	-35.9	-35.6
Strontium	MLE	<0.001	261	363	326	301	291	283	240	253
Tellurium	MLE	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	-85.0	-91.9	<LRL	-93.9	-96.2	-94.0	-94.6	-95.5
Tin	MLE	0.049	-90.6	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	<0.001	-	-	-87.8	-84.9	-98.2	-80.9	-81.7	-90.9
Uranium	MLE	<0.001	-64.8	-68.9	-86.7	-86.8	-93.0	-79.8	-84.9	-87.9
Vanadium	MLE	<0.001	ns	-77.9	-87.7	-83.9	-95.2	-79.4	-82.6	-91.2
Zinc	MLE	<0.001	-65.8	-83.4	-88.3	-84.0	-90.9	-69.4	-86.6	-88.0
Zirconium	MLE	-	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed). ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/Pre-breach x 100%.

Table F.4.3: Statistical Comparisons of Exposed - Reference Relative Differences of Periphyton Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-U (HAC-R2) Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	<0.001	0.003	AB	AB	AB	BC	A	A	C	baseline	ns	ns	ns	ns	ns	-72	-75	-77	-82	-89	-70	-71	-93
Antimony	MLE	0.041	0.003	0.098	A	A	A	A	A	A	A	baseline	ns									-12			
Arsenic	MLE	<0.001	<0.001	<0.001	A	A	C	AB	BC	AB	AB	baseline	ns	-66	ns	-48	ns	ns	-70	-71	-90	-82	-84	-75	-82
Barium	MLE	<0.001	0.036	0.003	A	A	B	A	A	A	A	baseline	ns	-69	ns	ns	ns	ns	ns	ns	-80	-42	-55	ns	ns
Beryllium	MLE	<0.001	<0.001	0.004	A	AB	ABC	BC	AB	AB	C	baseline	ns	ns	-50	ns	ns	-71	-75	-77	-87	-88	-80	-76	-93
Bismuth	MLE	<0.001	<0.001	0.297	A	A	A	A	A	A	A	baseline	ns									-89			
Boron	MLE	<0.001	0.032	<0.001	C	B	A	A	A	B	B	baseline	589	1,863	1,968	1,449	322	372	ns	640	2,007	2,120	1,563	353	407
Cadmium	MLE	<0.001	<0.001	<0.001	AB	A	CD	B	D	BC	BC	baseline	ns	-57	ns	-60	ns	ns	-68	-56	-86	-77	-87	-78	-78
Calcium	MLE	<0.001	0.016	<0.001	BCD	A	CD	ABC	D	AB	CD	baseline	30	ns	ns	ns	ns	ns	2,075	2,732	1,986	2,363	1,771	2,482	1,947
Cesium	MLE	<0.001	<0.001	<0.001	B	AB	A	BC	AB	AB	C	baseline	ns	107	ns	ns	ns	-50	-61	-48	ns	-66	-56	-52	-81
Chromium	MLE	<0.001	<0.001	0.039	AB	AB	ABC	BC	ABC	A	C	baseline	ns	ns	ns	ns	ns	-74	-90	-92	-93	-96	-95	-88	-97
Cobalt	MLE	<0.001	<0.001	0.004	AB	A	C	BC	BC	BC	C	baseline	ns	-55	ns	ns	ns	-46	-88	-86	-95	-93	-93	-92	-94
Copper	MLE	<0.001	0.037	0.711	A	A	A	A	A	A	A	baseline	ns									83			
Iron	MLE	<0.001	<0.001	<0.001	A	A	ABC	BC	A	AB	C	baseline	ns	ns	-65	ns	ns	-72	-83	-84	-91	-94	-85	-88	-95
Lead	MLE	<0.001	<0.001	0.002	A	A	AB	B	A	A	B	baseline	ns	ns	-64	ns	ns	-64	-77	-73	-86	-92	-77	-79	-92
Lithium	MLE	<0.001	<0.001	0.229	A	A	A	A	A	A	A	baseline	ns									-81			
Magnesium	MLE	<0.001	<0.001	0.195	A	A	A	A	A	A	A	baseline	ns									-29			
Manganese	MLE	<0.001	<0.001	<0.001	B	A	B	A	B	A	A	baseline	101	ns	76	ns	163	156	-79	-58	-84	-63	-79	-45	-47
Mercury	MLE	<0.001	<0.001	0.004	A	AB	AB	AB	AB	B	C	baseline	ns	ns	ns	ns	-44	-71	-75	-83	-83	-85	-86	-86	-93
Molybdenum	MLE	<0.001	<0.001	0.002	AB	A	AB	AB	BC	BC	C	baseline	ns	ns	ns	ns	ns	-43	-47	ns	-47	-41	-54	-61	-69
Nickel	MLE	<0.001	<0.001	0.003	AB	A	C	BC	BC	BC	C	baseline	ns	-44	ns	ns	ns	-41	-90	-88	-95	-94	-94	-93	-94
Phosphorus	MLE	<0.001	<0.001	0.004	BC	C	ABC	A	AB	A	BC	baseline	ns	ns	54	ns	57	ns	-62	-70	-58	-41	-53	-40	-65
Potassium	MLE	0.069	<0.001	<0.001	D	BC	A	A	B	C	CD	baseline	61	337	403	144	54	ns	-46	ns	138	174	ns	ns	ns
Rubidium	MLE	<0.001	<0.001	<0.001	D	C	A	AB	B	C	D	baseline	45	265	189	143	64	ns	-73	-61	ns	-23	-35	-56	-72
Selenium	MLE	<0.001	<0.001	<0.001	D	CD	BC	AB	AB	AB	A	baseline	ns	74	88	98	140	176	124	173	290	320	345	437	519
Silver	MLE	<0.001	<0.001	0.004	-	A	A	A	A	A	B	-	baseline	ns	ns	ns	ns	-72	-	-85	-83	-84	-80	-87	-96
Sodium	MLE	0.831	<0.001	0.030	AB	C	ABC	AB	A	ABC	BC	baseline	-37	ns	ns	ns	ns	ns	ns	-31	ns	ns	50	ns	ns
Strontium	MLE	<0.001	0.011	<0.001	AB	A	C	A	C	AB	BC	baseline	ns	-23	ns	-28	ns	ns	598	728	436	681	402	646	509
Tellurium	MLE	<0.001	0.194	0.448	<LRL	<LRL	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	<LRL	92		<LRL	<LRL	<LRL
Thallium	MLE	<0.001	<0.001	0.001	AB	A	BC	AB	AB	A	C	baseline	ns	ns	ns	ns	ns	-56	-91	-90	-94	-92	-92	-89	-96
Tin	MLE	<0.001	<0.001	0.004	B	C	A	C	<LRL	A	<LRL	baseline	**-61**	407	**-65**	<LRL	508	<LRL	ns	**ns**	-44	**ns**	<LRL	ns	<LRL
Titanium	MLE	<0.001	<0.001	<0.001	-	A	AB	C	A	AB	BC	-	baseline	ns	-71	ns	ns	-66	-	-64	-74	-90	-52	-75	-88
Uranium	MLE	<0.001	<0.001	0.101	A	A	A	A	A	A	A	baseline	ns									-78			
Vanadium	MLE	<0.001	<0.001	0.006	A	A	AB	B	A	A	B	baseline	ns	ns	-57	ns	ns	-53	-75	-74	-85	-89	-75	-78	-88
Zinc	MLE	<0.001	<0.001	<0.001	A	AB	C	C	C	BC	C	baseline	ns	-59	-56	-62	-54	-64	-75	-82	-90	-89	-90	-88	-91
Zirconium	MLE	<0.001	<0.001	<0.001	A	A	A	B	A	A	B	baseline	ns	ns	-66	ns	ns	-71	-75	-76	-81	-92	-79	-85	-93

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant."-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-U:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-U:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.4: Statistical Comparisons of Periphyton Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) Monitoring Area in Post-Breach Years (2018 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]						
			Post-Breach Period						
			2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	-83.0	-86.8	-89.7	-92.9	-84.8	-91.7	-97.3
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	<0.001	-58.5	-66.4	-65.5	-68.7	-62.9	-67.2	-78.0
Barium	MLE	0.410	ns	ns	ns	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	ns	ns	ns	-42.2	-39.7	-58.2	-52.6
Calcium	MLE	<0.001	1,842	1,840	1,572	1,686	1,362	1,679	1,542
Cesium	MLE	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	-90.9	-89.9	-92.3	-85.7	-88.2	-88.0	-98.5
Cobalt	MLE	<0.001	-75.5	-74.2	-78.3	-83.9	-76.2	-85.5	-88.3
Copper	MLE	0.306	ns	ns	ns	ns	ns	ns	ns
Iron	MLE	<0.001	-79.4	-82.8	-85.1	-91.8	-82.7	-91.7	-96.2
Lead	MLE	<0.001	-79.7	-82.4	-90.0	-88.8	-85.0	-92.9	-96.0
Lithium	MLE	<0.001	-78.2	<LRL	-87.6	-90.5	-86.0	<LRL	<LRL
Magnesium	MLE	<0.001	-37.7	-33.4	-38.8	-42.7	-38.1	-51.5	-55.7
Manganese	MLE	<0.001	-77.9	-57.6	-58.1	-59.7	-52.3	-45.9	-43.4
Mercury	MLE	<0.001	ns	-52.2	-68.8	-73.4	-64.5	-82.7	<LRL
Molybdenum	MLE	<0.001	-44.7	ns	ns	ns	ns	-35.5	-45.1
Nickel	MLE	<0.001	-83.1	-81.8	-83.2	-86.3	-82.3	-89.7	-90.3
Phosphorus	MLE	<0.001	-69.7	-66.3	-57.4	-54.5	ns	-55.5	-71.7
Potassium	MLE	<0.001	-68.3	ns	51.1	50.8	ns	ns	-37.9
Rubidium	MLE	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	-69.6	-65.9	-55.1	-49.7	ns	-61.6	-51.8
Silver	MLE	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	ns	ns	ns	ns	ns	-41.7	-55.2
Strontium	MLE	<0.001	363	351	291	331	262	297	253
Tellurium	MLE	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	-89.2	<LRL	-90.2	-91.1	-90.1	-92.8	-95.8
Tin	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Titanium	MLE	<0.001	-	-80.0	-81.0	-92.3	-77.2	-90.7	-95.4
Uranium	MLE	<0.001	-75.7	-79.8	-81.2	-82.7	-77.9	-84.6	-87.3
Vanadium	MLE	<0.001	-75.5	-79.5	-79.5	-87.7	-75.9	-86.9	-92.6
Zinc	MLE	<0.001	-72.8	-80.6	-81.9	-87.1	-76.1	-91.5	-91.1
Zirconium	MLE	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed).ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/Pre-breach x 100%.

Table F.4.5: Statistical Comparisons of Exposed - Reference Relative Differences of Caddisfly Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-R1 Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.142	<0.001	<0.001	A	A	B	B	B	A	B	baseline	ns	-87	-93	-87	ns	-82	389	231	ns	-65	ns	254	ns
Antimony	MLE	<0.001	<0.001	<0.001	A	AB	D	D	C	BC	BC	baseline	ns	-81	-84	-61	-47	-48	312	205	ns	ns	61	119	115
Arsenic	MLE	0.479	<0.001	<0.001	A	A	BC	C	C	AB	BC	baseline	ns	-53	-69	-66	ns	-54	ns	105	ns	-50	-44	ns	ns
Barium	MLE	<0.001	<0.001	<0.001	AB	A	D	D	BC	AB	CD	baseline	ns	-81	-87	ns	ns	-75	ns	158	-83	-89	ns	ns	-78
Beryllium	MLE	0.007	0.001	<0.001	A	A	B	B	<LRL	A	<LRL	baseline	ns	-85	-87	<LRL	ns	<LRL	300	306	ns	ns	<LRL	211	<LRL
Bismuth	MLE	<0.001	0.184	0.436	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	<LRL	65		<LRL	<LRL	<LRL	<LRL	<LRL
Boron	MLE	0.494	<0.001	<0.001	B	A	C	C	<LRL	<LRL	<LRL	baseline	343	-90	-80	<LRL	<LRL	<LRL	108	822	-78	-58	<LRL	<LRL	<LRL
Cadmium	MLE	<0.001	<0.001	<0.001	B	A	C	C	BC	B	C	baseline	320	-81	-79	ns	ns	-80	ns	165	-88	-87	-65	ns	-87
Calcium	MLE	0.010	<0.001	<0.001	A	A	B	B	B	B	B	baseline	ns	-87	-81	-80	-80	-82	365	372	-41	ns	ns	ns	ns
Cesium	MLE	<0.001	<0.001	<0.001	A	AB	D	D	CD	AB	BC	baseline	ns	-91	-93	-87	ns	-71	784	552	ns	ns	ns	311	155
Chromium	MLE	0.013	<0.001	<0.001	A	A	B	B	B	A	B	baseline	ns	-80	-81	-80	ns	-78	ns	ns	-73	-74	-73	160	-71
Cobalt	MLE	<0.001	<0.001	<0.001	AB	A	DE	DE	CD	BC	E	baseline	ns	-80	-89	-72	ns	-91	ns	124	-79	-89	-70	ns	-90
Copper	MLE	<0.001	<0.001	<0.001	A	A	BCD	BC	D	B	CD	baseline	ns	-73	-68	-83	-56	-82	491	598	60	88	ns	160	ns
Iron	MLE	0.647	<0.001	<0.001	A	A	C	C	BC	AB	C	baseline	ns	-85	-89	-79	ns	-85	206	141	ns	-67	ns	ns	ns
Lead	MLE	0.209	<0.001	<0.001	A	A	B	B	B	A	B	baseline	ns	-88	-93	-82	ns	-80	329	266	ns	-70	ns	163	ns
Lithium	MLE	<0.001	<0.001	0.104	A	A	A	<LRL	<LRL	A	<LRL	baseline	ns		<LRL	<LRL	ns	<LRL	206			<LRL	<LRL	206	<LRL
Magnesium	MLE	0.117	<0.001	<0.001	A	ABC	E	DE	CDE	AB	BCD	baseline	ns	-63	-47	-44	ns	-35	38	ns	-48	-27	ns	ns	ns
Manganese	MLE	<0.001	<0.001	<0.001	B	A	C	C	B	B	C	baseline	571	-77	-76	ns	ns	-79	ns	418	-82	-82	ns	ns	-84
Mercury	MLE	<0.001	0.009	<0.001	BC	A	A	ABC	C	AB	C	baseline	115	108	ns	ns	ns	ns	ns	160	151	77	ns	87	ns
Molybdenum	MLE	<0.001	<0.001	<0.001	A	CD	AB	AB	D	C	B	baseline	-87	ns	ns	-88	-77	-51	516	ns	363	248	ns	ns	203
Nickel	MLE	<0.001	<0.001	<0.001	AB	A	C	C	BC	A	D	baseline	ns	-85	-84	ns	ns	**-100**	ns	ns	-84	-83	ns	ns	**ns**
Phosphorus	MLE	<0.001	<0.001	0.008	A	A	B	A	A	A	A	baseline	ns	-22	ns	ns	ns	ns	-14	ns	-33	ns	-13	ns	ns
Potassium	MLE	<0.001	<0.001	<0.001	B	A	C	C	B	A	AB	baseline	55	-43	-26	ns	46	ns	-21	23	-55	-41	-20	ns	ns
Rubidium	MLE	<0.001	<0.001	<0.001	A	A	C	B	B	A	A	baseline	ns	-79	-61	-56	ns	ns	ns	ns	-81	-65	-60	ns	ns
Selenium	MLE	<0.001	<0.001	<0.001	C	BC	BC	A	AB	A	A	baseline	ns	ns	94	74	100	140	442	581	610	952	842	981	1,201
Silver	MLE	<0.001	<0.001	<0.001	-	A	B	B	C	AB	C	-	baseline	-79	-77	**-100**	ns	**-99**	-	ns	-85	-84	**ns**	-69	**ns**
Sodium	MLE	0.002	<0.001	<0.001	AB	A	C	B	B	AB	B	baseline	ns	-47	ns	ns	ns	ns	ns	ns	-45	-22	ns	ns	ns
Strontium	MLE	0.445	<0.001	<0.001	A	A	C	BC	B	B	B	baseline	ns	-87	-77	-71	-61	-73	193	234	-63	ns	ns	ns	ns
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	0.002	<0.001	A	A	C	C	<LRL	B	<LRL	baseline	ns	-84	-85	<LRL	-63	<LRL	ns	ns	-86	-87	<LRL	-68	<LRL
Tin	MLE	0.002	0.003	0.480	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	<LRL	90		<LRL	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	0.019	<0.001	0.004	-	A	B	B	B	A	AB	-	baseline	-82	-88	-79	ns	ns	-	366	ns	ns	ns	342	ns
Uranium	MLE	0.014	<0.001	<0.001	AB	A	D	D	BC	A	CD	baseline	ns	-90	-88	ns	ns	-81	ns	ns	-83	-80	ns	ns	-67
Vanadium	MLE	0.166	<0.001	<0.001	A	A	B	B	B	A	B	baseline	ns	-90	-91	-87	ns	-85	406	252	ns	ns	ns	206	ns
Zinc	MLE	<0.001	<0.001	<0.001	B	A	C	B	A	A	A	baseline	82	-46	ns	78	126	91	-55	ns	-76	-48	-20	ns	ns
Zirconium	MLE	0.889	<0.001	<0.001	A	A	B	B	<LRL	A	<LRL	baseline	ns	-87	-86	<LRL	ns	<LRL	104	185	-73	-71	<LRL	140	<LRL

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-R1:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-R1:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%

Table F.4.6: Statistical Comparisons of Exposed - Reference Relative Differences of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-R1 Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	<0.001	0.010	B	B	B	B	A	A	B	baseline	ns	ns	ns	154	143	ns	ns	ns	ns	ns	265	249	ns
Antimony	MLE	<0.001	<0.001	0.049	B	B	AB	B	A	B	AB	baseline	ns	ns	ns	110	ns	ns	ns	41	101	73	188	73	85
Arsenic	MLE	<0.001	<0.001	<0.001	AB	D	D	CD	AB	A	BC	baseline	-54	-54	-43	ns	ns	ns	80	ns	ns	ns	99	154	46
Barium	MLE	<0.001	<0.001	<0.001	BC	AB	D	CD	A	AB	AB	baseline	ns	-59	ns	199	ns	ns	ns	154	-49	ns	276	136	174
Beryllium	MLE	<0.001	<0.001	0.020	BC	BC	C	BC	A	AB	BC	baseline	ns	ns	ns	126	ns	ns	68	ns	ns	ns	279	169	ns
Bismuth	MLE	0.094	0.026	0.425	<LRL	A	<LRL	A	<LRL	<LRL	<LRL	<LRL	baseline	<LRL	ns	<LRL	<LRL	<LRL	<LRL	ns	<LRL	ns	<LRL	<LRL	<LRL
Boron	MLE	<0.001	<0.001	<0.001	C	B	C	B	A	B	B	baseline	132	ns	155	734	321	225	ns	58	ns	73	466	186	120
Cadmium	MLE	<0.001	<0.001	0.001	AB	AB	C	BC	AB	A	A	baseline	ns	-64	ns	ns	ns	ns	-54	-64	-84	-71	-53	ns	ns
Calcium	MLE	<0.001	<0.001	<0.001	A	CD	D	CD	BC	B	B	baseline	-94	-97	-95	-90	-83	-85	4,536	166	ns	137	379	702	577
Cesium	MLE	<0.001	<0.001	0.197	A	A	A	A	A	A	A	baseline	ns						163						
Chromium	MLE	0.121	<0.001	0.332	A	A	A	A	A	A	A	baseline	ns						ns						
Cobalt	MLE	<0.001	<0.001	0.223	A	A	A	A	A	A	A	baseline	ns						-24						
Copper	MLE	<0.001	0.042	0.003	A	BC	C	AB	BC	BC	BC	baseline	-49	-60	ns	-49	-50	-46	887	399	298	671	398	396	434
Iron	MLE	0.002	<0.001	0.019	BC	C	C	ABC	A	AB	BC	baseline	ns	ns	ns	146	ns	ns	ns	ns	ns	ns	161	107	ns
Lead	MLE	<0.001	<0.001	0.052	A	A	A	A	A	A	A	baseline	ns						50						
Lithium	MLE	<0.001	<0.001	0.100	A	A	A	A	A	A	A	baseline	ns						99						
Magnesium	MLE	0.001	<0.001	<0.001	BC	BCD	D	BC	AB	A	CD	baseline	ns	-35	ns	ns	50	ns	ns	ns	-21	ns	48	83	ns
Manganese	MLE	0.294	<0.001	<0.001	B	A	B	A	A	A	A	baseline	332	ns	141	168	193	168	-47	129	-55	ns	ns	ns	ns
Mercury	MLE	0.905	0.012	<0.001	D	BC	A	AB	CD	CD	CD	baseline	55	206	120	ns	ns	ns	-32	ns	109	50	ns	-30	ns
Molybdenum	MLE	<0.001	<0.001	<0.001	B	B	A	AB	C	B	B	baseline	ns	181	ns	-51	ns	ns	130	229	546	271	ns	132	199
Nickel	MLE	0.668	<0.001	<0.001	AB	BC	C	BC	A	A	BC	baseline	ns	-57	ns	ns	ns	ns	ns	ns	-54	ns	88	68	ns
Phosphorus	MLE	0.898	<0.001	<0.001	D	CD	BC	AB	BC	A	AB	baseline	ns	40	71	45	101	74	-32	-16	ns	ns	ns	36	ns
Potassium	MLE	0.062	<0.001	<0.001	C	AB	B	AB	A	A	A	baseline	92	52	104	136	142	116	-51	ns	-25	ns	ns	ns	ns
Rubidium	MLE	<0.001	<0.001	<0.001	B	B	D	CD	BC	A	AB	baseline	ns	-52	-39	ns	84	ns	-35	-32	-69	-61	-42	ns	ns
Selenium	MLE	<0.001	<0.001	<0.001	D	CD	AB	A	BC	AB	CD	baseline	ns	123	190	71	121	ns	193	260	555	749	403	549	250
Silver	MLE	<0.001	0.469	0.002	-	BC	AB	A	BC	BC	C	-	baseline	ns	213	ns	ns	ns	-	-83	-73	-46	-83	-76	-86
Sodium	MLE	0.028	<0.001	0.011	ABC	C	BC	AB	A	AB	AB	baseline	ns	ns	ns	ns	ns	ns	ns	-45	ns	ns	ns	ns	ns
Strontium	MLE	<0.001	<0.001	<0.001	A	CD	D	CD	BC	AB	A	baseline	-87	-92	-86	-79	ns	ns	1,454	109	ns	113	222	606	693
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	<0.001	<0.001	A	C	C	BC	A	AB	BC	baseline	-66	-67	-52	ns	ns	-45	ns	-76	-77	-67	ns	-53	-61
Tin	MLE	0.984	<0.001	<0.001	<LRL	C	B	A	<LRL	<LRL	<LRL	<LRL	baseline	320	4,648	<LRL	<LRL	<LRL	<LRL	-61	ns	ns	<LRL	<LRL	<LRL
Titanium	MLE	<0.001	<0.001	0.289	-	A	A	A	A	A	A	-	baseline	ns					-	146					
Uranium	MLE	0.019	<0.001	<0.001	BC	BC	C	BC	A	AB	BC	baseline	ns	ns	ns	132	ns	ns	ns	-39	-53	ns	87	ns	-36
Vanadium	MLE	<0.001	<0.001	0.011	BC	C	C	BC	A	AB	BC	baseline	ns	ns	ns	140	ns	ns	ns	ns	ns	74	291	216	89
Zinc	MLE	<0.001	<0.001	<0.001	C	B	C	AB	B	A	B	baseline	112	ns	176	133	223	109	-72	-41	-63	-24	-36	ns	-42
Zirconium	MLE	0.085	<0.001	<0.001	C	BC	B	B	A	B	B	baseline	ns	137	272	793	227	262	-72	-44	ns	ns	150	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-R1:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-R1:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.7: Statistical Comparisons of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) Monitoring Area in Post-Breach Years (2018 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]						
			Post-Breach Period						
			2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.117	ns	ns	ns	ns	ns	ns	ns
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	0.044	ns	ns	ns	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	180	152	ns	248	ns	230	361
Calcium	MLE	<0.001	3,227	ns	ns	ns	ns	387	748
Cesium	MLE	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	-76.3	-85.4	-86.8	-71.0	-86.0	-89.5	-90.6
Cobalt	MLE	0.002	ns	ns	ns	ns	ns	ns	ns
Copper	MLE	<0.001	336	168	ns	282	134	155	216
Iron	MLE	-	-	-	-	-	-	-	-
Lead	MLE	0.053	ns	ns	ns	ns	ns	ns	ns
Lithium	MLE	0.003	ns	ns	ns	146	<LRL	ns	ns
Magnesium	MLE	0.097	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	<0.001	-69.4	ns	-56.6	ns	-55.2	-60.3	ns
Mercury	MLE	<0.001	ns	105	164	85.3	ns	68.8	ns
Molybdenum	MLE	<0.001	ns	ns	ns	ns	ns	-46.2	-44.3
Nickel	MLE	<0.001	-64.4	-72.3	-79.9	ns	-71.5	-75.3	-79.1
Phosphorus	MLE	-	-	-	-	-	-	-	-
Potassium	MLE	-	-	-	-	-	-	-	-
Rubidium	MLE	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	-77.9	-67.8	-49.1	-36.3	-55.1	-41.0	-57.8
Silver	MLE	-	-	-	-	-	-	-	-
Sodium	MLE	-	-	-	-	-	-	-	-
Strontium	MLE	<0.001	925	ns	ns	ns	ns	ns	565
Tellurium	MLE	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Tin	MLE	nt	nt	nt	nt	nt	nt	nt	nt
Titanium	MLE	-	-	-	-	-	-	-	-
Uranium	MLE	0.001	ns	ns	-59.7	ns	ns	ns	-56.1
Vanadium	MLE	0.005	ns	ns	ns	146	ns	ns	ns
Zinc	MLE	<0.001	-76.4	-58.4	-48.5	-33.9	-48.1	-45.3	-48.2
Zirconium	MLE	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed). ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/ Pre-breach x100%.

Table F.4.8: Statistical Comparisons of Exposed - Reference Relative Differences of Caddisfly Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-U (HAC-R2) Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.077	<0.001	<0.001	A	A	D	CD	AB	AB	BC	baseline	ns	-93	-89	ns	ns	-74	ns	153	-86	-77	ns	ns	ns
Antimony	MLE	0.107	<0.001	<0.001	AB	A	C	D	B	B	B	baseline	ns	-67	-82	ns	ns	ns	83	165	-40	-67	52	ns	ns
Arsenic	MLE	0.036	<0.001	<0.001	AB	A	CD	D	BC	CD	BC	baseline	ns	-59	-72	ns	-53	ns	ns	89	-44	-62	ns	-35	ns
Barium	MLE	<0.001	<0.001	<0.001	B	A	C	C	AB	AB	B	baseline	414	-86	-73	ns	ns	ns	-60	104	-94	-89	ns	ns	ns
Beryllium	MLE	0.150	0.015	<0.001	A	A	C	B	<LRL	<LRL	<LRL	baseline	ns	**-99**	-82	<LRL	<LRL	<LRL	ns	200	**ns**	-72	<LRL	<LRL	<LRL
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	MLE	0.203	0.010	<0.001	B	A	D	C	<LRL	<LRL	<LRL	baseline	409	-93	-59	<LRL	<LRL	<LRL	ns	472	-92	-54	<LRL	<LRL	<LRL
Cadmium	MLE	<0.001	<0.001	<0.001	BC	A	D	C	AB	BC	BC	baseline	510	-94	ns	ns	ns	ns	ns	189	-97	-80	ns	ns	ns
Calcium	MLE	0.003	<0.001	<0.001	A	A	D	C	B	BC	BC	baseline	ns	-95	-83	-66	-79	-73	400	450	-75	ns	72	ns	ns
Cesium	MLE	0.006	<0.001	<0.001	AB	A	C	C	B	B	AB	baseline	ns	-93	-88	ns	ns	ns	237	488	-75	-61	98	123	137
Chromium	MLE	<0.001	<0.001	<0.001	AB	A	C	C	B	AB	D	baseline	ns	-90	-88	ns	ns	**-98**	ns	ns	-92	-90	-55	ns	**ns**
Cobalt	MLE	<0.001	<0.001	<0.001	B	A	C	C	B	B	C	baseline	269	-85	-79	ns	ns	-66	-65	ns	-95	-93	-55	-70	-88
Copper	MLE	<0.001	<0.001	<0.001	B	A	D	CD	CD	C	CD	baseline	64	-71	-66	-60	-56	-60	229	440	ns	ns	30	44	31
Iron	MLE	<0.001	<0.001	<0.001	AB	A	E	DE	ABC	BC	CD	baseline	ns	-89	-87	ns	ns	-70	ns	ns	-86	-84	ns	ns	-61
Lead	MLE	0.050	<0.001	<0.001	AB	A	D	D	BC	B	C	baseline	ns	-91	-90	ns	ns	-76	92	223	-83	-80	ns	ns	ns
Lithium	MLE	0.014	0.038	0.347	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	<LRL	94		<LRL	<LRL	<LRL	<LRL	<LRL
Magnesium	MLE	<0.001	<0.001	<0.001	AB	A	C	BC	A	A	A	baseline	ns	-39	ns	ns	ns	ns	-23	ns	-53	-44	ns	ns	ns
Manganese	MLE	<0.001	<0.001	<0.001	BCD	A	E	D	B	BC	CD	baseline	904	-86	ns	ns	ns	ns	-49	410	-93	-76	ns	ns	-55
Mercury	MLE	0.008	0.012	0.005	C	A	AB	BC	BC	BC	C	baseline	178	104	ns	ns	ns	ns	ns	129	68	ns	ns	ns	ns
Molybdenum	MLE	<0.001	<0.001	<0.001	B	D	A	B	CD	BC	B	baseline	-69	177	ns	-52	ns	ns	146	ns	581	199	ns	105	262
Nickel	MLE	<0.001	<0.001	<0.001	BC	A	E	D	ABC	AB	C	baseline	166	-95	-84	ns	ns	ns	-48	ns	-97	-92	ns	ns	-72
Phosphorus	MLE	<0.001	<0.001	<0.001	CD	ABC	D	BC	AB	A	AB	baseline	ns	ns	ns	19	30	19	-22	ns	-33	-20	ns	ns	ns
Potassium	MLE	<0.001	<0.001	<0.001	D	A	E	E	CD	AB	BC	baseline	84	-37	-25	ns	60	35	-32	26	-57	-49	-18	ns	ns
Rubidium	MLE	<0.001	<0.001	<0.001	AB	A	D	C	C	B	AB	baseline	ns	-85	-61	-45	ns	ns	ns	ns	-87	-65	-52	ns	ns
Selenium	MLE	<0.001	<0.001	<0.001	F	E	D	CD	B	A	BC	baseline	93	179	246	464	862	367	234	544	830	1,053	1,781	3,111	1,458
Silver	MLE	<0.001	<0.001	<0.001	-	A	C	C	C	B	B	-	baseline	-92	-92	-90	-74	-73	-	ns	-95	-95	-94	-84	-84
Sodium	MLE	<0.001	<0.001	<0.001	B	A	C	C	B	AB	B	baseline	43	-37	-30	ns	ns	ns	-20	ns	-49	-44	ns	ns	ns
Strontium	MLE	0.929	<0.001	<0.001	AB	A	E	D	BC	CD	CD	baseline	ns	-91	-68	ns	-52	-48	96	220	-82	-38	58	ns	ns
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	0.001	<0.001	A	A	C	C	<LRL	B	<LRL	baseline	ns	-84	-87	<LRL	-51	<LRL	-40	ns	-90	-92	<LRL	-70	<LRL
Tin	MLE	0.579	0.001	0.154	A	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	<LRL	ns		<LRL	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	0.404	<0.001	<0.001	-	A	B	B	A	A	A	-	baseline	-95	-94	ns	ns	ns	-	244	-81	-81	ns	ns	ns
Uranium	MLE	<0.001	<0.001	<0.001	B	AB	D	C	A	AB	B	baseline	ns	-93	-76	250	ns	ns	ns	ns	-96	-85	120	ns	ns
Vanadium	MLE	0.115	<0.001	<0.001	AB	A	C	C	AB	AB	B	baseline	ns	-93	-86	ns	ns	ns	ns	159	-87	-73	ns	ns	ns
Zinc	MLE	<0.001	<0.001	<0.001	C	A	D	B	A	A	A	baseline	106	-41	49	117	130	130	-63	-23	-78	-44	ns	ns	ns
Zirconium	MLE	<0.001	<0.001	<0.001	B	A	C	D	<LRL	AB	<LRL	baseline	136	-88	**-98**	<LRL	ns	<LRL	ns	111	-89	**ns**	<LRL	ns	<LRL

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-U:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-U:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.9: Statistical Comparisons of Exposed - Reference Relative Differences of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-U (HAC-R2) Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.726	<0.001	0.002	BCD	AB	D	ABC	ABC	A	CD	baseline	ns	ns	ns	ns	195	ns	ns	ns	-54	ns	ns	170	ns
Antimony	MLE	<0.001	<0.001	<0.001	CD	BCD	D	BCD	AB	A	ABC	baseline	ns	ns	ns	76	128	ns	ns	ns	ns	ns	76	128	54
Arsenic	MLE	0.010	<0.001	<0.001	BC	BC	D	CD	A	AB	B	baseline	ns	-57	ns	134	ns	ns	ns	ns	-44	ns	202	81	54
Barium	MLE	0.002	<0.001	<0.001	C	B	D	C	AB	A	B	baseline	307	-59	ns	514	830	316	ns	152	-75	ns	280	475	157
Beryllium	MLE	0.198	<0.001	0.002	AB	A	C	AB	AB	A	BC	baseline	ns	-64	ns	ns	ns	ns	ns	ns	-57	ns	ns	138	ns
Bismuth	MLE	0.626	0.035	0.006	<LRL	B	<LRL	B	<LRL	A	<LRL	<LRL	baseline	<LRL	ns	<LRL	1,026	<LRL	<LRL	ns	<LRL	ns	<LRL	ns	<LRL
Boron	MLE	0.001	<0.001	<0.001	D	CD	E	BC	A	A	AB	baseline	ns	-62	117	341	415	231	ns	ns	-71	65	237	294	153
Cadmium	MLE	<0.001	<0.001	<0.001	AB	BC	D	CD	AB	AB	A	baseline	ns	-72	-56	ns	ns	ns	-58	-69	-88	-82	-47	-40	ns
Calcium	MLE	<0.001	<0.001	<0.001	C	B	D	BC	A	A	BC	baseline	142	-73	ns	546	581	ns	136	471	ns	184	1,426	1,508	219
Cesium	MLE	<0.001	<0.001	0.001	BC	AB	D	BCD	ABC	A	CD	baseline	ns	-60	ns	ns	142	ns	81	202	ns	ns	134	338	ns
Chromium	MLE	<0.001	<0.001	0.002	B	AB	C	B	BC	A	BC	baseline	ns	-54	ns	ns	125	ns	ns	ns	-72	ns	-41	ns	-62
Cobalt	MLE	<0.001	<0.001	<0.001	AB	AB	C	B	AB	A	AB	baseline	ns	-63	ns	ns	ns	ns	-51	ns	-82	-59	-38	ns	-51
Copper	MLE	<0.001	<0.001	<0.001	B	B	C	B	A	B	B	baseline	ns	-51	ns	351	ns	ns	269	479	79	371	1,564	509	436
Iron	MLE	0.250	<0.001	<0.001	BC	ABC	D	ABC	AB	A	CD	baseline	ns	-56	ns	ns	133	ns	ns	ns	-62	ns	ns	101	-48
Lead	MLE	0.724	<0.001	0.008	BC	AB	C	B	AB	A	BC	baseline	ns	ns	ns	ns	123	ns	ns	ns	-50	ns	ns	119	ns
Lithium	MLE	0.045	<0.001	0.009	A	A	B	AB	A	A	B	baseline	ns	-56	ns	ns	ns	-55	ns	ns	ns	ns	ns	130	ns
Magnesium	MLE	0.349	0.006	<0.001	CD	B	D	BC	A	A	BC	baseline	55	ns	ns	195	136	ns	-28	ns	-45	ns	111	69	ns
Manganese	MLE	0.002	<0.001	<0.001	C	A	D	BC	B	A	A	baseline	355	-49	ns	127	603	389	-36	190	-67	ns	ns	348	211
Mercury	MLE	0.703	0.004	<0.001	C	AB	A	A	AB	BC	AB	baseline	79	134	148	102	ns	70	-42	ns	36	44	ns	ns	ns
Molybdenum	MLE	<0.001	<0.001	<0.001	BC	AB	A	BC	D	C	BC	baseline	ns	224	ns	-68	ns	ns	134	310	657	219	ns	104	220
Nickel	MLE	<0.001	<0.001	<0.001	C	BC	D	C	AB	A	BC	baseline	ns	-64	ns	151	252	ns	-47	ns	-81	-42	ns	86	ns
Phosphorus	MLE	0.998	<0.001	<0.001	AB	B	B	B	A	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	-15	-18	-14	18	24	ns
Potassium	MLE	<0.001	<0.001	<0.001	A	A	C	BC	AB	A	A	baseline	ns	-40	-33	ns	ns	ns	ns	ns	-43	-36	-19	ns	ns
Rubidium	MLE	<0.001	0.056	<0.001	A	A	B	B	A	A	A	baseline	ns	-71	-64	ns	ns	ns	ns	-38	-76	-71	ns	ns	-37
Selenium	MLE	<0.001	<0.001	<0.001	B	B	A	A	A	A	A	baseline	ns	117	99	116	144	97	219	207	592	534	587	677	529
Silver	MLE	<0.001	<0.001	<0.001	-	B	C	B	A	AB	B	-	baseline	-61	ns	216	ns	ns	-	-78	-91	-70	ns	-57	-71
Sodium	MLE	<0.001	<0.001	0.049	ABC	C	BC	ABC	A	ABC	AB	baseline	ns	ns	ns	ns	ns	ns	-28	-50	-44	-33	ns	-34	ns
Strontium	MLE	<0.001	0.003	<0.001	C	B	D	C	A	A	BC	baseline	106	-73	ns	293	392	ns	95	302	-48	102	666	858	187
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	<0.001	<0.001	<0.001	BC	C	D	CD	A	B	BC	baseline	ns	-60	ns	239	ns	ns	-66	-67	-86	-78	ns	-39	-62
Tin	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	MLE	0.049	<0.001	0.007	-	AB	C	AB	BC	A	BC	-	baseline	-62	ns	ns	ns	ns	-	ns	ns	ns	ns	220	ns
Uranium	MLE	<0.001	<0.001	<0.001	C	BC	D	C	A	AB	BC	baseline	ns	-57	ns	331	226	ns	-64	ns	-85	-54	ns	ns	-38
Vanadium	MLE	0.073	<0.001	<0.001	B	B	C	AB	AB	A	BC	baseline	ns	-62	ns	ns	160	ns	ns	ns	-56	ns	ns	200	ns
Zinc	MLE	<0.001	<0.001	<0.001	B	AB	C	AB	B	A	A	baseline	ns	-30	ns	ns	66	44	-51	-41	-66	-40	-49	ns	-29
Zirconium	MLE	<0.001	<0.001	0.059	A	A	A	A	A	A	A	baseline	ns						-44						

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis (i.e., data from HAC-U in 2015 were excluded). Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-U:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-U:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.10: Statistical Comparisons of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) Monitoring Area in Post-Breach Years (2015 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]							
			Post-Breach Period							
			2015	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	315	ns	ns	ns	ns	ns	ns	ns
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	<0.001	ns	ns	ns	-61.3	ns	ns	ns	ns
Barium	MLE	<0.001	ns	-55.7	ns	-77.2	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	ns	157	ns	ns	ns	ns	217	448
Calcium	MLE	<0.001	ns	ns	515	ns	ns	631	877	299
Cesium	MLE	-	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	ns	-85.5	-82.2	-95.0	-74.2	-93.4	-87.9	-94.6
Cobalt	MLE	<0.001	ns	ns	ns	-74.0	ns	ns	ns	ns
Copper	MLE	<0.001	253	ns	211	ns	134	680	213	217
Iron	MLE	-	-	-	-	-	-	-	-	-
Lead	MLE	<0.001	225	ns	ns	-62.5	ns	ns	ns	ns
Lithium	MLE	<0.001	276	ns	148	<LRL	ns	<LRL	ns	<LRL
Magnesium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	<0.001	-70.7	-63.3	ns	-68.8	ns	-54.5	ns	ns
Mercury	MLE	<0.001	-	ns	101	72.3	78.2	81.4	102	69.0
Molybdenum	MLE	<0.001	-63.9	ns	ns	84.9	ns	ns	-52.5	ns
Nickel	MLE	<0.001	ns	-82.3	-71.1	-91.7	-61.9	-79.9	-72.6	-81.0
Phosphorus	MLE	-	-	-	-	-	-	-	-	-
Potassium	MLE	-	-	-	-	-	-	-	-	-
Rubidium	MLE	-	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	-55.2	-75.9	-72.5	-46.1	-52.4	-38.6	ns	ns
Silver	MLE	-	-	-	-	-	-	-	-	-
Sodium	MLE	-	-	-	-	-	-	-	-	-
Strontium	MLE	<0.001	179	ns	220	ns	ns	225	306	ns
Tellurium	MLE	-	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Tin	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Titanium	MLE	-	-	-	-	-	-	-	-	-
Uranium	MLE	<0.001	ns	-69.5	ns	-86.9	ns	ns	ns	ns
Vanadium	MLE	<0.001	351	ns	ns	ns	ns	ns	ns	ns
Zinc	MLE	<0.001	-58.2	-57.9	-58.2	-51.8	-47.7	-59.1	-49.8	-36.2
Zirconium	MLE	-	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed). ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/Pre-breach x 100%.

Table F.4.11: Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Caddisfly Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-R1 Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	<0.001	0.056	A	A	A	A	A	A	A	baseline	ns						774						
Antimony	log_{10}	<0.001	<0.001	<0.001	A	-	C	C	BC	B	AB	baseline	-	-87	-88	-71	-62	ns	468	-	ns	ns	ns	114	155
Arsenic	log_{10}	<0.001	<0.001	0.252	A	A	A	A	A	A	A	baseline	ns						483						
Barium	log_{10}	0.530	<0.001	0.001	AB	A	B	C	AB	AB	BC	baseline	ns	ns	-86	ns	ns	ns	ns	368	ns	-80	ns	ns	ns
Beryllium	log_{10}	<0.001	0.102	0.832	A	A	A	A	-	A	-	baseline	ns						1,033						
Bismuth	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	log_{10}	<0.001	0.001	<0.001	A	A	B	B	-	A	-	baseline	ns	-98	-93	-	ns	-	ns	ns	-99	-96	-	ns	-
Cadmium	log_{10}	<0.001	<0.001	0.043	ABC	A	BC	C	AB	ABC	BC	baseline	ns	ns	ns	ns	ns	ns	ns	614	ns	ns	398	ns	ns
Calcium	log_{10}	<0.001	<0.001	<0.001	A	A	B	B	B	B	B	baseline	ns	-91	-87	-86	-85	-85	-72	-82	-97	-96	-96	-96	-96
Cesium	log_{10}	<0.001	<0.001	0.001	A	AB	C	ABC	C	C	BC	baseline	ns	-91	ns	-91	-80	-81	1,688	1,569	ns	446	ns	256	248
Chromium	log_{10}	<0.001	<0.001	0.052	A	A	A	A	A	A	A	baseline	ns						1,354						
Cobalt	log_{10}	<0.001	<0.001	<0.001	AB	A	BC	CD	BCD	B	D	baseline	ns	ns	-77	ns	ns	-82	675	2,296	384	ns	341	570	ns
Copper	log_{10}	<0.001	<0.001	<0.001	AB	A	BCD	ABC	D	CD	CD	baseline	ns	ns	ns	-82	-63	-70	229	434	ns	140	ns	ns	ns
Iron	log_{10}	<0.001	<0.001	0.047	AB	A	BC	ABC	C	ABC	BC	baseline	ns	ns	ns	-80	ns	ns	2,234	3,089	570	1,279	374	789	473
Lead	log_{10}	<0.001	0.002	0.086	A	A	A	A	A	A	A	baseline	ns						1,132						
Lithium	log_{10}	<0.001	0.057	0.261	A	-	A	A	-	A	-	baseline	-	ns		-	ns	-	1,379	-	1,379		-	1,379	-
Magnesium	log_{10}	<0.001	0.001	0.003	A	AB	C	BC	BC	BC	B	baseline	ns	-69	-46	-60	-50	-45	176	86	ns	49	ns	ns	53
Manganese	log_{10}	<0.001	<0.001	<0.001	B	A	BCD	CD	B	BC	D	baseline	374	ns	-75	ns	ns	-80	366	2,107	135	ns	451	217	ns
Mercury	log_{10}	<0.001	<0.001	<0.001	C	ABC	A	AB	BC	C	C	baseline	ns	320	192	ns	ns	ns	510	1,261	2,461	1,679	1,040	491	662
Molybdenum	log_{10}	<0.001	<0.001	<0.001	AB	D	A	A	CD	BC	AB	baseline	-86	ns	ns	-72	ns	ns	403	ns	780	746	ns	206	571
Nickel	log_{10}	<0.001	<0.001	0.005	ABC	AB	D	CD	BCD	A	-	baseline	ns	-77	ns	ns	ns	-	1,200	1,907	199	321	440	3,038	-
Phosphorus	log_{10}	<0.001	<0.001	0.136	A	A	A	A	A	A	A	baseline	ns						147						
Potassium	log_{10}	0.001	<0.001	<0.001	B	B	C	B	AB	A	AB	baseline	ns	-70	ns	ns	88	ns	ns	ns	-74	-35	ns	60	ns
Rubidium	log_{10}	<0.001	<0.001	<0.001	A	AB	C	AB	B	AB	A	baseline	ns	-88	ns	-49	ns	ns	128	110	-72	73	ns	84	172
Selenium	log_{10}	<0.001	<0.001	0.132	A	A	A	A	A	A	A	baseline	ns						192						
Silver	log_{10}	0.004	0.989	0.494	-	-	A	A	-	A	-	-	-	baseline	ns	-	ns	-	-	-	149		-	149	-
Sodium	log_{10}	0.474	0.011	<0.001	BC	A	CD	AB	D	BCD	CD	baseline	85	ns	ns	-46	ns	ns	ns	100	-33	ns	-41	ns	-33
Strontium	log_{10}	<0.001	<0.001	<0.001	A	A	C	BC	B	B	BC	baseline	ns	-84	-78	-62	-58	-69	-58	-57	-93	-91	-84	-82	-87
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	<0.001	0.003	0.351	A	-	A	A	-	A	-	baseline	-	ns		-	ns	-	718	-	718		-	718	-
Tin	log_{10}	0.218	0.213	0.579	A	-	A	-	-	-	-	baseline	-	ns	-	-	-	-	ns	-	ns	-	-	-	-
Titanium	log_{10}	<0.001	<0.001	0.057	-	A	A	A	A	A	A	-	baseline	ns					-	738					
Uranium	log_{10}	<0.001	<0.001	0.002	ABC	A	D	BCD	ABC	AB	CD	baseline	ns	-81	ns	ns	ns	ns	477	1,237	ns	204	352	553	ns
Vanadium	log_{10}	<0.001	<0.001	0.026	A	A	B	AB	B	AB	AB	baseline	ns	-81	ns	-87	ns	ns	2,107	2,154	320	966	193	954	437
Zinc	log_{10}	<0.001	<0.001	0.005	BC	A	C	A	A	AB	A	baseline	150	ns	128	124	ns	139	189	623	164	559	546	442	591
Zirconium	log_{10}	<0.001	0.168	0.029	A	A	B	-	-	AB	-	baseline	ns	-70	-	-	ns	-	687	1,133	132	-	-	527	-

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-R1:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-R1:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.12: **Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-R1 Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	<0.001	0.438	A	A	A	A	A	A	A	baseline	ns						1,072						
Antimony	log_{10}	<0.001	<0.001	0.325	A	-	A	A	A	A	A	baseline	-	ns					128	-	128				
Arsenic	log_{10}	<0.001	<0.001	0.008	AB	B	A	A	A	A	A	baseline	ns	ns	ns	ns	ns	ns	632	241	1,036	861	1,490	905	722
Barium	log_{10}	<0.001	<0.001	0.011	C	ABC	BC	C	A	BC	AB	baseline	ns	ns	ns	504	ns	278	ns	360	228	ns	1,152	167	682
Beryllium	log_{10}	<0.001	<0.001	0.008	C	BC	AB	A	AB	C	ABC	baseline	ns	172	317	261	ns	ns	476	512	1,468	2,303	1,980	440	1,032
Bismuth	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	log_{10}	<0.001	<0.001	<0.001	AB	B	C	BC	BC	A	A	baseline	ns	-76	ns	ns	ns	ns	-80	-87	-95	-91	-94	-61	-66
Cadmium	log_{10}	<0.001	<0.001	0.019	BC	C	ABC	ABC	A	AB	A	baseline	ns	ns	ns	184	ns	173	ns	ns	ns	117	313	158	297
Calcium	log_{10}	<0.001	<0.001	<0.001	A	CD	D	CD	BC	B	B	baseline	-96	-98	-97	-93	-88	-88	179	-90	-93	-90	-80	-65	-67
Cesium	log_{10}	<0.001	<0.001	0.047	B	B	B	A	AB	B	AB	baseline	ns	ns	321	ns	ns	ns	408	511	265	2,041	989	370	778
Chromium	log_{10}	<0.001	<0.001	0.062	A	A	A	A	A	A	A	baseline	ns						1,577						
Cobalt	log_{10}	<0.001	<0.001	0.157	A	A	A	A	A	A	A	baseline	ns						860						
Copper	log_{10}	<0.001	<0.001	0.007	AB	BC	BC	A	BC	C	ABC	baseline	ns	ns	ns	ns	-58	ns	448	282	229	885	203	131	392
Iron	log_{10}	<0.001	<0.001	0.009	B	B	B	A	B	B	B	baseline	ns	ns	610	ns	ns	ns	710	1,186	1,290	5,652	1,832	972	1,270
Lead	log_{10}	<0.001	0.002	0.006	C	BC	BC	A	AB	BC	BC	baseline	ns	ns	724	214	ns	ns	436	796	1,376	4,322	1,584	713	1,342
Lithium	log_{10}	<0.001	0.004	0.030	BC	-	AB	A	AB	C	BC	baseline	-	ns	258	ns	ns	ns	369	-	1,305	1,579	1,309	295	415
Magnesium	log_{10}	<0.001	<0.001	0.160	A	A	A	A	A	A	A	baseline	ns						93						
Manganese	log_{10}	<0.001	<0.001	0.029	C	AB	BC	AB	A	ABC	AB	baseline	205	ns	151	364	ns	157	220	878	499	705	1,386	609	723
Mercury	log_{10}	<0.001	<0.001	<0.001	D	CD	A	AB	BC	D	CD	baseline	ns	516	350	143	ns	ns	245	457	2,026	1,451	738	210	417
Molybdenum	log_{10}	<0.001	<0.001	<0.001	E	CDE	A	AB	DE	BCD	ABC	baseline	ns	555	379	ns	165	254	88	203	1,128	798	126	397	563
Nickel	log_{10}	<0.001	<0.001	0.151	A	A	A	A	A	A	A	baseline	ns						1,184						
Phosphorus	log_{10}	<0.001	<0.001	0.068	A	A	A	A	A	A	A	baseline	ns						183						
Potassium	log_{10}	0.104	<0.001	<0.001	B	B	B	A	A	A	A	baseline	ns	ns	109	185	211	115	-47	-41	-58	ns	51	64	ns
Rubidium	log_{10}	<0.001	<0.001	<0.001	AB	B	C	AB	AB	A	A	baseline	ns	-72	ns	ns	ns	ns	66	ns	-54	95	70	177	150
Selenium	log_{10}	<0.001	<0.001	<0.001	BC	BC	AB	A	AB	CD	D	baseline	ns	ns	77	ns	ns	-58	83	68	132	224	91	ns	ns
Silver	log_{10}	<0.001	0.187	<0.001	-	-	B	A	B	B	B	-	-	baseline	296	ns	ns	ns	-	-	100	694	ns	ns	ns
Sodium	log_{10}	0.503	<0.001	0.092	A	A	A	A	A	A	A	baseline	ns						ns						
Strontium	log_{10}	<0.001	<0.001	<0.001	A	CD	D	CD	BC	AB	AB	baseline	-88	-90	-86	-73	ns	ns	122	-73	-78	-70	ns	ns	ns
Tellurium	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	<0.001	<0.001	0.156	A	-	A	A	A	A	A	baseline	-	ns					758	-	758				
Tin	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	log_{10}	<0.001	<0.001	<0.001	-	B	B	A	B	B	B	-	baseline	ns	749	ns	ns	ns	-	825	836	7,760	838	592	830
Uranium	log_{10}	<0.001	<0.001	0.002	B	B	B	A	A	B	B	baseline	ns	ns	270	227	ns	ns	173	294	198	911	792	283	231
Vanadium	log_{10}	<0.001	<0.001	0.015	B	B	B	A	AB	B	B	baseline	ns	ns	486	ns	ns	ns	610	733	991	4,060	1,702	988	1,249
Zinc	log_{10}	<0.001	<0.001	<0.001	C	B	B	A	B	B	B	baseline	195	124	438	192	168	162	79	428	301	863	423	379	368
Zirconium	log_{10}	<0.001	<0.001	<0.001	C	BC	AB	-	A	AB	AB	baseline	ns	247	-	640	217	391	ns	ns	391	-	949	349	596

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-R1:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-R1:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%

Table F.4.13: Statistical Comparisons of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-R1; Exposed) Monitoring Area in Post-Breach Years (2018 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference in Relative to Pre-Breach Period (%)[a]						
			Post-Breach Period						
			2018	2019	2020	2021	2022	2023	2024
Aluminum	log10	<0.001	141	308	209	466	212	174	285
Antimony	log10	-	-	-	-	-	-	-	-
Arsenic	log10	<0.001	67	70	44	132	51	80	91
Barium	log10	0.084	ns	ns	ns	ns	ns	ns	ns
Beryllium	log10	-	-	-	-	-	-	-	-
Bismuth	log10	-	-	-	-	-	-	-	-
Boron	log10	-	-	-	-	-	-	-	-
Cadmium	log10	<0.001	83	65	ns	176	ns	133	204
Calcium	log10	<0.001	ns	-55	-67	-58	-59	ns	ns
Cesium	log10	-	-	-	-	-	-	-	-
Chromium	log10	<0.001	ns	ns	ns	125	ns	ns	ns
Cobalt	log10	<0.001	57	140	80	193	84	80	136
Copper	log10	<0.001	91	101	75	151	ns	ns	140
Iron	log10	-	-	-	-	-	-	-	-
Lead	log10	<0.001	110	234	231	412	180	168	248
Lithium	log10	<0.001	126	-	266	358	192	198	213
Magnesium	log10	<0.001	42	41	35	61	ns	47	56
Manganese	log10	<0.001	ns	65	ns	156	ns	ns	67
Mercury	log10	<0.001	64	80	223	177	103	117	117
Molybdenum	log10	<0.001	ns	ns	ns	37	ns	ns	ns
Nickel	log10	<0.001	ns	ns	ns	93	ns	ns	ns
Phosphorus	log10	-	-	-	-	-	-	-	-
Potassium	log10	-	-	-	-	-	-	-	-
Rubidium	log10	-	-	-	-	-	-	-	-
Selenium	log10	<0.001	ns	ns	ns	36	ns	ns	ns
Silver	log10	-	-	-	-	-	-	-	-
Sodium	log10	-	-	-	-	-	-	-	-
Strontium	log10	<0.001	ns	ns	ns	ns	ns	ns	ns
Tellurium	log10	-	-	-	-	-	-	-	-
Thallium	log10	-	-	-	-	-	-	-	-
Tin	log10	-	-	-	-	-	-	-	-
Titanium	log10	-	-	-	-	-	-	-	-
Uranium	log10	<0.001	ns	82	62	214	62	69	75
Vanadium	log10	<0.001	104	232	131	455	145	149	209
Zinc	log10	<0.001	ns	73	66	136	ns	84	89
Zirconium	log10	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = one way analysis of variance. MOD = Magnitude of Difference. ns = not significant.

[a] Magnitude of difference (MOD) calculated on back-transformed least-squares means as (Post-breach-Pre-breach)/Pre-breach x100%.

Table F.4.14: Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Caddisfly Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-U (HAC-R2) Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	<0.001	0.006	AB	A	C	BC	AB	ABC	AB	baseline	ns	-91	ns	ns	ns	ns	709	1,011	ns	ns	351	221	646
Antimony	log_{10}	0.447	<0.001	<0.001	A	-	B	C	A	AB	AB	baseline	-	-74	-89	ns	ns	ns	158	-	ns	-73	ns	ns	ns
Arsenic	log_{10}	<0.001	<0.001	0.031	ABC	A	AB	C	AB	BC	AB	baseline	ns	ns	ns	ns	ns	ns	361	556	456	112	419	159	400
Barium	log_{10}	0.179	<0.001	<0.001	BCD	A	CD	D	AB	AB	BC	baseline	409	ns	ns	ns	ns	ns	ns	210	-73	-81	ns	ns	ns
Beryllium	log_{10}	<0.001	0.072	0.466	A	A	-	A	-	A	-	baseline	ns	-	ns	-	ns	-	366		-	366	-	366	-
Bismuth	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	log_{10}	<0.001	<0.001	<0.001	A	A	C	B	BC	A	-	baseline	ns	-99	-89	-97	ns	-	ns	ns	-99	-88	-97	ns	-
Cadmium	log_{10}	<0.001	<0.001	<0.001	BC	A	D	CD	A	AB	ABC	baseline	337	-79	ns	342	ns	ns	ns	552	-69	ns	560	243	195
Calcium	log_{10}	<0.001	<0.001	<0.001	A	A	D	C	B	C	BC	baseline	ns	-95	-85	-60	-82	-72	-77	-81	-99	-97	-91	-96	-94
Cesium	log_{10}	<0.001	<0.001	<0.001	A	A	D	C	BC	AB	A	baseline	ns	-96	-88	-80	ns	ns	772	1,027	-69	ns	ns	263	728
Chromium	log_{10}	<0.001	<0.001	0.006	AB	A	C	BC	AB	ABC	-	baseline	ns	-85	ns	ns	ns	-	743	1,476	ns	ns	691	329	-
Cobalt	log_{10}	<0.001	<0.001	<0.001	BCD	A	E	DE	AB	ABC	CDE	baseline	208	-67	ns	ns	ns	ns	197	814	ns	ns	522	267	ns
Copper	log_{10}	0.673	<0.001	0.118	A	A	A	A	A	A	A	baseline	ns						ns						
Iron	log_{10}	<0.001	<0.001	0.011	AB	A	C	BC	AB	AB	AB	baseline	ns	-80	ns	ns	ns	ns	666	1,107	ns	174	548	418	721
Lead	log_{10}	<0.001	<0.001	0.002	AB	A	C	BC	C	ABC	AB	baseline	ns	-83	ns	-77	ns	ns	731	1,085	ns	186	ns	332	1,581
Lithium	log_{10}	<0.001	0.001	0.049	AB	B	-	A	-	AB	-	baseline	ns	-	ns	-	ns	-	203	ns	-	723	-	312	-
Magnesium	log_{10}	0.245	0.003	0.018	AB	AB	C	BC	AB	AB	A	baseline	ns	-48	ns	ns	ns	ns	ns	ns	-35	ns	ns	ns	50
Manganese	log_{10}	<0.001	<0.001	<0.001	BC	A	E	DE	AB	CD	CDE	baseline	399	-82	-73	ns	ns	ns	144	1,119	-56	ns	438	ns	ns
Mercury	log_{10}	<0.001	<0.001	0.011	B	A	A	A	A	AB	A	baseline	297	191	130	115	ns	109	235	1,228	876	671	621	559	600
Molybdenum	log_{10}	<0.001	<0.001	<0.001	B	C	A	B	B	B	A	baseline	-78	178	ns	ns	ns	157	360	ns	1,179	407	161	429	1,084
Nickel	log_{10}	<0.001	<0.001	<0.001	BC	AB	CD	D	AB	A	AB	baseline	ns	ns	-76	ns	215	ns	440	1,085	ns	ns	641	1,603	862
Phosphorus	log_{10}	<0.001	<0.001	0.006	ABC	A	C	C	ABC	BC	AB	baseline	ns	ns	ns	ns	ns	ns	103	203	60	ns	97	69	164
Potassium	log_{10}	<0.001	<0.001	<0.001	A	A	C	C	B	A	A	baseline	ns	-86	-85	-51	ns	ns	ns	ns	-82	-81	-38	ns	ns
Rubidium	log_{10}	0.086	<0.001	<0.001	A	A	D	C	C	B	AB	baseline	ns	-96	-86	-77	-46	ns	229	212	-87	-55	ns	78	200
Selenium	log_{10}	<0.001	<0.001	<0.001	D	CD	CD	BC	AB	A	BCD	baseline	ns	ns	84	184	301	ns	49	136	139	174	323	498	152
Silver	log_{10}	0.882	0.278	0.182	-	A	A	A	A	A	-	-	baseline	ns				-	-	ns					-
Sodium	log_{10}	<0.001	<0.001	<0.001	BCD	A	D	D	CD	BC	AB	baseline	129	ns	ns	ns	ns	ns	ns	67	-46	-48	-41	ns	ns
Strontium	log_{10}	<0.001	<0.001	<0.001	AB	A	E	D	A	CD	BC	baseline	ns	-88	-72	ns	-55	ns	-72	-61	-97	-92	-68	-87	-83
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	<0.001	0.002	0.016	B	AB	BC	C	BC	BC	A	baseline	ns	ns	-71	ns	ns	409	463	649	178	ns	259	388	2,768
Tin	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	log_{10}	<0.001	<0.001	0.002	-	A	C	BC	AB	AB	A	-	baseline	-92	-80	ns	ns	ns	-	845	ns	ns	302	454	1,091
Uranium	log_{10}	<0.001	<0.001	<0.001	BC	AB	D	C	A	AB	AB	baseline	ns	-93	ns	253	ns	ns	172	627	-82	ns	861	259	283
Vanadium	log_{10}	<0.001	<0.001	<0.001	AB	A	C	BC	AB	AB	A	baseline	ns	-89	ns	ns	ns	ns	645	899	ns	146	432	339	822
Zinc	log_{10}	<0.001	<0.001	<0.001	E	CD	DE	BC	AB	AB	A	baseline	167	ns	238	472	397	532	ns	291	113	395	737	627	825
Zirconium	log_{10}	<0.001	0.202	0.003	A	A	B	-	-	A	-	baseline	ns	-71	-	-	ns	-	214	527	ns	-	-	485	-

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline = first year of data included in analysis. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-U:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-U:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.15: **Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Upper Edney Creek (EDC-U; Reference) Monitoring Areas, 2018 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-U (HAC-R2) Mean Relative to EDC-U (%)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	<0.001	0.334	A	A	A	A	A	A	A	baseline	ns						464						
Antimony	log_{10}	<0.001	<0.001	<0.001	BCD	-	D	CD	AB	A	ABC	baseline	-	ns	ns	ns	107	ns	ns	-	ns	ns	128	199	79
Arsenic	log_{10}	<0.001	<0.001	0.002	BC	C	BC	BC	A	BC	AB	baseline	ns	ns	ns	350	ns	ns	333	267	454	348	1,849	621	771
Barium	log_{10}	<0.001	<0.001	<0.001	C	AB	C	BC	A	A	AB	baseline	303	ns	ns	780	618	334	ns	283	ns	ns	736	582	312
Beryllium	log_{10}	<0.001	<0.001	0.324	A	A	A	A	A	A	A	baseline	ns						577						
Bismuth	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	log_{10}	<0.001	<0.001	<0.001	A	B	C	B	BC	A	A	baseline	-75	-98	-90	-93	ns	ns	ns	-82	-98	-93	-95	ns	-54
Cadmium	log_{10}	<0.001	<0.001	<0.001	BC	C	C	C	A	AB	A	baseline	ns	ns	ns	222	ns	168	ns	ns	ns	ns	325	179	255
Calcium	log_{10}	<0.001	<0.001	<0.001	B	B	C	B	A	A	B	baseline	ns	-72	ns	651	474	ns	-89	-80	-97	-88	ns	ns	-84
Cesium	log_{10}	<0.001	<0.001	0.005	A	A	B	A	A	A	A	baseline	ns	-81	ns	ns	ns	ns	367	479	ns	339	431	814	561
Chromium	log_{10}	<0.001	<0.001	0.283	A	A	A	A	A	A	A	baseline	ns						880						
Cobalt	log_{10}	<0.001	<0.001	0.153	A	A	A	A	A	A	A	baseline	ns						490						
Copper	log_{10}	<0.001	<0.001	0.013	BC	BC	C	ABC	A	AB	AB	baseline	ns	ns	ns	497	ns	ns	ns	141	ns	190	759	273	290
Iron	log_{10}	<0.001	<0.001	0.065	A	A	A	A	A	A	A	baseline	ns						762						
Lead	log_{10}	<0.001	0.002	0.158	A	A	A	A	A	A	A	baseline	ns						538						
Lithium	log_{10}	<0.001	0.005	0.127	A	A	A	A	A	A	A	baseline	ns						430						
Magnesium	log_{10}	<0.001	<0.001	<0.001	CD	BC	D	ABC	A	AB	ABC	baseline	ns	ns	ns	133	76	ns	ns	ns	ns	60	167	101	63
Manganese	log_{10}	<0.001	<0.001	0.002	BC	A	C	BC	A	A	AB	baseline	126	ns	ns	128	167	ns	206	592	106	204	597	716	484
Mercury	log_{10}	<0.001	<0.001	0.004	B	A	A	A	A	A	A	baseline	156	235	321	255	158	161	136	504	691	895	739	509	516
Molybdenum	log_{10}	<0.001	0.030	<0.001	B	B	A	B	C	B	AB	baseline	ns	225	ns	-62	ns	ns	338	438	1,321	441	ns	428	948
Nickel	log_{10}	<0.001	<0.001	<0.001	DE	CDE	E	BCD	AB	A	ABC	baseline	ns	ns	ns	275	372	137	446	561	249	803	1,948	2,479	1,193
Phosphorus	log_{10}	<0.001	<0.001	0.027	AB	AB	BC	C	AB	ABC	A	baseline	ns	ns	-45	ns	ns	ns	161	182	97	45	151	107	223
Potassium	log_{10}	<0.001	<0.001	<0.001	A	AB	C	C	B	A	A	baseline	ns	-86	-87	-65	ns	ns	76	ns	-76	-76	-39	ns	ns
Rubidium	log_{10}	0.081	<0.001	<0.001	A	B	C	C	B	AB	AB	baseline	-48	-92	-88	-54	ns	ns	205	60	-76	-62	ns	83	127
Selenium	log_{10}	<0.001	<0.001	0.621	A	A	A	A	A	A	A	baseline	ns						38						
Silver	log_{10}	0.041	0.005	0.008	-	BC	C	AB	A	AB	A	-	baseline	ns	ns	879	ns	994	-	ns	ns	ns	208	ns	ns
Sodium	log_{10}	<0.001	<0.001	0.807	A	A	A	A	A	A	A	baseline	ns						-32						
Strontium	log_{10}	<0.001	<0.001	<0.001	B	B	C	B	A	A	B	baseline	ns	-65	ns	448	360	ns	-72	-51	-90	-74	ns	ns	-53
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	<0.001	<0.001	<0.001	C	C	C	C	A	BC	AB	baseline	ns	ns	ns	327	ns	218	241	146	168	167	1,355	447	983
Tin	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	log_{10}	<0.001	<0.001	0.024	-	AB	B	A	B	A	AB	-	baseline	ns	ns	ns	ns	ns	-	369	ns	1,482	ns	1,176	525
Uranium	log_{10}	<0.001	<0.001	<0.001	CD	ABC	D	BC	A	AB	ABC	baseline	ns	ns	ns	335	150	ns	ns	192	ns	182	573	286	204
Vanadium	log_{10}	<0.001	<0.001	0.069	A	A	A	A	A	A	A	baseline	ns						572						
Zinc	log_{10}	<0.001	<0.001	<0.001	C	BC	BC	AB	AB	A	A	baseline	ns	ns	176	171	257	296	95	202	233	438	427	596	672
Zirconium	log_{10}	<0.001	<0.001	<0.001	C	C	C	AB	BC	AB	A	baseline	ns	ns	191	ns	205	346	151	ns	92	630	243	664	1,018

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline = first year of data included in analysis. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-U:EDC-U) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-U:EDC-U).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.16: Statistical Comparisons of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) Monitoring Area in Post-Breach Years (2018 to 2024) Relative to Pre-Breach Conditions (2010; W7)

Parameter	Data Transformation	Year	Magnitude of Difference in Relative to Pre-Breach Period (%)[a]						
			Post-Breach Period						
			2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	ns	225	ns	294	ns	203	220
Antimony	log_{10}	-	-	-	-	-	-	-	-
Arsenic	log_{10}	<0.001	ns	75	ns	66	65	56	96
Barium	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Beryllium	log_{10}	-	-	-	-	-	-	-	-
Bismuth	log_{10}	-	-	-	-	-	-	-	-
Boron	log_{10}	-	-	-	-	-	-	-	-
Cadmium	log_{10}	<0.001	76	ns	ns	77	ns	141	189
Calcium	log_{10}	<0.001	-65	ns	-76	-55	ns	ns	-46
Cesium	log_{10}	-	-	-	-	-	-	-	-
Chromium	log_{10}	0.009	ns	ns	ns	ns	ns	ns	ns
Cobalt	log_{10}	<0.001	ns	80	ns	125	ns	110	91
Copper	log_{10}	0.001	ns	ns	ns	ns	138	ns	ns
Iron	log_{10}	-	-	-	-	-	-	-	-
Lead	log_{10}	<0.001	ns	142	ns	198	ns	202	199
Lithium	log_{10}	<0.001	ns	126	ns	259	156	180	204
Magnesium	log_{10}	<0.001	ns	ns	ns	ns	41	47	56
Manganese	log_{10}	<0.001	ns	42	ns	68	ns	38	44
Mercury	log_{10}	<0.001	ns	87	110	128	103	191	135
Molybdenum	log_{10}	0.002	ns	ns	ns	ns	ns	ns	ns
Nickel	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Phosphorus	log_{10}	-	-	-	-	-	-	-	-
Potassium	log_{10}	-	-	-	-	-	-	-	-
Rubidium	log_{10}	-	-	-	-	-	-	-	-
Selenium	log_{10}	0.001	ns	ns	ns	ns	ns	ns	ns
Silver	log_{10}	-	-	-	-	-	-	-	-
Sodium	log_{10}	-	-	-	-	-	-	-	-
Strontium	log_{10}	<0.001	-43	ns	-60	ns	ns	ns	ns
Tellurium	log_{10}	-	-	-	-	-	-	-	-
Thallium	log_{10}	-	-	-	-	-	-	-	-
Tin	log_{10}	-	-	-	-	-	-	-	-
Titanium	log_{10}	-	-	-	-	-	-	-	-
Uranium	log_{10}	<0.001	ns	ns	ns	80	ns	70	69
Vanadium	log_{10}	<0.001	ns	164	ns	240	ns	175	143
Zinc	log_{10}	<0.001	ns	ns	53	83	ns	116	135
Zirconium	log_{10}	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. ANOVA = one way analysis of variance. MOD = Magnitude of Difference. ns = not significant.

[a] Magnitude of difference (MOD) calculated on back-transformed least-squares means as (Post-breach-Pre-breach)/Pre-breach x100%.

Table F.4.17: **Statistical Comparisons of Exposed - Reference Relative Differences of Periphyton Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2017 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]								Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]								Magnitude of Difference for HAC-D (HAC-R5) Mean Relative to EDC-D (EDC-REF; %)[c]							
					Post-Breach Period								Post-Breach Period								Post-Breach Period							
		Area	Year	Area × Year	2017	2018	2019	2020	2021	2022	2023	2024	2017	2018	2019	2020	2021	2022	2023	2024	2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.010	<0.001	<0.001	A	A	B	B	A	B	B	B	baseline	ns	-55	-65	ns	-72	-53	-59	ns	93	-42	-55	ns	-64	ns	-48
Antimony	MLE	0.331	<0.001	0.001	BC	C	D	A	BC	AB	A	A	baseline	ns	**-73**	158	ns	ns	140	188	-45	-55	**ns**	ns	ns	ns	ns	ns
Arsenic	MLE	<0.001	<0.001	0.111	A	A	A	A	A	A	A	A	baseline	ns							-42							
Barium	MLE	<0.001	0.566	0.028	B	A	B	A	A	AB	A	A	baseline	125	ns	102	141	ns	109	144	ns	96	ns	76	110	ns	82	112
Beryllium	MLE	0.141	0.002	<0.001	A	A	B	B	A	B	B	B	baseline	ns	-69	-68	ns	-77	-62	-73	91	69	-40	-38	64	-56	ns	-48
Bismuth	MLE	0.005	0.006	<0.001	A	A	BC	BC	B	C	BC	BC	baseline	ns	-77	-77	-60	-85	-75	-75	120	117	-49	-50	ns	-67	-45	-44
Boron	MLE	<0.001	<0.001	<0.001	F	E	AB	A	D	BC	CD	E	baseline	430	5,735	11,307	1,448	3,260	1,729	478	-85	ns	777	1,614	132	405	175	ns
Cadmium	MLE	<0.001	0.338	0.007	ABC	BC	BC	AB	C	BC	C	A	baseline	ns	ns	ns	ns	ns	ns	ns	70	ns	ns	99	ns	ns	ns	155
Calcium	MLE	<0.001	0.006	<0.001	F	D	B	AB	E	A	CD	BC	baseline	494	1,635	2,483	134	3,997	796	1,422	ns	303	1,076	1,650	59	2,676	507	931
Cesium	MLE	<0.001	0.154	<0.001	A	AB	BC	C	AB	C	BC	BC	baseline	ns	-70	-75	ns	-80	-69	-68	83	ns	-45	-54	ns	-64	-43	-42
Chromium	MLE	<0.001	<0.001	0.003	A	AB	BC	C	BC	BC	BC	C	baseline	ns	-68	-81	-73	-78	-68	-79	ns	ns	-57	-75	-63	-70	-56	-72
Cobalt	MLE	<0.001	0.004	<0.001	A	A	BC	BC	AB	C	BC	AB	baseline	ns	-67	-66	ns	-74	-68	ns	ns	ns	-48	-47	ns	-60	-51	ns
Copper	MLE	<0.001	0.003	<0.001	A	AB	C	C	A	BC	BC	BC	baseline	ns	-73	-72	ns	-63	-66	-61	1,247	669	265	279	1,287	402	364	426
Iron	MLE	0.002	<0.001	<0.001	A	A	BC	BC	AB	C	C	C	baseline	ns	-68	-66	ns	-79	-72	-74	70	82	-45	-42	ns	-65	-52	-55
Lead	MLE	0.034	<0.001	<0.001	A	A	B	B	B	B	B	B	baseline	ns	-73	-78	-68	-84	-71	-76	138	82	ns	-48	ns	-62	ns	-44
Lithium	MLE	0.005	<0.001	<0.001	A	A	BC	C	AB	C	C	C	baseline	ns	-68	-79	ns	-82	-71	-72	92	ns	ns	-60	ns	-65	-45	-47
Magnesium	MLE	0.787	<0.001	0.142	A	A	A	A	A	A	A	A	baseline	ns							ns							
Manganese	MLE	0.490	0.014	<0.001	BC	BC	CD	BC	D	BC	B	A	baseline	ns	ns	ns	-62	ns	ns	330	ns	ns	ns	ns	-69	ns	ns	245
Mercury	MLE	<0.001	0.005	<0.001	AB	BC	D	D	A	CD	BCD	CD	baseline	ns	-68	-66	ns	-54	ns	-62	ns	ns	-59	-58	ns	-42	ns	-52
Molybdenum	MLE	0.031	0.215	0.001	A	B	B	B	B	B	B	B	baseline	-75	-79	-80	-70	-71	-77	-63	159	ns	-45	-48	ns	ns	ns	ns
Nickel	MLE	<0.001	<0.001	<0.001	A	AB	BCD	BCD	BC	D	CD	BC	baseline	ns	-65	-59	-57	-78	-74	-58	ns	ns	-56	-49	-46	-72	-67	-47
Phosphorus	MLE	<0.001	<0.001	<0.001	CD	D	CD	C	AB	A	BC	C	baseline	ns	ns	ns	101	185	ns	ns	-49	-61	-52	-36	ns	45	-34	-39
Potassium	MLE	<0.001	0.002	<0.001	D	CD	BCD	AB	BC	A	BCD	AB	baseline	ns	ns	173	91	301	ns	171	-67	-57	-51	ns	-37	ns	-40	ns
Rubidium	MLE	<0.001	<0.001	0.006	A	A	C	BC	AB	A	ABC	AB	baseline	ns	-52	-42	ns	ns	ns	ns	ns	-29	-63	-54	-32	ns	-46	-33
Selenium	MLE	0.025	<0.001	<0.001	DE	F	EF	BC	DE	B	CD	A	baseline	-50	ns	70	ns	137	ns	336	ns	-53	-30	57	ns	119	ns	303
Silver	MLE	<0.001	<0.001	0.003	-	-	BC	BC	A	C	AB	C	-	-	baseline	ns	130	ns	ns	ns	-	-	-43	-41	ns	-61	ns	-61
Sodium	MLE	0.003	<0.001	0.004	BC	C	C	ABC	A	AB	C	C	baseline	ns	ns	ns	84	ns	ns	ns	ns	-39	-38	ns	ns	ns	-41	-44
Strontium	MLE	<0.001	0.016	<0.001	F	DE	BC	AB	E	A	CD	CD	baseline	179	400	564	80	873	232	310	ns	134	320	457	51	717	179	244
Tellurium	MLE	<0.001	0.089	0.485	A	<LRL	<LRL	A	A	A	<LRL	<LRL	baseline	<LRL	<LRL		ns		<LRL	<LRL	116	<LRL	<LRL		116		<LRL	<LRL
Thallium	MLE	0.264	0.019	<0.001	A	A	D	BCD	ABC	CD	ABC	AB	baseline	ns	-80	-62	ns	-71	ns	ns	77	67	-65	ns	ns	-48	ns	ns
Tin	MLE	0.205	<0.001	<0.001	A	C	D	B	AB	<LRL	B	<LRL	baseline	**-97**	**-99**	-59	ns	<LRL	-56	<LRL	97	**ns**	**ns**	ns	ns	<LRL	ns	<LRL
Titanium	MLE	0.010	<0.001	0.098	-	-	A	A	A	A	A	A	-	-	baseline			ns			-	-			-29			
Uranium	MLE	0.052	<0.001	0.007	A	AB	C	BC	ABC	BC	BC	ABC	baseline	ns	-74	-68	ns	-67	-69	ns	81	ns	-52	-41	ns	ns	-44	ns
Vanadium	MLE	0.744	<0.001	<0.001	A	A	BC	BC	AB	C	C	BC	baseline	ns	-60	-57	ns	-74	-68	-62	106	118	ns	ns	ns	-46	ns	ns
Zinc	MLE	<0.001	<0.001	<0.001	A	AB	C	BC	AB	C	C	BC	baseline	ns	-63	-45	ns	-63	-64	-56	ns	ns	-51	ns	ns	-51	-52	-42
Zirconium	MLE	0.001	<0.001	<0.001	A	AB	BC	BC	AB	C	C	C	baseline	ns	-56	-59	ns	-78	-69	-71	ns	ns	ns	ns	ns	-65	-52	-55

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant."-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-D:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-D:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.18: Statistical Comparisons of Periphyton Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) Monitoring Area in Post-Breach Years (2017 to 2024) Relative to Pre-Breach Conditions (2010; W11)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]							
			Post-Breach Period							
			2017	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	ns	ns	ns	ns	ns	ns	-69.0	-73.2
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	0.007	ns	ns	ns	ns	ns	ns	ns	ns
Barium	MLE	0.384	ns	ns	ns	ns	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-	-
Cadmium	MLE	0.002	103	ns	ns	133	ns	ns	ns	124
Calcium	MLE	<0.001	ns	678	480	620	ns	1,096	685	763
Cesium	MLE	-	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	ns	ns	ns	ns	ns	ns	-76.2	-82.5
Cobalt	MLE	0.016	ns	ns	ns	ns	ns	ns	ns	ns
Copper	MLE	<0.001	912	566	393	274	1,006	457	304	255
Iron	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	-66.5
Lead	MLE	<0.001	ns	ns	ns	ns	ns	ns	-67.9	-66.6
Lithium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Magnesium	MLE	0.090	ns	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	<0.001	ns	ns	ns	ns	-78.5	ns	ns	ns
Mercury	MLE	<0.001	615	375	231	ns	517	240	217	ns
Molybdenum	MLE	<0.001	251	ns	ns	ns	ns	ns	ns	ns
Nickel	MLE	<0.001	ns	ns	ns	ns	ns	ns	-65.7	ns
Phosphorus	MLE	<0.001	ns	ns	ns	ns	ns	117	ns	ns
Potassium	MLE	<0.001	-59.7	ns	ns	ns	ns	ns	ns	ns
Rubidium	MLE	-	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	ns	ns	-45.2	ns	ns	ns	83.2	169
Silver	MLE	-	-	-	-	-	-	-	-	-
Sodium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	-55.6
Strontium	MLE	<0.001	ns	198	136	190	ns	351	180	183
Tellurium	MLE	-	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Tin	MLE	0.022	<LRL	<LRL	<LRL	-85.4	-82.4	<LRL	<LRL	<LRL
Titanium	MLE	<0.001	-	-	ns	ns	ns	ns	ns	-78.1
Uranium	MLE	<0.001	ns	ns	ns	ns	ns	ns	-57.3	ns
Vanadium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Zinc	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Zirconium	MLE	-	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed). ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. HAC-R5 is the alternate name for the HAC-D sampling area for HRWG reporting. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/ Pre-breach x100%.

Table F.4.19: **Statistical Comparisons of Exposed - Reference Relative Differences of Caddisfly Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-D [HAC-R5] Mean Relative to EDC-D (EDC-REF; %)[c]						
					Post-Breach Period							Post-Breach Period							Post-Breach Period						
		Area	Year	Area × Year	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.072	<0.001	<0.001	B	A	B	A	B	A	A	baseline	1,109	ns	1,774	ns	1,063	1,284	-87	ns	-73	ns	-77	ns	ns
Antimony	MLE	<0.001	<0.001	<0.001	D	AB	BC	A	CD	AB	A	baseline	248	114	383	ns	241	287	-44	94	ns	170	ns	91	116
Arsenic	MLE	<0.001	<0.001	<0.001	C	A	AB	AB	B	AB	B	baseline	602	348	459	201	239	194	-90	ns	-55	-44	-70	-66	-71
Barium	MLE	<0.001	<0.001	<0.001	D	AB	BC	A	BC	C	ABC	baseline	1,978	947	3,903	751	366	1,372	-95	ns	ns	ns	ns	-75	ns
Beryllium	MLE	<0.001	0.008	<0.001	C	A	B	A	B	<LRL	A	baseline	2,206	604	4,071	378	<LRL	2,695	-95	ns	-67	ns	-78	<LRL	ns
Bismuth	MLE	<0.001	0.094	<0.001	C	<LRL	B	<LRL	C	<LRL	A	baseline	**<LRL**	**5,346**	**<LRL**	**ns**	**<LRL**	**19,719**	**ns**	<LRL	-54	<LRL	**ns**	<LRL	ns
Boron	MLE	0.018	<0.001	<0.001	C	<LRL	B	A	B	<LRL	B	baseline	<LRL	2,374	12,745	1,970	<LRL	1,852	-97	<LRL	ns	302	ns	<LRL	ns
Cadmium	MLE	0.377	<0.001	<0.001	D	BC	B	A	BC	C	B	baseline	1,007	2,858	12,876	893	250	2,363	-90	ns	198	1,207	ns	-65	148
Calcium	MLE	0.054	<0.001	<0.001	C	B	B	A	B	B	A	baseline	173	87	448	129	179	561	-70	ns	-43	66	ns	ns	100
Cesium	MLE	0.123	<0.001	<0.001	C	A	B	A	BC	A	A	baseline	1,480	196	1,971	ns	1,191	1,366	-88	ns	-65	144	-69	ns	ns
Chromium	MLE	<0.001	<0.001	<0.001	C	AB	BC	A	C	A	A	baseline	759	ns	1,322	ns	861	869	-89	ns	-70	ns	-89	ns	ns
Cobalt	MLE	0.021	<0.001	<0.001	C	AB	B	A	B	AB	AB	baseline	876	364	1,361	221	437	815	-87	ns	ns	ns	-58	ns	ns
Copper	MLE	<0.001	<0.001	<0.001	E	CD	BC	A	DE	DE	AB	baseline	76	116	269	ns	ns	164	ns	102	148	324	62	45	203
Iron	MLE	0.006	<0.001	<0.001	B	A	B	A	B	A	A	baseline	881	ns	1,405	ns	867	1,119	-88	ns	-70	ns	-76	ns	ns
Lead	MLE	0.664	<0.001	<0.001	B	A	B	A	B	A	A	baseline	788	ns	1,504	ns	723	881	-81	ns	ns	206	-59	ns	ns
Lithium	MLE	<0.001	0.001	<0.001	C	A	B	A	B	<LRL	A	baseline	**49,927**	**8,103**	**65,752**	**8,951**	**<LRL**	**55,259**	**ns**	ns	-79	ns	-77	<LRL	ns
Magnesium	MLE	<0.001	<0.001	<0.001	C	A	BC	A	BC	A	AB	baseline	69	ns	75	ns	72	55	-43	ns	-34	ns	-34	ns	ns
Manganese	MLE	0.444	<0.001	<0.001	C	AB	B	A	AB	B	AB	baseline	645	403	1,887	874	445	1,237	-87	ns	ns	166	ns	ns	ns
Mercury	MLE	0.011	<0.001	<0.001	D	D	BC	AB	C	A	ABC	baseline	ns	135	274	118	347	198	-65	-54	ns	ns	ns	58	ns
Molybdenum	MLE	0.159	<0.001	<0.001	A	B	C	D	BC	B	BC	baseline	-49	-69	-87	-58	-43	-56	170	38	ns	-66	ns	54	ns
Nickel	MLE	<0.001	<0.001	<0.001	D	AB	BC	A	CD	AB	AB	baseline	841	306	1,958	ns	677	1,077	-92	ns	-67	ns	-85	ns	ns
Phosphorus	MLE	0.003	<0.001	0.012	A	B	A	A	AB	A	A	baseline	-21	ns	ns	ns	ns	ns	ns	-22	ns	ns	ns	ns	ns
Potassium	MLE	<0.001	<0.001	<0.001	D	ABC	BC	ABC	AB	A	C	baseline	95	91	130	142	163	75	-61	-24	-25	ns	ns	ns	-32
Rubidium	MLE	<0.001	<0.001	<0.001	D	AB	C	AB	BC	A	AB	baseline	221	81	223	159	409	265	-80	-37	-64	-36	-49	ns	ns
Selenium	MLE	<0.001	<0.001	<0.001	E	DE	CD	C	C	A	B	baseline	ns	52	118	79	632	218	80	112	175	293	223	1,220	473
Silver	MLE	<0.001	<0.001	<0.001	-	C	BC	A	C	BC	AB	-	baseline	ns	449	ns	ns	142	-	-64	-62	100	-74	-52	ns
Sodium	MLE	<0.001	0.001	<0.001	CD	CD	A	D	BC	AB	A	baseline	ns	75	ns	ns	38	62	-29	-28	23	-39	-21	ns	ns
Strontium	MLE	<0.001	<0.001	<0.001	D	BC	C	AB	C	BC	A	baseline	243	163	432	184	234	583	-78	ns	-42	ns	-37	ns	51
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.005	<0.001	<0.001	C	AB	B	A	BC	B	A	baseline	621	384	1,844	ns	457	1,642	-89	ns	ns	ns	-68	ns	ns
Tin	MLE	0.637	<0.001	0.003	B	A	<LRL	<LRL	<LRL	<LRL	<LRL	baseline	241	<LRL	<LRL	<LRL	<LRL	<LRL	-57	ns	<LRL	<LRL	<LRL	<LRL	<LRL
Titanium	MLE	0.912	<0.001	0.006	-	A	B	A	B	A	A	-	baseline	-80	ns	-82	ns	ns	-	ns	-67	ns	-71	ns	ns
Uranium	MLE	0.012	<0.001	<0.001	C	B	B	A	B	B	AB	baseline	1,153	695	6,599	668	1,382	2,292	-95	ns	ns	266	ns	ns	ns
Vanadium	MLE	0.263	<0.001	<0.001	B	A	B	A	B	A	A	baseline	1,063	ns	1,799	ns	1,048	1,404	-86	ns	ns	163	-74	ns	ns
Zinc	MLE	0.810	<0.001	<0.001	D	D	B	A	BC	D	CD	baseline	ns	114	212	57	ns	ns	-33	-27	43	110	ns	-30	ns
Zirconium	MLE	<0.001	<0.001	<0.001	C	AB	AB	AB	B	<LRL	A	baseline	2,297	671	1,145	621	<LRL	2,412	-96	ns	-66	ns	-68	<LRL	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-D:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-D:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.20: **Statistical Comparisons of Exposed - Reference Relative Differences of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2015 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]								Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]								Magnitude of Difference for HAC-D (HAC-R5) Mean Relative to EDC-D (EDC-REF; %)[c]							
		Area	Year	Area × Year	Post-Breach Period								Post-Breach Period								Post-Breach Period							
					2015	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024	2015	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	0.068	<0.001	A	E	CD	DE	BC	DE	AB	B	baseline	-97	-90	-94	-82	-94	ns	-72	1,901	ns	ns	ns	261	ns	591	452
Antimony	MLE	<0.001	<0.001	<0.001	AB	D	BCD	ABC	BCD	CD	A	A	baseline	-60	ns	ns	ns	-50	ns	ns	186	ns	79	135	83	ns	264	271
Arsenic	MLE	0.465	<0.001	<0.001	A	C	AB	AB	B	AB	AB	A	baseline	-85	ns	ns	-56	ns	ns	ns	ns	-76	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	0.154	<0.001	A	D	C	BC	BC	C	AB	BC	baseline	-98	-78	-75	-71	-81	ns	-69	978	-79	139	169	217	101	467	232
Beryllium	MLE	<0.001	0.104	<0.001	A	F	CDE	E	BCD	DE	B	BC	baseline	-98	-90	-94	-83	-93	-68	-78	2,041	-50	114	ns	258	ns	594	370
Bismuth	MLE	<0.001	0.997	<0.001	B	D	C	<LRL	C	<LRL	A	C	baseline	**-100**	-76	<LRL	-81	<LRL	**199**	-76	980	**ns**	162	<LRL	100	<LRL	**ns**	161
Boron	MLE	<0.001	<0.001	<0.001	A	D	C	BC	A	BC	AB	BC	baseline	-96	-81	-73	ns	-62	ns	-67	433	-79	ns	ns	429	103	169	75
Cadmium	MLE	<0.001	<0.001	<0.001	A	B	B	B	B	B	B	A	baseline	-92	-88	-87	-93	-90	-91	ns	994	ns	ns	ns	ns	ns	ns	565
Calcium	MLE	<0.001	0.003	<0.001	ABC	E	E	DE	BC	CD	A	AB	baseline	-80	-75	-70	ns	ns	ns	ns	191	-42	ns	ns	114	ns	347	249
Cesium	MLE	<0.001	0.049	<0.001	A	E	CD	D	BCD	CD	BC	B	baseline	-97	-89	-93	-88	-92	-83	-75	1,511	-54	79	ns	89	ns	173	301
Chromium	MLE	<0.001	<0.001	<0.001	A	BC	BC	C	BC	C	BC	B	baseline	-90	-88	-92	-88	-92	-81	-75	1,139	ns	ns	ns	ns	ns	132	206
Cobalt	MLE	<0.001	0.009	<0.001	A	D	C	C	C	C	BC	B	baseline	-97	-93	-93	-92	-93	-87	-81	2,039	-46	ns	60	73	ns	175	301
Copper	MLE	<0.001	<0.001	<0.001	A	D	D	D	C	D	B	BC	baseline	-86	-84	-85	-66	-84	-45	-55	1,173	80	101	93	332	110	596	469
Iron	MLE	<0.001	0.135	<0.001	A	E	CD	DE	BCD	DE	B	BC	baseline	-97	-92	-95	-88	-95	-80	-82	2,256	ns	ns	ns	172	ns	378	335
Lead	MLE	<0.001	0.230	<0.001	A	D	C	C	BC	C	B	B	baseline	-97	-90	-93	-87	-93	-75	-70	2,076	ns	114	ns	185	ns	453	554
Lithium	MLE	<0.001	0.155	<0.001	A	E	CD	D	BC	CD	AB	BC	baseline	-98	-82	-90	-74	-89	ns	-73	1,164	-73	129	ns	232	ns	528	241
Magnesium	MLE	0.124	<0.001	<0.001	ABC	D	D	CD	AB	CD	A	BC	baseline	-47	-45	ns	ns	ns	ns	ns	41	-25	ns	ns	43	ns	81	ns
Manganese	MLE	<0.001	<0.001	<0.001	ABC	E	CD	BC	D	AB	A	A	baseline	-91	ns	ns	-74	ns	ns	ns	202	-72	ns	91	ns	190	426	381
Mercury	MLE	0.272	0.034	0.005	-	B	AB	B	B	B	B	A	-	baseline	ns	ns	ns	ns	ns	142	-	ns	ns	ns	ns	-31	ns	79
Molybdenum	MLE	<0.001	<0.001	<0.001	C	B	A	B	B	B	B	B	baseline	813	2,565	1,117	830	901	1,107	1,115	-74	138	594	217	143	161	215	217
Nickel	MLE	0.056	<0.001	<0.001	A	C	C	BC	BC	BC	B	BC	baseline	-91	-90	-90	-88	-87	-76	-79	715	ns	ns	ns	ns	ns	98	ns
Phosphorus	MLE	<0.001	<0.001	<0.001	C	A	B	A	A	AB	A	AB	baseline	168	94	155	151	142	159	130	-62	ns	-26	ns	ns	ns	ns	ns
Potassium	MLE	<0.001	<0.001	0.027	B	B	AB	A	A	AB	A	AB	baseline	ns	ns	51	40	ns	45	ns	-31	-29	ns	ns	ns	-19	ns	ns
Rubidium	MLE	0.021	<0.001	<0.001	A	E	D	D	D	CD	BC	AB	baseline	-86	-77	-76	-70	-67	-51	ns	150	-65	-43	-40	ns	ns	ns	67
Selenium	MLE	<0.001	<0.001	<0.001	BCD	D	CD	BC	BCD	B	B	A	baseline	ns	ns	ns	ns	ns	ns	115	91	46	77	148	102	170	172	311
Silver	MLE	<0.001	0.421	<0.001	A	-	BC	D	CD	CD	B	B	baseline	-	-94	-97	-97	-97	-91	-93	550	-	-63	-81	-78	-81	-38	-53
Sodium	MLE	0.122	<0.001	0.021	C	A	BC	AB	BC	AB	AB	AB	baseline	116	ns	61	ns	62	61	78	-40	ns	-25	ns	ns	ns	ns	ns
Strontium	MLE	<0.001	0.004	<0.001	AB	C	C	C	AB	B	A	AB	baseline	-83	-75	-71	ns	ns	ns	ns	170	-54	ns	ns	121	54	236	148
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.002	0.453	<0.001	A	D	C	CD	CD	CD	B	B	baseline	-94	-85	-91	-88	-90	-71	-54	732	-47	ns	ns	ns	ns	144	284
Tin	MLE	0.614	<0.001	<0.001	C	<LRL	B	B	A	<LRL	<LRL	<LRL	baseline	<LRL	543	525	21,287	<LRL	<LRL	<LRL	-83	<LRL	ns	ns	ns	<LRL	<LRL	<LRL
Titanium	MLE	<0.001	<0.001	<0.001	A	-	BC	C	AB	C	AB	AB	baseline	-	-78	-87	ns	-86	ns	ns	1,037	-	145	ns	364	ns	441	482
Uranium	MLE	<0.001	0.610	<0.001	A	D	C	C	BC	C	B	B	baseline	-98	-93	-93	-89	-91	-78	-77	1,553	-72	ns	ns	78	ns	260	275
Vanadium	MLE	<0.001	0.187	<0.001	A	D	CD	CD	BC	CD	B	B	baseline	-99	-97	-98	-94	-98	-89	-89	7,174	ns	127	ns	314	ns	705	702
Zinc	MLE	0.043	<0.001	<0.001	A	B	D	A	BCD	BC	BC	CD	baseline	-38	-57	ns	-43	-41	-39	-54	47	ns	-36	51	ns	ns	ns	-33
Zirconium	MLE	0.001	<0.001	<0.001	A	D	C	C	A	BC	A	AB	baseline	-94	-85	-86	ns	-83	ns	ns	557	-63	ns	ns	181	ns	256	160

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-D:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-D:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.21: Statistical Comparisons of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) Monitoring Area in Post-Breach Years (2015 to 2024) Relative to Pre-Breach Conditions (2010; W11)

Parameter	Data Transformation	Year	Magnitude of Difference Relative to Pre-Breach Period (%)[a]							
			Post-Breach Period							
			2015	2018	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Antimony	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Arsenic	MLE	<0.001	ns	-57.7	ns	ns	ns	ns	ns	ns
Barium	MLE	<0.001	ns	-82.9	ns	ns	ns	ns	ns	ns
Beryllium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Bismuth	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Boron	MLE	-	-	-	-	-	-	-	-	-
Cadmium	MLE	<0.001	ns	ns	ns	206	ns	213	273	718
Calcium	MLE	<0.001	ns	ns	ns	ns	ns	ns	207	246
Cesium	MLE	-	-	-	-	-	-	-	-	-
Chromium	MLE	<0.001	-82.6	-80.2	-90.1	-92.0	-84.0	-92.9	-90.9	-89.8
Cobalt	MLE	<0.001	ns	-62.5	ns	ns	ns	ns	ns	ns
Copper	MLE	<0.001	682	ns	163	183	527	173	543	701
Iron	MLE	-	-	-	-	-	-	-	-	-
Lead	MLE	<0.001	ns	-63.3	ns	ns	ns	ns	ns	ns
Lithium	MLE	<0.001	ns	<LRL	ns	ns	ns	ns	<LRL	<LRL
Magnesium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Manganese	MLE	<0.001	-81.5	-84.4	-75.1	ns	ns	ns	ns	ns
Mercury	MLE	<0.001	-	ns	ns	ns	ns	69.3	105	106
Molybdenum	MLE	<0.001	-74.1	ns	ns	ns	-63.0	-59.5	-57.8	-57.2
Nickel	MLE	0.007	-83.9	-79.3	-86.0	-83.2	-77.9	-79.6	-79.8	-77.3
Phosphorus	MLE	-	-	-	-	-	-	-	-	-
Potassium	MLE	-	-	-	-	-	-	-	-	-
Rubidium	MLE	-	-	-	-	-	-	-	-	-
Selenium	MLE	<0.001	ns	ns	-26.1	ns	ns	39.5	95.8	78.0
Silver	MLE	-	-	-	-	-	-	-	-	-
Sodium	MLE	-	-	-	-	-	-	-	-	-
Strontium	MLE	<0.001	ns	ns	ns	ns	ns	ns	ns	ns
Tellurium	MLE	-	-	-	-	-	-	-	-	-
Thallium	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Tin	MLE	nt	nt	nt	nt	nt	nt	nt	nt	nt
Titanium	MLE	-	-	-	-	-	-	-	-	-
Uranium	MLE	<0.001	ns	-76.8	ns	ns	ns	ns	ns	ns
Vanadium	MLE	<0.001	318	ns	ns	ns	ns	ns	ns	ns
Zinc	MLE	<0.001	ns	ns	ns	155	ns	ns	ns	ns
Zirconium	MLE	-	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available in 2010 (so comparison of post-breach and pre-breach results was not completed). ANOVA = one way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. <LRL = greater than 50% LRL data for the area in a given year so the time period was omitted from the analysis. ns = not significant. HAC-R5 is the alternate name for the HAC-D sampling area for HRWG reporting. Data were analysed in units of mg/kg dry weight.

[a] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Post-breach-Pre-breach)/ Pre-breach x100%.

Table F.4.22: Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Caddisfly Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-D (HAC-R5) Mean Relative to EDC-D (EDC-REF; %)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	0.885	<0.001	<0.001	C	AB	B	AB	B	AB	A	baseline	3,901	813	2,335	900	3,575	5,017	-94	ns	ns	ns	ns	ns	232
Antimony	log_{10}	0.416	<0.001	0.155	A	-	A	A	A	A	A	baseline	-			ns			ns	-			ns		
Arsenic	log_{10}	<0.001	<0.001	<0.001	C	A	AB	AB	B	AB	B	baseline	1,170	507	525	322	627	362	-88	ns	ns	ns	ns	ns	ns
Barium	log_{10}	<0.001	<0.001	<0.001	D	A	ABC	AB	BC	C	ABC	baseline	4,622	1,068	3,638	960	402	1,259	-97	ns	-68	ns	-71	-86	-63
Beryllium	log_{10}	0.457	<0.001	0.008	C	AB	BC	AB	A	AB	A	baseline	1,573	ns	780	2,520	2,222	2,333	-93	ns	-59	ns	ns	ns	ns
Bismuth	log_{10}	0.556	0.105	0.306	-	-	A	-	-	-	A	-	-	baseline	-	-	-	ns	-	-	ns	-	-	-	ns
Boron	log_{10}	<0.001	<0.001	<0.001	BC	BC	C	AB	AB	-	A	baseline	ns	ns	ns	ns	-	689	-91	-94	-95	-76	-78	-	ns
Cadmium	log_{10}	0.899	<0.001	<0.001	C	B	B	A	B	BC	B	baseline	550	988	9,251	531	ns	608	-86	ns	ns	1,188	ns	ns	ns
Calcium	log_{10}	<0.001	<0.001	<0.001	CD	CD	DE	A	E	BC	B	baseline	ns	ns	1,290	-67	ns	158	-92	-93	-97	ns	-98	-86	-81
Cesium	log_{10}	0.155	<0.001	<0.001	D	A	C	ABC	BC	ABC	AB	baseline	2,646	514	2,041	590	2,047	2,309	-88	240	ns	165	ns	166	198
Chromium	log_{10}	0.328	<0.001	<0.001	C	A	AB	A	BC	A	A	baseline	1,295	659	1,649	ns	2,309	2,196	-84	ns	ns	175	ns	279	261
Cobalt	log_{10}	0.769	<0.001	<0.001	B	A	A	A	A	A	A	baseline	2,068	913	1,823	812	1,153	1,140	-89	ns	ns	ns	ns	ns	ns
Copper	log_{10}	<0.001	<0.001	<0.001	C	AB	A	BC	AB	B	AB	baseline	271	338	ns	116	108	287	-85	-45	ns	-69	-68	-69	-42
Iron	log_{10}	0.769	<0.001	<0.001	D	AB	C	ABC	BC	AB	A	baseline	3,171	704	2,626	936	3,561	4,870	-93	ns	ns	ns	ns	ns	225
Lead	log_{10}	0.530	<0.001	<0.001	B	A	A	A	A	A	A	baseline	2,400	800	1,954	922	1,657	2,302	-90	162	ns	ns	ns	ns	152
Lithium	log_{10}	0.622	0.020	0.190	-	A	A	A	A	-	A	-	baseline		ns		-	ns	-			ns		-	ns
Magnesium	log_{10}	0.012	0.002	0.026	B	A	AB	AB	AB	A	A	baseline	156	ns	ns	ns	146	79	-53	ns	ns	ns	ns	ns	ns
Manganese	log_{10}	0.723	<0.001	<0.001	C	B	B	A	B	BC	BC	baseline	928	382	4,937	521	ns	ns	-83	ns	ns	764	ns	ns	ns
Mercury	log_{10}	0.042	<0.001	0.006	D	ABCD	AB	CD	ABC	A	BCD	baseline	ns	237	ns	127	298	ns	ns	ns	98	ns	ns	134	ns
Molybdenum	log_{10}	<0.001	0.007	<0.001	A	AB	AB	C	B	AB	B	baseline	ns	ns	-89	-63	ns	-70	310	151	ns	-57	ns	155	ns
Nickel	log_{10}	0.274	<0.001	<0.001	C	AB	AB	A	B	A	AB	baseline	1,460	481	1,841	375	1,781	1,050	-89	ns	ns	ns	ns	ns	ns
Phosphorus	log_{10}	<0.001	<0.001	<0.001	A	AB	AB	CD	D	BC	B	baseline	ns	ns	-63	-75	-44	-40	154	61	64	ns	-37	43	53
Potassium	log_{10}	0.524	<0.001	0.055	A	A	A	A	A	A	A	baseline				ns						ns			
Rubidium	log_{10}	0.240	<0.001	<0.001	C	A	B	AB	B	A	AB	baseline	506	181	238	142	569	286	-72	69	ns	ns	ns	87	ns
Selenium	log_{10}	<0.001	0.005	<0.001	B	BC	CD	B	D	A	D	baseline	ns	-55	ns	-62	167	-63	287	203	75	352	ns	933	ns
Silver	log_{10}	0.559	<0.001	0.205	-	A	A	A	A	A	A	-	baseline			ns			-			ns			
Sodium	log_{10}	0.409	<0.001	<0.001	AB	AB	A	C	BC	A	A	baseline	ns	ns	-62	ns	ns	ns	ns	ns	ns	-56	-39	66	104
Strontium	log_{10}	<0.001	<0.001	<0.001	DE	CD	DE	A	E	BC	AB	baseline	ns	ns	724	ns	180	365	-91	-82	-90	ns	-92	-74	-56
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	0.078	<0.001	<0.001	B	A	A	A	A	A	A	baseline	2,848	917	1,731	874	787	1,696	-93	ns	ns	ns	ns	ns	ns
Tin	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	log_{10}	0.120	<0.001	0.052	-	A	A	A	A	A	A	-	baseline			ns			-			ns			
Uranium	log_{10}	0.326	<0.001	<0.001	C	AB	AB	A	B	AB	AB	baseline	2,918	1,467	7,465	1,384	2,937	2,631	-95	ns	ns	258	ns	ns	ns
Vanadium	log_{10}	0.234	<0.001	<0.001	C	AB	B	AB	B	A	AB	baseline	2,975	608	2,766	658	3,701	2,656	-94	ns	ns	ns	ns	ns	ns
Zinc	log_{10}	<0.001	0.001	0.007	B	A	A	A	A	A	A	baseline	115	178	226	209	106	103	ns	ns	95	129	116	ns	ns
Zirconium	log_{10}	0.074	0.005	<0.001	D	ABC	BC	CD	A	ABC	AB	baseline	1,012	640	ns	2,794	5,770	2,376	-93	ns	ns	-72	ns	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline = first year of data included in analysis. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-D:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-D:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.23: Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for HAC-D (HAC-R5) Mean Relative to EDC-D (EDC-REF; %)[c]						
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period						
					2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	0.008	<0.001	D	ABC	C	C	BC	A	AB	baseline	1,005	746	684	908	3,551	3,317	-69	242	161	142	211	1,028	956
Antimony	log_{10}	<0.001	<0.001	0.607	A	-	A	A	A	A	A	baseline	-	ns					85	-	85				
Arsenic	log_{10}	<0.001	<0.001	<0.001	C	A	AB	B	AB	A	A	baseline	870	484	230	506	1,082	896	-70	189	ns	ns	ns	252	196
Barium	log_{10}	0.152	0.095	<0.001	B	A	A	A	A	A	A	baseline	2,438	1,301	1,282	1,072	2,750	1,333	-89	177	ns	ns	ns	212	ns
Beryllium	log_{10}	<0.001	<0.001	<0.001	C	AB	B	B	AB	A	AB	baseline	1,218	726	717	1,337	3,224	1,000	-77	203	ns	ns	230	664	ns
Bismuth	log_{10}	0.036	0.830	0.282	-	A	A	A	A	-	A	-	baseline	ns			-	ns	-	86				-	86
Boron	log_{10}	<0.001	<0.001	<0.001	C	CD	D	A	BC	AB	AB	baseline	ns	-77	677	ns	284	205	-74	-88	-94	ns	-68	ns	ns
Cadmium	log_{10}	0.912	<0.001	0.074	A	A	A	A	A	A	A	baseline	ns							ns					
Calcium	log_{10}	<0.001	<0.001	<0.001	CD	DE	E	A	DE	AB	BC	baseline	ns	-66	835	ns	410	ns	-86	-94	-95	ns	-94	ns	-66
Cesium	log_{10}	<0.001	0.003	<0.001	C	AB	AB	B	AB	AB	A	baseline	579	379	325	641	890	1,339	ns	227	131	ns	257	377	593
Chromium	log_{10}	<0.001	<0.001	0.227	A	A	A	A	A	A	A	baseline	ns							308					
Cobalt	log_{10}	<0.001	<0.001	<0.001	C	AB	AB	B	AB	A	AB	baseline	529	542	317	707	1,076	896	-53	198	204	97	282	457	372
Copper	log_{10}	<0.001	<0.001	<0.001	D	BC	BCD	CD	CD	A	AB	baseline	136	ns	ns	ns	543	364	-77	-45	-49	-69	-58	ns	ns
Iron	log_{10}	<0.001	<0.001	<0.001	C	AB	B	B	AB	A	A	baseline	896	524	704	919	2,856	2,798	-66	235	ns	170	242	893	873
Lead	log_{10}	<0.001	0.010	<0.001	B	A	A	A	A	A	A	baseline	860	775	1,001	1,093	2,225	1,584	-66	231	202	279	311	701	480
Lithium	log_{10}	<0.001	<0.001	0.056	A	A	A	A	A	A	A	baseline	ns							155					
Magnesium	log_{10}	0.219	<0.001	0.011	B	B	B	B	B	A	B	baseline	ns	ns	ns	ns	245	ns	-38	ns	ns	ns	ns	115	ns
Manganese	log_{10}	<0.001	0.001	<0.001	C	AB	AB	AB	AB	A	B	baseline	567	543	601	549	954	283	-64	143	134	156	137	284	ns
Mercury	log_{10}	0.001	<0.001	<0.001	BC	A	AB	C	AB	AB	A	baseline	183	ns	ns	ns	ns	112	ns	160	90	-53	ns	ns	95
Molybdenum	log_{10}	<0.001	0.006	0.074	A	A	A	A	A	A	A	baseline	ns							371					
Nickel	log_{10}	<0.001	0.013	0.034	C	BC	BC	BC	AB	A	AB	baseline	ns	ns	ns	293	511	219	ns	ns	ns	ns	288	504	215
Phosphorus	log_{10}	<0.001	<0.001	<0.001	A	B	B	BC	C	B	B	baseline	-42	-43	-64	-76	-43	-46	165	53	52	ns	-36	50	44
Potassium	log_{10}	0.009	0.005	0.021	A	A	AB	A	B	A	AB	baseline	ns	ns	ns	-63	ns	ns	66	82	ns	ns	-39	66	ns
Rubidium	log_{10}	0.002	<0.001	<0.001	C	AB	AB	B	B	A	A	baseline	206	166	123	118	357	404	-50	ns	ns	ns	ns	127	150
Selenium	log_{10}	<0.001	0.023	0.004	A	AB	BCD	ABC	CD	ABC	D	baseline	ns	-49	ns	-61	ns	-67	213	154	59	132	ns	113	ns
Silver	log_{10}	0.001	<0.001	0.169	-	A	A	A	A	A	A	-	baseline	ns					-	-40					
Sodium	log_{10}	0.056	0.004	0.003	A	AB	AB	B	B	A	A	baseline	ns	ns	-72	-65	ns	ns	111	ns	ns	-41	ns	ns	90
Strontium	log_{10}	<0.001	<0.001	<0.001	B	B	B	A	B	A	A	baseline	ns	ns	637	ns	507	263	-80	-84	-86	ns	-81	ns	ns
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	0.002	0.010	<0.001	D	A	BC	C	ABC	AB	A	baseline	1,007	256	211	424	757	840	-68	252	ns	ns	ns	173	199
Tin	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	log_{10}	<0.001	<0.001	0.022	-	B	B	AB	AB	A	A	-	baseline	ns	ns	ns	276	341	-	150	ns	243	265	841	1,003
Uranium	log_{10}	<0.001	0.007	<0.001	C	AB	AB	B	AB	A	AB	baseline	877	746	627	902	2,574	1,451	-76	133	ns	ns	140	539	271
Vanadium	log_{10}	<0.001	0.003	<0.001	D	C	C	C	BC	A	AB	baseline	562	346	589	680	2,836	2,385	-58	176	ns	186	225	1,122	934
Zinc	log_{10}	<0.001	0.096	0.073	A	A	A	A	A	A	A	baseline	ns							37					
Zirconium	log_{10}	<0.001	0.036	<0.001	C	B	B	B	AB	A	AB	baseline	590	599	993	1,619	3,427	1,134	-80	ns	ns	121	248	613	149

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated due to values reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline = first year of data included in analysis. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (HAC-D:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (HAC-D:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.24: Statistical Comparisons of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) Monitoring Area in Post-Breach Years (2018 to 2024) Relative to Pre-Breach Conditions (2010; W11)

Parameter	Data Transformation	Year	Magnitude of Difference in Relative to Pre-Breach Period (%)[a]						
			Post-Breach Period						
			2018	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	<0.001	ns	ns	ns	ns	ns	108	ns
Antimony	log_{10}	-	-	-	-	-	-	-	-
Arsenic	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Barium	log_{10}	<0.001	-58	ns	ns	ns	ns	ns	ns
Beryllium	log_{10}	-	-	-	-	-	-	-	-
Bismuth	log_{10}	-	-	-	-	-	-	-	-
Boron	log_{10}	-	-	-	-	-	-	-	-
Cadmium	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	76
Calcium	log_{10}	<0.001	-65	-51	-56	ns	-63	ns	ns
Cesium	log_{10}	-	-	-	-	-	-	-	-
Chromium	log_{10}	<0.001	ns	-62	-62	ns	-56	ns	ns
Cobalt	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Copper	log_{10}	<0.001	-42	ns	ns	ns	ns	ns	ns
Iron	log_{10}	-	-	-	-	-	-	-	-
Lead	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Lithium	log_{10}	0.014	ns	ns	ns	ns	ns	ns	ns
Magnesium	log_{10}	0.001	ns	ns	ns	ns	ns	ns	ns
Manganese	log_{10}	0.007	ns	ns	ns	ns	ns	ns	ns
Mercury	log_{10}	<0.001	-42	ns	ns	-51	ns	ns	ns
Molybdenum	log_{10}	0.002	ns	ns	ns	-49	ns	ns	ns
Nickel	log_{10}	0.044	ns	ns	ns	ns	ns	ns	ns
Phosphorus	log_{10}	-	-	-	-	-	-	-	-
Potassium	log_{10}	-	-	-	-	-	-	-	-
Rubidium	log_{10}	-	-	-	-	-	-	-	-
Selenium	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Silver	log_{10}	-	-	-	-	-	-	-	-
Sodium	log_{10}	-	-	-	-	-	-	-	-
Strontium	log_{10}	<0.001	-54	-37	-46	ns	-52	ns	ns
Tellurium	log_{10}	-	-	-	-	-	-	-	-
Thallium	log_{10}	0.011	ns	ns	ns	ns	ns	ns	ns
Tin	log_{10}	0.036	-	-	ns	65	-	-	-
Titanium	log_{10}	-	-	-	-	-	-	-	-
Uranium	log_{10}	<0.001	-45	ns	ns	ns	ns	ns	ns
Vanadium	log_{10}	<0.001	ns	ns	ns	ns	ns	ns	ns
Zinc	log_{10}	0.050	ns	ns	ns	ns	ns	ns	ns
Zirconium	log_{10}	-	-	-	-	-	-	-	-

Year P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. HAC-R5 is the alternate names for the HAC-D sampling area, for HRWG reporting. ANOVA = one way analysis of variance. MOD = Magnitude of Difference. ns = not significant.

[a] Magnitude of difference (MOD) calculated on back-transformed least-squares means as (Post-breach-Pre-breach)/ Pre-breach x 100%.

Table F.4.25: **Statistical Comparisons of Exposed - Reference Relative Differences of Periphyton Tissue Metal Concentrations for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for E1 (EDC-EXP) Mean Relative to EDC-D (EDC-REF; %)[c]					
		Area	Year	Area × Year	Post-Breach Period						Post-Breach Period						Post-Breach Period					
					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.015	<0.001	0.001	BC	BC	A	C	B	AB	baseline	ns	100	ns	ns	ns	ns	ns	123	ns	ns	68
Antimony	MLE	0.383	0.021	0.260	A	A	A	A	A	A	baseline	ns					ns					
Arsenic	MLE	<0.001	0.403	0.009	AB	A	CD	D	BCD	ABC	baseline	ns	-40	-46	ns	ns	ns	ns	-49	-54	-40	ns
Barium	MLE	0.003	0.040	0.001	B	B	A	B	B	B	baseline	ns	637	ns	ns	ns	ns	ns	484	ns	ns	105
Beryllium	MLE	0.144	<0.001	0.235	A	A	A	A	A	A	baseline	ns					ns					
Bismuth	MLE	0.170	<0.001	0.008	BC	AB	BC	C	ABC	A	baseline	ns	ns	ns	ns	75	ns	ns	ns	-43	ns	52
Boron	MLE	0.050	<0.001	<0.001	A	A	A	A	A	B	baseline	ns	ns	ns	ns	-59	ns	ns	ns	ns	ns	-69
Cadmium	MLE	0.051	0.009	0.036	AB	AB	AB	B	A	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-52	ns	ns
Calcium	MLE	<0.001	<0.001	<0.001	BC	B	A	C	B	B	baseline	ns	311	ns	ns	ns	ns	59	350	ns	86	ns
Cesium	MLE	0.047	<0.001	0.030	ABC	AB	BC	C	ABC	A	baseline	ns	ns	ns	ns	ns	ns	ns	-32	-46	ns	ns
Chromium	MLE	0.400	<0.001	0.002	B	B	A	B	A	AB	baseline	ns	313	ns	330	ns	ns	ns	137	ns	147	ns
Cobalt	MLE	0.079	<0.001	0.128	A	A	A	A	A	A	baseline	ns					ns					
Copper	MLE	<0.001	0.423	0.256	A	A	A	A	A	A	baseline	ns					360					
Iron	MLE	0.572	<0.001	0.042	AB	A	AB	B	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	ns	-37	ns	ns
Lead	MLE	0.804	<0.001	0.065	A	A	A	A	A	A	baseline	ns					ns					
Lithium	MLE	0.314	<0.001	0.012	A	A	A	B	A	A	baseline	ns	ns	-53	ns	ns	ns	ns	ns	-44	ns	67
Magnesium	MLE	0.015	<0.001	0.001	A	A	A	B	A	A	baseline	ns	ns	-61	ns	ns	65	ns	49	-35	ns	ns
Manganese	MLE	<0.001	0.141	0.031	AB	AB	B	B	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	-66	-68	-42	ns
Mercury	MLE	0.076	<0.001	0.826	A	A	A	A	A	A	baseline	ns					ns					
Molybdenum	MLE	0.002	0.027	0.587	A	A	A	A	A	A	baseline	ns					-29					
Nickel	MLE	<0.001	<0.001	0.027	B	AB	B	B	AB	A	baseline	ns	ns	ns	ns	63	-31	ns	-38	-44	ns	ns
Phosphorus	MLE	0.339	0.015	0.747	A	A	A	A	A	A	baseline	ns					ns					
Potassium	MLE	0.007	<0.001	0.848	A	A	A	A	A	A	baseline	ns					-24					
Rubidium	MLE	0.001	<0.001	0.032	A	AB	B	B	AB	A	baseline	ns	-35	-37	ns	ns	ns	ns	-38	-39	ns	ns
Selenium	MLE	<0.001	<0.001	0.049	B	A	B	B	B	AB	baseline	85	ns	ns	ns	ns	ns	ns	-44	-33	-41	ns
Silver	MLE	0.034	<0.001	0.015	AB	A	AB	B	A	A	baseline	ns	ns	ns	ns	ns	ns	81	ns	ns	65	ns
Sodium	MLE	0.006	<0.001	0.078	A	A	A	A	A	A	baseline	ns					25					
Strontium	MLE	0.003	<0.001	<0.001	B	B	A	B	B	B	baseline	ns	242	ns	ns	ns	ns	ns	233	ns	ns	ns
Tellurium	MLE	<0.001	0.054	0.074	<LRL	A	A	A	<LRL	<LRL	<LRL	baseline	ns		<LRL	<LRL	<LRL	94			<LRL	<LRL
Thallium	MLE	0.002	<0.001	0.013	BC	AB	BC	C	ABC	A	baseline	ns	ns	ns	ns	110	-40	ns	-40	-45	ns	ns
Tin	MLE	0.003	<0.001	<0.001	C	B	B	B	B	A	baseline	246	232	205	240	**7,003**	-48	79	ns	ns	ns	**ns**
Titanium	MLE	<0.001	<0.001	<0.001	BC	AB	A	C	AB	A	baseline	ns	138	ns	ns	99	ns	52	133	ns	ns	95
Uranium	MLE	0.472	<0.001	0.171	A	A	A	A	A	A	baseline	ns					ns					
Vanadium	MLE	0.008	<0.001	0.011	BC	A	AB	C	ABC	AB	baseline	102	ns	ns	ns	ns	ns	96	ns	ns	ns	71
Zinc	MLE	0.124	<0.001	0.010	AB	ABC	BC	C	AB	A	baseline	ns	ns	-46	ns	ns	ns	ns	-32	-43	ns	ns
Zirconium	MLE	0.249	<0.001	0.023	BC	AB	A	C	ABC	AB	baseline	ns	90	ns	ns	ns	ns	ns	55	-32	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (E1:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (E1:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.26: **Statistical Comparisons of Exposed - Reference Relative Differences of Caddisfly Tissue Metal Concentrations for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for E1 (EDC-EXP) Mean Relative to EDC-D (EDC-REF; %)[c]					
		Area	Year	Area × Year	Post-Breach Period						Post-Breach Period						Post-Breach Period					
					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	MLE	0.055	<0.001	0.366	A	A	A	A	A	A	baseline	ns					ns					
Antimony	MLE	0.834	<0.001	0.172	A	A	A	A	A	A	baseline	ns					ns					
Arsenic	MLE	<0.001	<0.001	0.020	AB	B	B	A	B	B	baseline	ns	ns	ns	ns	ns	ns	-59	-58	ns	-58	-67
Barium	MLE	0.276	<0.001	0.111	A	A	A	A	A	A	baseline	ns					ns					
Beryllium	MLE	0.069	<0.001	0.055	A	A	A	A	<LRL	A	baseline	ns					ns				<LRL	ns
Bismuth	MLE	0.106	0.294	0.104	<LRL	A	<LRL	A	<LRL	<LRL	<LRL	baseline	<LRL	ns	<LRL	<LRL	<LRL	ns	<LRL	ns	<LRL	<LRL
Boron	MLE	0.792	0.253	0.008	<LRL	B	<LRL	A	<LRL	B	<LRL	baseline	<LRL	647	<LRL	ns	<LRL	ns	<LRL	250	<LRL	ns
Cadmium	MLE	0.059	<0.001	0.194	A	A	A	A	A	A	baseline	ns					ns					
Calcium	MLE	0.003	<0.001	0.003	C	BC	BC	A	BC	B	baseline	ns	ns	214	ns	80	-53	-33	-33	47	ns	ns
Cesium	MLE	0.018	<0.001	0.177	A	A	A	A	A	A	baseline	ns					-36					
Chromium	MLE	0.034	<0.001	0.420	A	A	A	A	A	A	baseline	ns					-38					
Cobalt	MLE	0.084	<0.001	0.262	A	A	A	A	A	A	baseline	ns					ns					
Copper	MLE	<0.001	<0.001	<0.001	D	B	B	A	CD	BC	baseline	114	80	290	ns	75	ns	95	65	256	ns	60
Iron	MLE	0.037	<0.001	0.229	A	A	A	A	A	A	baseline	ns					-35					
Lead	MLE	0.473	<0.001	0.323	A	A	A	A	A	A	baseline	ns					ns					
Lithium	MLE	0.868	0.002	0.019	<LRL	B	<LRL	A	<LRL	AB	<LRL	baseline	<LRL	526	<LRL	ns	<LRL	-63	<LRL	ns	<LRL	ns
Magnesium	MLE	0.133	<0.001	0.013	ABC	C	BC	A	AB	AB	baseline	ns	ns	ns	ns	ns	ns	-34	ns	30	ns	ns
Manganese	MLE	0.410	<0.001	0.352	A	A	A	A	A	A	baseline	ns					ns					
Mercury	MLE	0.416	<0.001	0.443	A	A	A	A	A	A	baseline	ns					ns					
Molybdenum	MLE	<0.001	0.014	0.210	A	A	A	A	A	A	baseline	ns					-43					
Nickel	MLE	0.004	<0.001	0.533	A	A	A	A	A	A	baseline	ns					-48					
Phosphorus	MLE	0.233	0.008	<0.001	B	A	B	B	B	B	baseline	30	ns	ns	ns	ns	ns	18	ns	ns	-10	ns
Potassium	MLE	0.411	<0.001	<0.001	B	B	B	A	B	B	baseline	ns	ns	73	ns	ns	ns	ns	-23	67	ns	ns
Rubidium	MLE	0.631	<0.001	0.002	B	B	B	A	B	B	baseline	ns	ns	98	ns	ns	ns	ns	ns	107	ns	ns
Selenium	MLE	0.002	0.071	<0.001	B	A	B	B	B	B	baseline	121	ns	ns	ns	ns	ns	108	ns	ns	30	ns
Silver	MLE	0.058	<0.001	0.026	B	B	AB	A	B	AB	baseline	ns	ns	284	ns	ns	-54	ns	ns	75	ns	ns
Sodium	MLE	0.905	0.033	0.368	A	A	A	A	A	A	baseline	ns					ns					
Strontium	MLE	<0.001	<0.001	0.003	B	B	B	A	B	B	baseline	ns	ns	191	ns	ns	-48	-46	-37	52	-36	ns
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.071	<0.001	0.114	A	A	A	A	A	A	baseline	ns					ns					
Tin	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	MLE	0.159	<0.001	0.126	A	A	A	A	A	A	baseline	ns					ns					
Uranium	MLE	0.037	<0.001	0.090	A	A	A	A	A	A	baseline	ns					-39					
Vanadium	MLE	0.066	<0.001	0.373	A	A	A	A	A	A	baseline	ns					ns					
Zinc	MLE	0.849	<0.001	<0.001	CD	A	ABC	AB	D	BC	baseline	50	ns	45	ns	ns	ns	30	ns	26	-33	ns
Zirconium	MLE	0.027	<0.001	0.008	B	B	C	A	<LRL	AB	baseline	ns	-99	654	<LRL	ns	ns	ns	ns	ns	<LRL	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reportingMerged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (E1:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (E1:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.27: **Statistical Comparisons of Exposed - Reference Relative Differences of Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for E1 (EDC-EXP) Mean Relative to EDC-D (EDC-REF; %)[c]					
		Area	Year	Area × Year	Post-Breach Period						Post-Breach Period						Post-Breach Period					
					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	MLE	<0.001	0.031	0.622	A	A	A	A	A	A	baseline			ns						70		
Antimony	MLE	0.109	<0.001	0.011	B	B	AB	AB	A	A	baseline	ns	ns	ns	168	181	ns	ns	ns	ns	93	103
Arsenic	MLE	0.359	<0.001	0.547	A	A	A	A	A	A	baseline			ns						ns		
Barium	MLE	0.040	0.116	0.417	A	A	A	A	A	A	baseline			ns						32		
Beryllium	MLE	<0.001	0.134	0.808	A	A	A	A	A	A	baseline			ns						64		
Bismuth	MLE	0.746	0.424	0.351	<LRL	<LRL	A	A	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	ns		<LRL	<LRL
Boron	MLE	0.264	<0.001	0.019	BC	C	A	A	A	AB	baseline	ns	162	154	132	ns	-51	-58	ns	ns	ns	ns
Cadmium	MLE	<0.001	<0.001	0.042	AB	B	AB	B	AB	A	baseline	ns	ns	ns	ns	ns	145	ns	130	ns	186	299
Calcium	MLE	0.257	0.010	<0.001	C	BC	BC	B	A	B	baseline	ns	ns	66	223	109	-36	ns	ns	ns	108	35
Cesium	MLE	0.074	0.093	0.512	A	A	A	A	A	A	baseline			ns						ns		
Chromium	MLE	0.005	0.001	0.106	A	A	A	A	A	A	baseline			ns						39		
Cobalt	MLE	<0.001	0.005	0.293	A	A	A	A	A	A	baseline			ns						63		
Copper	MLE	<0.001	0.023	0.001	C	BC	AB	BC	A	BC	baseline	ns	116	ns	185	ns	ns	ns	107	46	174	45
Iron	MLE	<0.001	0.018	0.644	A	A	A	A	A	A	baseline			ns						57		
Lead	MLE	<0.001	0.014	0.199	A	A	A	A	A	A	baseline			ns						65		
Lithium	MLE	<0.001	0.522	0.918	A	A	A	A	A	A	baseline			ns						59		
Magnesium	MLE	0.304	0.047	0.002	C	BC	BC	AB	A	AB	baseline	ns	ns	66	91	47	-24	ns	ns	26	44	ns
Manganese	MLE	0.577	0.002	0.437	A	A	A	A	A	A	baseline			ns						ns		
Mercury	MLE	0.983	0.021	0.030	A	ABC	BC	C	BC	AB	baseline	ns	-42	-57	-44	ns	53	ns	ns	-35	ns	ns
Molybdenum	MLE	0.106	0.068	0.072	A	A	A	A	A	A	baseline			ns						ns		
Nickel	MLE	0.850	0.003	0.037	C	BC	C	A	AB	ABC	baseline	ns	ns	124	102	ns	ns	ns	ns	60	ns	ns
Phosphorus	MLE	0.483	0.017	0.010	C	C	ABC	AB	A	BC	baseline	ns	ns	30	38	ns	-14	ns	ns	ns	19	ns
Potassium	MLE	0.590	0.005	0.009	AB	B	AB	A	A	B	baseline	ns	ns	ns	ns	ns	ns	-22	ns	ns	ns	ns
Rubidium	MLE	0.146	0.008	0.002	A	B	A	A	A	A	baseline	-40	ns	ns	ns	ns	ns	-40	ns	58	ns	ns
Selenium	MLE	0.064	<0.001	0.951	A	A	A	A	A	A	baseline			ns						ns		
Silver	MLE	<0.001	0.140	0.011	ABC	BC	C	BC	A	AB	baseline	ns	ns	ns	ns	ns	-33	-50	-56	-40	ns	ns
Sodium	MLE	<0.001	0.036	0.062	A	A	A	A	A	A	baseline			ns						50		
Strontium	MLE	0.303	0.006	<0.001	C	BC	B	B	A	B	baseline	ns	102	99	287	114	-52	ns	ns	ns	85	ns
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	MLE	0.003	0.062	0.037	BC	C	ABC	ABC	A	AB	baseline	ns	ns	ns	104	ns	ns	ns	ns	ns	113	77
Tin	MLE	0.185	<0.001	0.321	A	A	<LRL	<LRL	<LRL	<LRL	baseline	ns	<LRL	<LRL	<LRL	<LRL	ns		<LRL	<LRL	<LRL	<LRL
Titanium	MLE	<0.001	<0.001	0.796	A	A	A	A	A	A	baseline			ns						105		
Uranium	MLE	0.004	0.125	0.180	A	A	A	A	A	A	baseline			ns						39		
Vanadium	MLE	<0.001	<0.001	0.620	A	A	A	A	A	A	baseline			ns						95		
Zinc	MLE	<0.001	0.305	0.060	A	A	A	A	A	A	baseline			ns						-16		
Zirconium	MLE	<0.001	<0.001	0.613	A	A	A	A	A	A	baseline			ns						52		

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less than accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD. No MOD is displayed if the comparison was not significant. "-" = no data available. ANOVA = two way analysis of variance. MLE = censored regression using maximum likelihood estimation. MOD = Magnitude of Difference. nt = not tested because all data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. <LRL = greater than 50% LRL data for both areas so the time period was omitted from the analysis. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis. Data were analysed in units of mg/kg dry weight.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations E1:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (E1:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.28: Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Caddisfly Tissue Metal Concentrations for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]						Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]						Magnitude of Difference for E1 (EDC-EXP) Mean Relative to EDC-D (EDC-REF; %)[c]					
		Area	Year	Area × Year	Post-Breach Period						Post-Breach Period						Post-Breach Period					
					2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	0.010	<0.001	0.071	A	A	A	A	A	A	baseline	ns					-50					
Antimony	log_{10}	0.409	<0.001	0.146	A	A	A	A	A	A	baseline	ns					ns					
Arsenic	log_{10}	0.101	<0.001	0.003	B	B	B	A	B	B	baseline	ns	ns	269	ns	ns	ns	-57	ns	185	ns	-55
Barium	log_{10}	0.007	<0.001	0.022	AB	B	B	A	B	B	baseline	ns	ns	ns	ns	ns	ns	ns	-83	ns	ns	-74
Beryllium	log_{10}	0.781	0.061	0.002	ABC	C	BC	A	ABC	AB	baseline	ns	ns	ns	ns	ns	ns	-75	ns	233	ns	ns
Bismuth	log_{10}	0.951	0.060	0.217	-	A	-	A	-	A	-	baseline	-	ns	-	ns	-	ns	-	ns	-	ns
Boron	log_{10}	0.207	<0.001	<0.001	AB	C	-	B	-	A	baseline	-84	-	ns	-	ns	ns	-64	-	ns	-	544
Cadmium	log_{10}	0.009	<0.001	0.030	C	ABC	AB	A	BC	BC	baseline	ns	313	561	ns	ns	ns	ns	208	393	ns	ns
Calcium	log_{10}	<0.001	<0.001	<0.001	B	B	C	A	B	B	baseline	ns	-65	379	ns	ns	-57	-58	-85	105	-56	-45
Cesium	log_{10}	0.170	<0.001	0.033	B	B	B	A	AB	B	baseline	ns	ns	593	ns	ns	ns	ns	ns	238	ns	ns
Chromium	log_{10}	0.125	<0.001	0.021	A	A	B	A	A	A	baseline	ns	-86	ns	ns	ns	ns	ns	-89	ns	ns	ns
Cobalt	log_{10}	0.334	<0.001	0.066	A	A	A	A	A	A	baseline	ns					ns					
Copper	log_{10}	<0.001	0.020	0.073	A	A	A	A	A	A	baseline	ns					-65					
Iron	log_{10}	0.034	<0.001	0.068	A	A	A	A	A	A	baseline	ns					-38					
Lead	log_{10}	0.148	<0.001	0.074	A	A	A	A	A	A	baseline	ns					ns					
Lithium	log_{10}	0.305	0.084	0.001	-	B	-	A	-	A	-	baseline	-	892	-	336	-	-75	-	151	-	ns
Magnesium	log_{10}	0.003	<0.001	<0.001	B	B	B	A	B	B	baseline	ns	ns	262	ns	ns	-45	-39	-46	100	ns	ns
Manganese	log_{10}	0.013	<0.001	0.014	B	B	AB	A	B	B	baseline	ns	ns	497	ns	ns	ns	ns	ns	556	ns	ns
Mercury	log_{10}	0.047	<0.001	0.418	A	A	A	A	A	A	baseline	ns					-17					
Molybdenum	log_{10}	0.101	0.036	0.960	A	A	A	A	A	A	baseline	ns					ns					
Nickel	log_{10}	0.216	<0.001	0.195	A	A	A	A	A	A	baseline	ns					ns					
Phosphorus	log_{10}	0.617	0.044	0.485	A	A	A	A	A	A	baseline	ns					ns					
Potassium	log_{10}	0.049	<0.001	0.369	A	A	A	A	A	A	baseline	ns					26					
Rubidium	log_{10}	0.125	<0.001	<0.001	B	B	B	A	B	B	baseline	ns	ns	213	ns	ns	ns	ns	ns	243	ns	ns
Selenium	log_{10}	<0.001	<0.001	0.254	A	A	A	A	A	A	baseline	ns					63					
Silver	log_{10}	0.043	<0.001	0.005	B	B	AB	A	B	B	baseline	ns	ns	408	ns	ns	ns	-58	ns	156	ns	ns
Sodium	log_{10}	0.009	<0.001	0.036	AB	AB	B	A	AB	A	baseline	ns	ns	ns	ns	ns	ns	ns	-53	ns	ns	ns
Strontium	log_{10}	<0.001	<0.001	<0.001	B	BC	C	A	B	B	baseline	ns	-65	244	ns	ns	-46	-58	-81	86	-53	ns
Tellurium	log_{10}	nt	nt	nt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	0.707	<0.001	0.055	A	A	A	A	A	A	baseline	ns					ns					
Tin	log_{10}	0.442	0.126	0.690	A	A	-	-	-	-	baseline	ns	-	-	-	-	ns		-	-	-	-
Titanium	log_{10}	0.019	<0.001	0.017	BC	BC	C	A	AB	ABC	baseline	ns	ns	806	ns	ns	-70	ns	-83	ns	ns	ns
Uranium	log_{10}	0.214	<0.001	0.134	A	A	A	A	A	A	baseline	ns					ns					
Vanadium	log_{10}	0.005	<0.001	0.093	A	A	A	A	A	A	baseline	ns					-50					
Zinc	log_{10}	0.158	<0.001	<0.001	B	A	A	A	B	B	baseline	86	85	171	ns	ns	ns	53	52	123	-32	ns
Zirconium	log_{10}	0.465	0.112	0.009	AB	B	-	A	AB	AB	baseline	ns	-	ns	ns	ns	ns	-65	-	280	ns	ns

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or Trophic Transfer Factor (TTF) not calculated because > 50% analyte concentrations were below the Laboratory Reporting Limit (LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because all data were reported <LRL or because there were only data for a single time period. ns = not significant. baseline= first year of data included in analysis. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (E1:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (E1:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

Table F.4.29: **Statistical Comparisons of Exposed - Reference Relative Differences of Trophic Transfer Factors for Composite-Taxa Benthic Invertebrate Tissue Metal Concentrations for the Lower Edney Creek (E1 [EDC-EXP]; Exposed and EDC-D [EDC-REF]; Reference) Monitoring Areas, 2019 to 2024**

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]							Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]							Magnitude of Difference for E1 (EDC-EXP) Mean Relative to EDC-D (EDC-REF; %)[c]					
		Area	Year	Area × Year	Post-Breach Period							Post-Breach Period							Post-Breach Period					
					2019	2020	2021	2022	2022	2023	2024	2024	2023	2024	2023	2024	2023	2024	2019	2020	2021	2022	2023	2024
Aluminum	log_{10}	0.053	0.156	0.480	A	A	A	A	A	A	A	baseline	ns						ns					
Antimony	log_{10}	0.752	0.194	0.143	A	A	A	A	A	A	A	baseline	ns						ns					
Arsenic	log_{10}	0.009	<0.001	0.066	A	A	A	A	A	A	A	baseline	ns						39					
Barium	log_{10}	0.278	0.492	0.012	A	AB	B	A	A	A	A	baseline	ns	-86	ns	ns	ns	ns	ns	ns	-81	ns	ns	ns
Beryllium	log_{10}	0.321	0.004	0.093	A	A	A	A	A	A	A	baseline	ns						ns					
Bismuth	log_{10}	0.429	0.274	0.283	A	-	A	A	A	A	-	baseline	-	ns	ns	ns	ns	-	ns	-	ns		-	ns
Boron	log_{10}	0.719	<0.001	0.250	A	A	A	A	A	A	A	baseline	ns						ns					
Cadmium	log_{10}	<0.001	<0.001	0.918	A	A	A	A	A	A	A	baseline	ns						173					
Calcium	log_{10}	0.002	<0.001	<0.001	B	B	C	A	A	A	AB	baseline	ns	-64	153	153	153	ns	ns	-45	-79	ns	ns	ns
Cesium	log_{10}	0.015	<0.001	0.409	A	A	A	A	A	A	A	baseline	ns						45					
Chromium	log_{10}	0.261	0.138	0.183	A	A	A	A	A	A	A	baseline	ns						ns					
Cobalt	log_{10}	<0.001	<0.001	0.320	A	A	A	A	A	A	A	baseline	ns						88					
Copper	log_{10}	<0.001	0.032	0.100	A	A	A	A	A	A	A	baseline	ns						-66					
Iron	log_{10}	0.008	0.003	0.707	A	A	A	A	A	A	A	baseline	ns						50					
Lead	log_{10}	0.014	0.435	0.736	A	A	A	A	A	A	A	baseline	ns						46					
Lithium	log_{10}	0.178	<0.001	0.088	A	A	A	A	A	A	A	baseline	ns						ns					
Magnesium	log_{10}	0.162	0.001	<0.001	C	B	BC	A	A	A	AB	baseline	88	ns	324	324	324	159	-54	ns	-36	94	ns	ns
Manganese	log_{10}	<0.001	<0.001	0.159	A	A	A	A	A	A	A	baseline	ns						76					
Mercury	log_{10}	0.032	0.004	0.531	A	A	A	A	A	A	A	baseline	ns						-20					
Molybdenum	log_{10}	0.001	0.014	0.222	A	A	A	A	A	A	A	baseline	ns						62					
Nickel	log_{10}	0.047	0.006	0.080	A	A	A	A	A	A	A	baseline	ns						ns					
Phosphorus	log_{10}	0.611	0.026	0.170	A	A	A	A	A	A	A	baseline	ns						ns					
Potassium	log_{10}	0.026	0.004	0.749	A	A	A	A	A	A	A	baseline	ns						30					
Rubidium	log_{10}	0.002	<0.001	0.008	BC	C	AB	A	A	A	ABC	baseline	ns	ns	149	149	149	ns	ns	ns	103	162	ns	ns
Selenium	log_{10}	<0.001	0.588	0.175	A	A	A	A	A	A	A	baseline	ns						52					
Silver	log_{10}	<0.001	0.020	0.119	A	A	A	A	A	A	A	baseline	ns						-47					
Sodium	log_{10}	0.092	<0.001	0.020	A	AB	B	A	A	A	A	baseline	ns	-57	ns	ns	ns	ns	ns	ns	-46	93	ns	ns
Strontium	log_{10}	0.002	<0.001	0.001	CD	BCD	D	AB	AB	AB	A	baseline	ns	ns	136	136	136	179	-51	ns	-71	ns	ns	ns
Tellurium	log_{10}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	log_{10}	<0.001	<0.001	0.137	A	A	A	A	A	A	A	baseline	ns						72					
Tin	log_{10}	0.338	0.701	0.036	A	B	-	-	-	-	-	baseline	-79	-	-	-	-	-	148	ns	-	-	-	-
Titanium	log_{10}	0.013	0.025	0.239	A	A	A	A	A	A	A	baseline	ns						50					
Uranium	log_{10}	0.019	0.007	0.490	A	A	A	A	A	A	A	baseline	ns						52					
Vanadium	log_{10}	0.007	0.013	0.500	A	A	A	A	A	A	A	baseline	ns						53					
Zinc	log_{10}	0.499	0.004	0.057	A	A	A	A	A	A	A	baseline	ns						ns					
Zirconium	log_{10}	0.134	0.036	0.172	A	A	A	A	A	A	A	baseline	ns						ns					

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: "-" = no data available or TTF not calculated because data were reported below the laboratory reporting limit (<LRL) for either the periphyton or benthic invertebrate tissue results. ANOVA = two way analysis of variance. MOD = Magnitude of Difference. nt = not tested because TTF not calculated because data were reported below the laboratory reporting limit (<LRL) or because there were only data for a single time period. ns = not significant. baseline = first year of data included in analysis. EDC-EXP and EDC-REF are the alternate names for the E1 and EDC-D sampling areas, respectively, for HRWG reporting. Merged cells across years indicate that the Area × Year term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (E1:EDC-D) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (E1:EDC-D).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted}) \times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

APPENDIX F.5
FISH TISSUE QUALITY

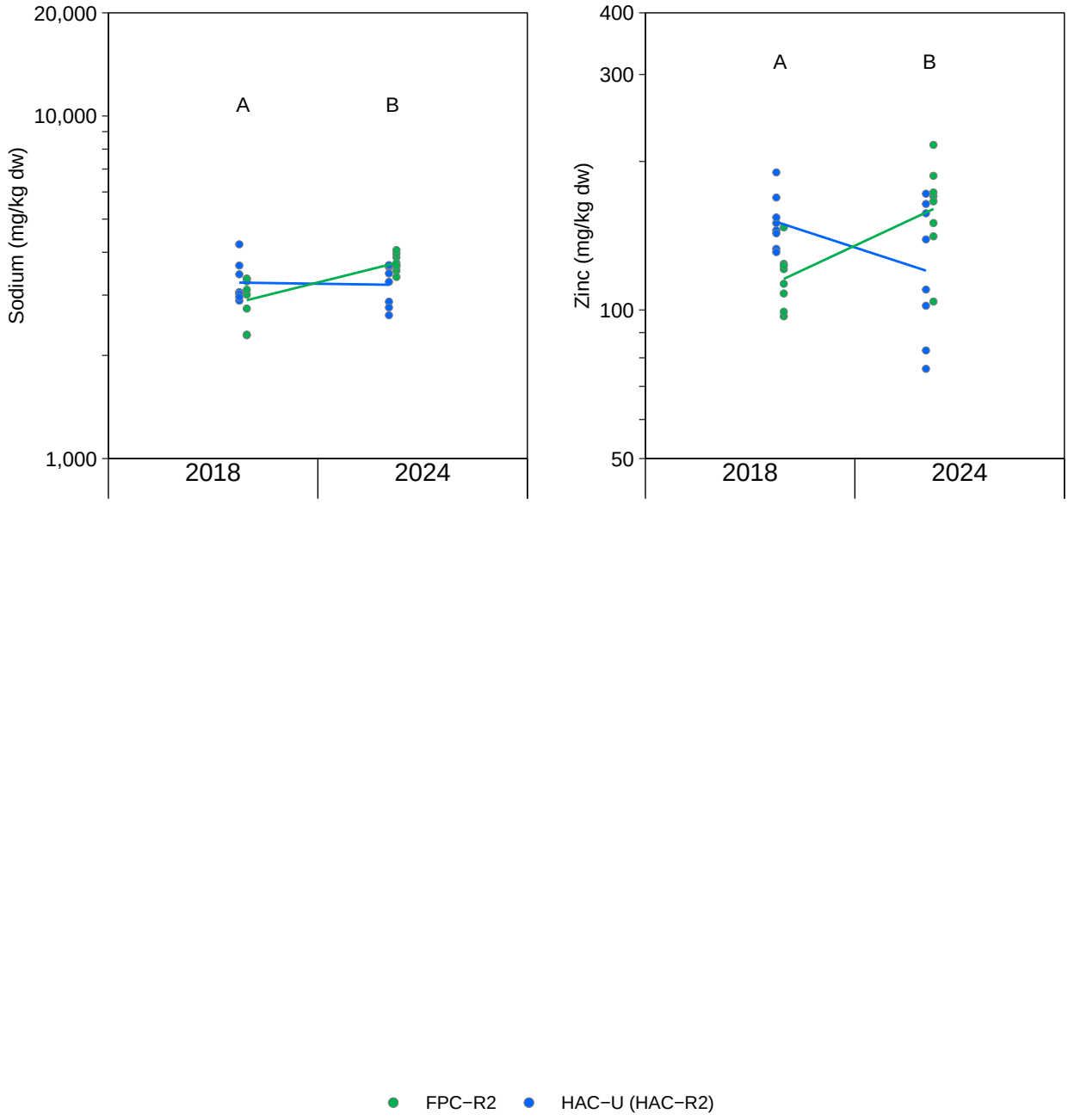

Figure F.5.1: Juvenile Rainbow Trout Whole-body Tissue Primary and Secondary Analyte Concentrations with a Significant Negative Exposed - Reference Difference and a Significant Area x Year Effect for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2018 to 2024

Notes: dw = dry weight. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Green represents reference data and blue represents exposed data. Rainbow trout from Upper Hazeltine Creek were collected from HAC−R1 and HAC−U (HAC−R2) in 2018 and only from HAC−U (HAC−R2) in 2024. Concentrations below the laboratory reporting limit (LRL) are plotted as open symbols at the LRL and the open symbol represents one or more values reported below the LRL. Individual samples are plotted and lines join the least- squares estimated mean values for years included in the statistical analysis (i.e., not <LRL). Statistical analyses were conducted using a two −way ANOVA with factors Area and Year. The models were fit using Maximum Likelihood Estimation with an assumed log −normal distribution. Years that share a letter (e.g., A,B,C) have ratios of concentrations (HAC−U:FPC−R2) that do not differ significantly (p−value <0.05) among years. Letter A was assigned to the year with the highest ratio of concentrations (HAC−U:FPC−R2).

Table F.5.1: Statistical Comparisons of Exposed - Reference Relative Differences of Juvenile Rainbow Trout Whole-body Tissue Metal Concentrations for the Upper Hazeltine Creek (HAC-U [HAC-R2]; Exposed) and Frypan Creek (FPC-R2; Reference) Monitoring Areas, 2018 to 2024

Parameter	Data Transformation	Two-way ANOVA P-values			(Exposed – Reference) Contrasts Among Periods[a]		Magnitude of Difference in (Exposed – Reference) Relative to Baseline Period (%)[b]		Magnitude of Difference for Exposed Mean Relative to Reference Mean (%)[c]	
		Area	Year	Area × Year	2018	2024	2018	2024	2018	2024
Aluminum	MLE	0.168	0.146	0.242	A	A	baseline	ns	**ns**	
Antimony	MLE	nt	nt	nt	-	-	-	-	-	-
Arsenic	MLE	0.220	0.206	0.701	A	A	baseline	ns	ns	
Barium	MLE	<0.001	0.002	0.535	A	A	baseline	ns	119	
Beryllium	MLE	nt	nt	nt	-	-	-	-	-	-
Bismuth	MLE	nt	nt	nt	-	-	-	-	-	-
Boron	MLE	nt	nt	nt	-	-	-	-	-	-
Cadmium	MLE	0.544	0.005	0.682	A	A	baseline	ns	ns	
Calcium	MLE	0.533	0.283	0.161	A	A	baseline	ns	ns	
Cesium	MLE	0.004	0.805	0.275	A	A	baseline	ns	77	
Chromium	MLE	0.030	0.069	0.319	A	A	baseline	ns	**-51**	
Cobalt	MLE	0.214	0.038	0.279	A	A	baseline	ns	ns	
Copper	MLE	<0.001	0.465	0.229	A	A	baseline	ns	180	
Iron	MLE	0.275	0.030	0.334	A	A	baseline	ns	ns	
Lead	MLE	nt	nt	nt	-	-	-	-	-	-
Lithium	MLE	nt	nt	nt	-	-	-	-	-	-
Magnesium	MLE	0.860	0.008	0.098	A	A	baseline	ns	ns	
Manganese	MLE	<0.001	0.268	0.021	B	A	baseline	128	86	326
Mercury (ww)[d]	ANCOVA	0.452	0.033	0.305	A	A	baseline	ns	ns	
Molybdenum	MLE	<0.001	0.316	0.041	A	B	baseline	-61	327	**ns**
Nickel	MLE	0.109	0.093	0.797	A	A	baseline	ns	ns	
Phosphorus	MLE	0.250	<0.001	0.074	A	A	baseline	ns	ns	
Potassium	MLE	0.160	<0.001	0.007	A	B	baseline	-22	ns	-18
Rubidium	MLE	<0.001	<0.001	0.003	A	B	baseline	-45	ns	-58
Selenium	MLE	<0.001	0.019	0.025	B	A	baseline	38	202	317
Silver	MLE	nt	nt	nt	-	-	-	-	-	-
Sodium	MLE	0.764	0.019	0.003	A	B	baseline	-23	ns	-14
Strontium	MLE	<0.001	0.451	0.156	A	A	baseline	ns	63	
Tellurium	MLE	nt	nt	nt	-	-	-	-	-	-
Thallium	MLE	<0.001	0.003	0.768	A	A	baseline	ns	-75	-75
Tin	MLE	nt	nt	nt	-	-	-	-	-	-
Titanium	MLE	nt	nt	nt	-	-	-	-	-	-
Uranium	MLE	0.924	0.079	0.355	A	A	baseline	ns	ns	
Vanadium	MLE	0.077	0.030	0.360	A	A	baseline	ns	ns	
Zinc	MLE	0.900	0.565	<0.001	A	B	baseline	-43	30	-25
Zirconium	MLE	nt	nt	nt	-	-	-	-	-	-
Fork Length	ANOVAlog	0.612	<0.001	0.644	A	A	baseline	ns	ns	
Body Weight	ANOVAlog	0.614	<0.001	0.849	A	A	baseline	ns	ns	

Area x Year or Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: **Bold font** = Data for either exposed or reference in the indicated year were entirely <LRL, leading to a less accurate estimate of the mean for the <LRL result and greater uncertainty for the calculated MOD**.** No MOD is displayed if the comparison was not significant. "-" = no data available or no post-hoc test conducted because of censored data, <LRL = greater than 50% laboratory reporting limit data for both stations so the time period was omitted from the analysis, nt = not tested because all data were reported below the LRL or because there were only data for a single time period, ns = not significant, baseline = first year of data included in analysis, ww = wet weight, ANOVA = analysis of variance, MLE = censored regression using maximum likelihood estimation, ANCOVA = two-way analysis of covariance using censored regression, MOD = magnitude of difference. HAC-R2 is the alternate name for the HAC-U sampling area for HRWG reporting. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight. Merged cells across years indicate that the Area × Time term was not significant, therefore MOD is for all years combined. Only years with samples from both reference and exposed were included in the analysis.

[a] Years that share a letter (e.g., A,B,C) had ratios of concentrations (Exposed:Reference) that do not differ significantly among years. Letters are assigned such that A is assigned to the year with the highest ratio of concentrations (Exposed:Reference).

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means for the observed time period as $(Exp_{observed} - Exp_{predicted})/(Exp_{predicted})\times 100\%$ where $Exp_{predicted} = Ref_{observed} + (Exp_{baseline} - Ref_{baseline})$.

[c] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[d] Conducted as a two-way ANCOVA with log10(fork length) as a covariate. Because the covariate was significant, all contrasts were conducted using mean log10(fork length).

Table F.5.2: Statistical Comparisons of Juvenile Coho Whole-body Tissue Metal Concentrations for the Lower Hazeltine Creek (HAC-D [HAC-R5]; Exposed) and Lower Edney Creek (EDC-D [EDC-REF]; Reference) Monitoring Areas, 2024

Parameter	Data Transformation	One-way ANOVA Area P-values	Spatial Difference [a]		Magnitude of Difference (%)[b]
			EDC-D (EDC-REF)	HAC-D (HAC-R5)	
Aluminum	MLE	0.304	A	A	ns
Antimony	MLE	nt	-	-	-
Arsenic	MLE	0.787	A	A	ns
Barium	MLE	0.292	A	A	ns
Beryllium	MLE	nt	-	-	-
Bismuth	MLE	nt	-	-	-
Boron	MLE	nt	-	-	-
Cadmium	MLE	0.056	A	A	ns
Calcium	MLE	0.248	A	A	ns
Cesium	MLE	0.444	A	A	ns
Chromium	MLE	0.718	A	A	ns
Cobalt	MLE	0.019	B	A	67
Copper	MLE	<0.001	B	A	91
Iron	MLE	0.623	A	A	ns
Lead	MLE	0.674	A	A	ns
Lithium	MLE	nt	-	-	-
Magnesium	MLE	0.212	A	A	ns
Manganese	MLE	0.038	B	A	53
Mercury (ww)[c]	ANCOVA	0.116	A	A	ns
Molybdenum	MLE	0.815	A	A	ns
Nickel	MLE	nt	-	-	-
Phosphorus	MLE	0.504	A	A	ns
Potassium	MLE	0.364	A	A	ns
Rubidium	MLE	0.265	A	A	ns
Selenium	MLE	<0.001	B	A	84
Silver	MLE	nt	-	-	-
Sodium	MLE	0.004	A	B	-20
Strontium	MLE	0.183	A	A	ns
Tellurium	MLE	nt	-	-	-
Thallium	MLE	0.654	A	A	ns
Tin	MLE	nt	-	-	-
Titanium	MLE	0.343	A	A	ns
Uranium	MLE	0.570	A	A	ns
Vanadium	MLE	0.135	A	A	ns
Zinc	MLE	0.038	A	B	-25
Zirconium	MLE	nt	-	-	-
Age	ANOVA	1.000	A	A	ns
Fork Length	ANOVAlog	<0.001	B	A	21
Body Weight	ANOVAlog	0.002	B	A	71

Area P-value < 0.05.

Contrast is significant (α = 0.05) and magnitude of difference is positive.

Contrast is significant (α = 0.05) and magnitude of difference is negative.

Notes: No MOD is displayed if the comparison was not significant. "-" = no data available or no test conducted because of censored data, <LRL = greater than 50% laboratory reporting limit data for both stations so the time period was omitted from the analysis, nt = not tested because all data were reported below the LRL, ns = not significant, ww = wet weight, ANOVA = one-way analysis of variance, MLE = censored regression using maximum likelihood estimation, ANCOVA = one-way analysis of covariance, MOD = magnitude of difference. HAC-R5 and EDC-REF are the alternate names for the HAC-D and EDC-D sampling areas, respectively, for HRWG reporting. Data were analysed in units of mg/kg dry weight except mercury which was analysed in units of mg/kg wet weight.

[a] Areas that share a letter (e.g., A,B,C) do not differ significantly. Letters are assigned such that A is assigned to the station with the highest concentrations.

[b] Magnitude of difference (MOD) calculated on backtransformed least-squares means as (Exp-Ref)/Ref x 100%.

[c] Conducted as a one-way ANCOVA with log10(fork length) as a covariate. Post-hoc comparisons made at mean log10(fork length).

APPENDIX G
ANALYTICAL REPORTS

WATER QUALITY

ALS Laboratory Report VA24B4763

(Finalized July 3, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B4763**	Page	: 1 of 6
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04- Task 5	Date Samples Received	: 21-Jun-2024 10:45
PO	: 5590017616	Date Analysis Commenced	: 22-Jun-2024
C-O-C number	: ----	Issue Date	: 03-Jul-2024 09:59
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Elke Tabora	Lab Analyst	Inorganics, Calgary, Alberta
Erin Sanchez		Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Leon Yang	Analyst	Inorganics, Burnaby, British Columbia
Ruifang Zheng	Analyst	Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-06	MP_POL-P2_WS-1_2024-06	MP_QUL-ZOO-1_WS-1_2024-06	MP_QUL-ZOO-7_WS-1_2024-06	MP_QUL-ZOO-1_WS-1X_2024-06
					Client sampling date / time	19-Jun-2024 16:40	19-Jun-2024 11:00	20-Jun-2024 10:00	20-Jun-2024 08:10	20-Jun-2024 10:00
						VA24B4763-001	VA24B4763-002	VA24B4763-003	VA24B4763-004	VA24B4763-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		43.4	95.1	48.9	45.9	49.4
Conductivity	----	E100/VA	2.0	µS/cm		106	253	111	103	110
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		46.2	112	50.4	48.1	50.9
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		47.4	113	50.9	48.0	51.2
pH	----	E108/VA	0.10	pH units		7.88	8.25	7.97	7.94	7.98
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		90	176	65	69	75
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		5.3	3.8	1.9	2.5	1.8
Turbidity	----	E121/VA	0.10	NTU		1.35	1.43	0.96	1.32	1.04
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0132	0.0059	<0.0050	0.0069	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		0.59	0.78	<0.50	<0.50	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.053	0.070	0.034	0.035	0.035
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0050	<0.0050	0.100	0.0797	0.100
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		<0.0051	<0.0051	0.100	0.0797	0.100
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.287	0.308	0.190	0.194	0.186
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0116	0.0164	<0.0020	0.0050	0.0022
Phosphorus, total dissolved	7723-14-0	E375-T/CG	0.0020	mg/L		0.0052	0.0106	<0.0020	0.0023	<0.0020
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		8.67	32.9	6.09	5.65	6.12
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L		7.94	7.96	2.54	4.10	2.81
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0618	0.0559	0.0324	0.0491	0.0353
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	0.00011	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00040	0.00060	0.00016	0.00020	0.00015

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-06	MP_POL-P2_WS-1_2024-06	MP_QUL-ZOO-1_WS-1_2024-06	MP_QUL-ZOO-7_WS-1_2024-06	MP_QUL-ZOO-1_WS-1X_2024-06
					Client sampling date / time	19-Jun-2024 16:40	19-Jun-2024 11:00	20-Jun-2024 10:00	20-Jun-2024 08:10	20-Jun-2024 10:00
						VA24B4763-001	VA24B4763-002	VA24B4763-003	VA24B4763-004	VA24B4763-005
						Result	Result	Result	Result	Result
Total Metals										
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0192	0.0115	0.00581	0.00809	0.00585
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.048	0.020	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000212	<0.0000100 DLM	<0.0000050	0.0000227	<0.0000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		14.4	36.1	16.8	15.6	16.9
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00405	0.00621	0.00099	0.00195	0.00103
Iron, total	7439-89-6	E420/VA	0.030	mg/L		0.077	0.045	0.044	0.071	0.050
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000089	<0.000050	<0.000050	0.000081	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		2.78	5.59	2.18	2.19	2.18
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.0330	0.00523	0.00736	0.00497	0.00766
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000928	0.00636	0.000411	0.000496	0.000425
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00058	<0.00050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.497	1.14	0.537	0.586	0.540
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000225	0.000524	0.000129	0.000159	0.000124
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.34	3.20	1.70	2.08	1.79
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.65	7.29	1.02	1.11	1.03
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.139	0.249	0.138	0.116	0.136
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000044	0.000205	0.000158	0.000132	0.000160
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	0.00147	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	0.0056	<0.0030
Dissolved Metals										

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-06	MP_POL-P2_WS-1_2024-06	MP_QUL-ZOO-1_WS-1_2024-06	MP_QUL-ZOO-7_WS-1_2024-06	MP_QUL-ZOO-1_WS-1X_2024-06
					Client sampling date / time	19-Jun-2024 16:40	19-Jun-2024 11:00	20-Jun-2024 10:00	20-Jun-2024 08:10	20-Jun-2024 10:00
						VA24B4763-001	VA24B4763-002	VA24B4763-003	VA24B4763-004	VA24B4763-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0074	0.0055	0.0088	0.0134	0.0079
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00030	0.00050	<0.00010	0.00016	0.00011
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.0166	0.00981	0.00547	0.00618	0.00560
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.044	0.018	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		0.0000123	<0.0000050	0.0000099	0.0000115	0.0000059
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		14.2	35.4	16.8	15.9	17.0
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00188	0.00409	0.00064	0.00084	0.00064
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	<0.030	<0.030
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		2.61	5.64	2.04	2.04	2.05
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.0249	0.00253	0.00118	0.00173	0.00103
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000944	0.00614	0.000424	0.000484	0.000373
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.467	1.11	0.520	0.566	0.522
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000199	0.000460	0.000124	0.000174	0.000138
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.16	2.99	1.67	1.94	1.67
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		2.59	7.34	0.965	1.10	0.979
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.126	0.234	0.127	0.109	0.128
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000040	0.000206	0.000161	0.000129	0.000157

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-06	MP_POL-P2_WS-1_2024-06	MP_QUL-ZOO-1_WS-1_2024-06	MP_QUL-ZOO-7_WS-1_2024-06	MP_QUL-ZOO-1_WS-1X_2024-06
					Client sampling date / time	19-Jun-2024 16:40	19-Jun-2024 11:00	20-Jun-2024 10:00	20-Jun-2024 08:10	20-Jun-2024 10:00
						VA24B4763-001	VA24B4763-002	VA24B4763-003	VA24B4763-004	VA24B4763-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	0.00128	<0.00050	<0.00050	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	0.0059	<0.0030
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B4763**	Page	: 1 of 19
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04- Task 5	Date Samples Received	: 21-Jun-2024 10:45
PO	: 5590017616	Issue Date	: 03-Jul-2024 09:59
C-O-C number	: ----		
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-06	E298	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1X_2024-06	E298	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-06	E298	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_BOL-B2_WS-1_2024-06	E298	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1_2024-06	E298	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1_2024-06	E235.Cl	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E235.Cl	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E235.Cl	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
MP_BOL-B2_WS-1_2024-06	E235.Cl	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
MP_POL-P2_WS-1_2024-06	E235.Cl	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E378-U	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-ZOO-1_WS-1X_2024-06	E378-U	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E378-U	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_BOL-B2_WS-1_2024-06	E378-U	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_POL-P2_WS-1_2024-06	E378-U	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E235.F	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E235.F	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1_2024-06	E235.F	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_BOL-B2_WS-1_2024-06	E235.F	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_POL-P2_WS-1_2024-06	E235.F	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-1_WS-1_2024-06	E235.NO3-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E235.NO3-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-7_WS-1_2024-06	E235.NO3-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_BOL-B2_WS-1_2024-06	E235.NO3-L	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_POL-P2_WS-1_2024-06	E235.NO3-L	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	4 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E235.NO2-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-1_WS-1X_2024-06	E235.NO2-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E235.NO2-L	20-Jun-2024	22-Jun-2024	3 days	2 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_BOL-B2_WS-1_2024-06	E235.NO2-L	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_POL-P2_WS-1_2024-06	E235.NO2-L	19-Jun-2024	22-Jun-2024	3 days	3 days	✓	23-Jun-2024	3 days	4 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E235.SO4	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-ZOO-1_WS-1X_2024-06	E235.SO4	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E235.SO4	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	23-Jun-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_BOL-B2_WS-1_2024-06	E235.SO4	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_POL-P2_WS-1_2024-06	E235.SO4	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	23-Jun-2024	28 days	4 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-1_WS-1_2024-06	E375-T	20-Jun-2024	28-Jun-2024	28 days	8 days	✓	02-Jul-2024	28 days	12 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-1_WS-1X_2024-06	E375-T	20-Jun-2024	28-Jun-2024	28 days	8 days	✓	02-Jul-2024	28 days	12 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-7_WS-1_2024-06	E375-T	20-Jun-2024	28-Jun-2024	28 days	8 days	✓	02-Jul-2024	28 days	12 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_BOL-B2_WS-1_2024-06	E375-T	19-Jun-2024	28-Jun-2024	28 days	9 days	✓	02-Jul-2024	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_POL-P2_WS-1_2024-06	E375-T	19-Jun-2024	28-Jun-2024	28 days	9 days	✓	02-Jul-2024	28 days	13 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-1_WS-1_2024-06	E366	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-1_WS-1X_2024-06	E366	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-7_WS-1_2024-06	E366	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	28-Jun-2024	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_BOL-B2_WS-1_2024-06	E366	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_POL-P2_WS-1_2024-06	E366	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	28-Jun-2024	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-1_WS-1_2024-06	E372-U	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	01-Jul-2024	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-1_WS-1X_2024-06	E372-U	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	01-Jul-2024	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_QUL-ZOO-7_WS-1_2024-06	E372-U	20-Jun-2024	27-Jun-2024	28 days	7 days	✓	01-Jul-2024	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_BOL-B2_WS-1_2024-06	E372-U	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	01-Jul-2024	28 days	12 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_POL-P2_WS-1_2024-06	E372-U	19-Jun-2024	27-Jun-2024	28 days	8 days	✓	01-Jul-2024	28 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-ZOO-1_WS-1_2024-06	E421	20-Jun-2024	25-Jun-2024	180 days	5 days	✓	27-Jun-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-ZOO-1_WS-1X_2024-06	E421	20-Jun-2024	25-Jun-2024	180 days	5 days	✓	27-Jun-2024	180 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-ZOO-7_WS-1_2024-06	E421	20-Jun-2024	25-Jun-2024	180 days	5 days	✓	27-Jun-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_BOL-B2_WS-1_2024-06	E421	19-Jun-2024	25-Jun-2024	180 days	6 days	✓	27-Jun-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_POL-P2_WS-1_2024-06	E421	19-Jun-2024	25-Jun-2024	180 days	6 days	✓	27-Jun-2024	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-1_WS-1_2024-06	E358-L	20-Jun-2024	28-Jun-2024	28 days	8 days	✓	29-Jun-2024	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-1_WS-1X_2024-06	E358-L	20-Jun-2024	28-Jun-2024	28 days	8 days	✓	29-Jun-2024	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_BOL-B2_WS-1_2024-06	E358-L	19-Jun-2024	28-Jun-2024	28 days	9 days	✓	29-Jun-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_POL-P2_WS-1_2024-06	E358-L	19-Jun-2024	28-Jun-2024	28 days	9 days	✓	29-Jun-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-7_WS-1_2024-06	E358-L	20-Jun-2024	28-Jun-2024	28 days	9 days	✓	29-Jun-2024	28 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E290	20-Jun-2024	22-Jun-2024	14 days	2 days	✓	24-Jun-2024	14 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E290	20-Jun-2024	22-Jun-2024	14 days	2 days	✓	24-Jun-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-7_WS-1_2024-06	E290	20-Jun-2024	22-Jun-2024	14 days	2 days	✓	24-Jun-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_BOL-B2_WS-1_2024-06	E290	19-Jun-2024	22-Jun-2024	14 days	3 days	✓	24-Jun-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_POL-P2_WS-1_2024-06	E290	19-Jun-2024	22-Jun-2024	14 days	3 days	✓	24-Jun-2024	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-1_WS-1_2024-06	E100	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	24-Jun-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E100	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	24-Jun-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-7_WS-1_2024-06	E100	20-Jun-2024	22-Jun-2024	28 days	2 days	✓	24-Jun-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_BOL-B2_WS-1_2024-06	E100	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	24-Jun-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_POL-P2_WS-1_2024-06	E100	19-Jun-2024	22-Jun-2024	28 days	3 days	✓	24-Jun-2024	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-1_WS-1_2024-06	E108	20-Jun-2024	22-Jun-2024	0.25 hrs	53 hrs	× EHTR-FM	24-Jun-2024	0.25 hrs	97 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E108	20-Jun-2024	22-Jun-2024	0.25 hrs	53 hrs	× EHTR-FM	24-Jun-2024	0.25 hrs	97 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-7_WS-1_2024-06	E108	20-Jun-2024	22-Jun-2024	0.25 hrs	54 hrs	× EHTR-FM	24-Jun-2024	0.25 hrs	98 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_BOL-B2_WS-1_2024-06	E108	19-Jun-2024	22-Jun-2024	0.25 hrs	70 hrs	× EHTR-FM	24-Jun-2024	0.25 hrs	114 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_POL-P2_WS-1_2024-06	E108	19-Jun-2024	22-Jun-2024	0.25 hrs	76 hrs	× EHTR-FM	24-Jun-2024	0.25 hrs	120 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_BOL-B2_WS-1_2024-06	E162	19-Jun-2024	----	----	----		26-Jun-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_POL-P2_WS-1_2024-06	E162	19-Jun-2024	----	----	----		26-Jun-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-ZOO-1_WS-1_2024-06	E162	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-ZOO-1_WS-1X_2024-06	E162	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E162	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_BOL-B2_WS-1_2024-06	E164	19-Jun-2024	----	----	----		25-Jun-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_POL-P2_WS-1_2024-06	E164	19-Jun-2024	----	----	----		25-Jun-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_QUL-ZOO-1_WS-1_2024-06	E164	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_QUL-ZOO-1_WS-1X_2024-06	E164	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_QUL-ZOO-7_WS-1_2024-06	E164	20-Jun-2024	----	----	----		27-Jun-2024	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_BOL-B2_WS-1_2024-06	E121	19-Jun-2024	----	----	----		22-Jun-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_POL-P2_WS-1_2024-06	E121	19-Jun-2024	----	----	----		22-Jun-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-06	E121	20-Jun-2024	----	----	----		23-Jun-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-ZOO-1_WS-1X_2024-06	E121	20-Jun-2024	----	----	----		23-Jun-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-06	E121	20-Jun-2024	----	----	----		23-Jun-2024	3 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-ZOO-1_WS-1_2024-06	E420	20-Jun-2024	26-Jun-2024	180 days	6 days	✓	28-Jun-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-ZOO-1_WS-1X_2024-06	E420	20-Jun-2024	26-Jun-2024	180 days	6 days	✓	28-Jun-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-ZOO-7_WS-1_2024-06	E420	20-Jun-2024	26-Jun-2024	180 days	6 days	✓	28-Jun-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_BOL-B2_WS-1_2024-06	E420	19-Jun-2024	26-Jun-2024	180 days	7 days	✓	28-Jun-2024	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_POL-P2_WS-1_2024-06	E420	19-Jun-2024	26-Jun-2024	180 days	7 days	✓	28-Jun-2024	180 days	9 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1509312	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	1518337	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1509315	1	11	9.0	5.0	✓
Conductivity in Water	E100	1509313	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1510023	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1521129	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1509321	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1509314	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1509317	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1509318	1	11	9.0	5.0	✓
pH by Meter	E108	1509311	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1509319	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1515353	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1519730	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1509939	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1518332	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1518342	1	17	5.8	5.0	✓
Turbidity by Nephelometry	E121	1509405	2	27	7.4	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1509312	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	1518337	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1509315	1	11	9.0	5.0	✓
Conductivity in Water	E100	1509313	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1510023	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1521129	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1509321	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1509314	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1509317	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1509318	1	11	9.0	5.0	✓
pH by Meter	E108	1509311	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1509319	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1515353	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1519730	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1509939	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1518332	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1518342	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1514076	2	39	5.1	5.0	✓
Turbidity by Nephelometry	E121	1509405	2	27	7.4	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1509312	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	1518337	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1509315	1	11	9.0	5.0	✓
Conductivity in Water	E100	1509313	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1510023	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1521129	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1509321	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1509314	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1509317	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1509318	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1509319	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1515353	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1519730	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1509939	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1518332	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1518342	1	17	5.8	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1514076	2	39	5.1	5.0	✓
Turbidity by Nephelometry	E121	1509405	2	27	7.4	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1518337	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1509315	1	11	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1510023	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1521129	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1509321	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1509314	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1509317	1	10	10.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1509318	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1509319	1	11	9.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1519730	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1509939	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1518332	1	11	9.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1518342	1	17	5.8	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Calgary	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Calgary	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24B4763**	Page	: 1 of 17
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04- Task 5	Date Samples Received	: 21-Jun-2024 10:45
PO	: 5590017616	Date Analysis Commenced	: 22-Jun-2024
C-O-C number	: ----	Issue Date	: 03-Jul-2024 09:59
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Elke Tabora	Lab Analyst	Calgary Inorganics, Calgary, Alberta
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Leon Yang	Analyst	Vancouver Inorganics, Burnaby, British Columbia
Ruifang Zheng	Analyst	Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1509311)											
FJ2401772-005	Anonymous	pH	----	E108	0.10	pH units	8.19	8.19	0.00%	4%	----
Physical Tests (QC Lot: 1509312)											
FJ2401772-005	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.6	82.6	0.00%	20%	----
Physical Tests (QC Lot: 1509313)											
FJ2401772-005	Anonymous	Conductivity	----	E100	2.0	µS/cm	173	173	0.0578%	10%	----
Physical Tests (QC Lot: 1509405)											
FJ2401772-004	Anonymous	Turbidity	----	E121	0.10	NTU	8.93	9.16	2.54%	15%	----
Physical Tests (QC Lot: 1509927)											
VA24B4664-003	Anonymous	Turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1515353)											
VA24B4645-003	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	960	941	1.95%	20%	----
Physical Tests (QC Lot: 1518785)											
KS2402338-009	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	63	61	2	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1509314)											
FJ2401772-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.064	0.060	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1509315)											
FJ2401772-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.94	0.84	0.11	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1509317)											
FJ2401772-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.272	0.271	0.103%	20%	----
Anions and Nutrients (QC Lot: 1509318)											
FJ2401772-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1509319)											
FJ2401772-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	87.0	87.3	0.306%	20%	----
Anions and Nutrients (QC Lot: 1509321)											
FJ2401772-003	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1518332)											
KS2402352-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.136	0.135	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1518337)											
FJ2401815-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1518342)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1518342) - continued											
FJ2401815-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0073	0.0073	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1519730)											
VA24B4745-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0182	0.0186	0.0005	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1521129)											
VA24B4727-007	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	12.6	12.9	2.76%	20%	----
Total Metals (QC Lot: 1509939)											
KS2402356-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0100	mg/L	0.511	0.486	5.01%	20%	----
		Antimony, total	7440-36-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00138	0.00131	5.26%	20%	----
		Barium, total	7440-39-3	E420	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	15.5	14.9	3.97%	20%	----
		Chromium, total	7440-47-3	E420	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00015	0.00015	0.000005	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.00146	0.00143	0.00004	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.030	mg/L	0.469	0.452	3.77%	20%	----
		Lead, total	7439-92-1	E420	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0023	0.0022	0.0001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	6.40	6.20	3.08%	20%	----
		Manganese, total	7439-96-5	E420	0.00200	mg/L	0.00271	0.00263	0.00008	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00103	0.000978	5.36%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00078	0.00074	0.00003	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	0.719	0.710	0.009	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	15.6	15.3	2.04%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	0.000013	<0.000010	0.000003	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	2.00	mg/L	11.5	11.1	0.330	Diff <2x LOR	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0498	0.0489	1.84%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.0144	0.0135	6.37%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1509939) - continued											
KS2402356-001	Anonymous	Uranium, total	7440-61-1	E420	0.000100	mg/L	0.000129	0.000129	0.0000004	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.0172	0.0165	4.21%	20%	----
		Zinc, total	7440-66-6	E420	0.0500	mg/L	<0.0500	<0.0500	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1510023)											
VA24B4752-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.418	0.407	2.64%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00159	0.00163	2.63%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00686	0.00679	1.11%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0335	0.0320	4.43%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000300	mg/L	<0.0000300	<0.0000300	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	63.1	61.4	2.60%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00527	0.00518	1.86%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.012	0.012	0.0003	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000528	0.000527	0.0951%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0029	0.0028	0.00006	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.0473	0.0448	0.0025	Diff <2x LOR	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00152	0.00159	4.33%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0268	0.0273	1.73%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00224	0.00219	0.00005	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	7.22	7.19	0.434%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000551	0.000594	7.52%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	8.66	8.60	0.760%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	25.8	25.2	2.42%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.04	1.08	3.43%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00086	0.00085	0.000004	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00065	0.00041	0.00024	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00990	0.00966	2.45%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1510023) - continued											
VA24B4752-001	Anonymous	Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0060	0.0060	0.00010	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1509312)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1509313)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1509405)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1509927)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1514076)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1515353)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1517071)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1518785)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1509314)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1509315)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1509317)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1509318)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1509319)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1509321)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1518332)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1518337)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1518342)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1518342) - continued						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1519730)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1521129)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1509939)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1509939) - continued						
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1510023)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1509311)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1509312)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1509313)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	102	90.0	110	----
Physical Tests (QCLot: 1509405)									
Turbidity	----	E121	0.1	NTU	200 NTU	101	85.0	115	----
Physical Tests (QCLot: 1509927)									
Turbidity	----	E121	0.1	NTU	200 NTU	101	85.0	115	----
Physical Tests (QCLot: 1514076)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1515353)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	99.8	85.0	115	----
Physical Tests (QCLot: 1517071)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	98.8	85.0	115	----
Physical Tests (QCLot: 1518785)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1509314)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 1509315)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1509317)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1509318)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 1509319)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1509321)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	92.6	80.0	120	----
Anions and Nutrients (QCLot: 1518332)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	107	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1518337)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.2	85.0	115	----
Anions and Nutrients (QCLot: 1518342)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	87.6	80.0	120	----
Anions and Nutrients (QCLot: 1519730)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.03 mg/L	94.3	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1521129)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Total Metals (QCLot: 1509939)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.4	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.7	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	94.3	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	108	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.9	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	106	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	113	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.5	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	112	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	115	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	99.9	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1509939) - continued									
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.3	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.9	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	105	80.0	120	----
Dissolved Metals (QCLot: 1510023)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.8	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.8	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	98.9	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	96.5	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	93.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.3	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.9	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.1	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.8	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	90.9	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.9	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.0	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.5	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.2	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	94.3	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100.0	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1510023) - continued									
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.2	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1509314)										
FJ2401772-004	Anonymous	Fluoride	16984-48-8	E235.F	5.16 mg/L	5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1509315)										
FJ2401772-004	Anonymous	Chloride	16887-00-6	E235.Cl	512 mg/L	500 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1509317)										
FJ2401772-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.7 mg/L	12.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1509318)										
FJ2401772-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.64 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1509319)										
FJ2401772-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1509321)										
FJ2401772-004	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0296 mg/L	0.03 mg/L	98.6	70.0	130	----
Anions and Nutrients (QCLot: 1518332)										
KS2402352-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.431 mg/L	0.4 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 1518337)										
FJ2401815-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0971 mg/L	0.1 mg/L	97.1	75.0	125	----
Anions and Nutrients (QCLot: 1518342)										
FJ2401815-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1519730)										
VA24B4745-003	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	ND mg/L	----	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1521129)										
VA24B4727-007	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Total Metals (QCLot: 1509939)										
VA24B4745-001	Anonymous	Aluminum, total	7429-90-5	E420	0.189 mg/L	0.2 mg/L	94.3	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0196 mg/L	0.02 mg/L	98.3	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0386 mg/L	0.04 mg/L	96.5	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00909 mg/L	0.01 mg/L	90.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.097 mg/L	0.1 mg/L	97.1	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1509939) - continued										
VA24B4745-001	Anonymous	Copper, total	7440-50-8	E420	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		Iron, total	7439-89-6	E420	1.94 mg/L	2 mg/L	97.0	70.0	130	----
		Lead, total	7439-92-1	E420	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0905 mg/L	0.1 mg/L	90.5	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	----	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0374 mg/L	0.04 mg/L	93.5	70.0	130	----
		Potassium, total	7440-09-7	E420	3.69 mg/L	4 mg/L	92.2	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		Silicon, total	7440-21-3	E420	8.92 mg/L	10 mg/L	89.2	70.0	130	----
		Silver, total	7440-22-4	E420	0.00405 mg/L	0.004 mg/L	101	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00370 mg/L	0.004 mg/L	92.4	70.0	130	----
		Tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0389 mg/L	0.04 mg/L	97.4	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Zinc, total	7440-66-6	E420	0.392 mg/L	0.4 mg/L	98.1	70.0	130	----
Dissolved Metals (QCLot: 1510023)										
VA24B4760-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0382 mg/L	0.04 mg/L	95.5	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00879 mg/L	0.01 mg/L	87.9	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.092 mg/L	0.1 mg/L	91.7	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00383 mg/L	0.004 mg/L	95.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0173 mg/L	0.02 mg/L	86.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.86 mg/L	2 mg/L	93.1	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0180 mg/L	0.02 mg/L	89.9	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0994 mg/L	0.1 mg/L	99.4	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	----	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0354 mg/L	0.04 mg/L	88.6	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	----	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00363 mg/L	0.004 mg/L	90.7	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1510023) - continued										
VA24B4760-001	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00353 mg/L	0.004 mg/L	88.4	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0989 mg/L	0.1 mg/L	98.9	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.369 mg/L	0.4 mg/L	92.2	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca

Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;

Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA24-MPMC100-007
Job #:	
PO / AFE:	24-04 Task 5
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang

Sampler: SLA SJM.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1 (F)	Total Metals	Dissolved Metals (F)	TN, NH3 (P)	DOC (F/P)	TSS (Whole Bottle)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_BOL-B2_WS[redacted]-1_2024-06	19-Jun-24	16:40	Water	6	R	R	R	R	R	R			
	MP_POL-P2_WS[redacted]-1_2024-06	19-Jun-24	11:00	Water	6	R	R	R	R	R	R			
	MP_QUL-ZOO-1_WS[redacted]-1_2024-06	20-Jun-24	10:00	Water	6	R	R	R	R	R	R			
	MP_QUL-ZOO-7_WS[redacted]-1_2024-06	20-Jun-24	8:10	Water	6	R	R	R	R	R	R			
	MP_QUL-ZOO-1_WS[redacted]-1X_2024-06	20-Jun-24	10:00	Water	6	R	R	R	R	R	R			

Environmental Division
Vancouver
Work Order Reference
VA24B4763

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please also report N+N Calc.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	15°C

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
S. Latimer	20-Jun-24	10:30

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	JUN 2 2024	10:44

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

WATER QUALITY

ALS Laboratory Report VA24B8050

(Finalized August 2, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B8050**	Page	: 1 of 6
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 24-Jul-2024 08:10
PO	: 5590017616	Date Analysis Commenced	: 25-Jul-2024
C-O-C number	: ----	Issue Date	: 02-Aug-2024 16:48
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Robert Nguyen	Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (02/08/2024): This report has been amended as a result of a request to change sample identification numbers for VA24B8050-003. All analysis results are as per the previous report.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_WS-1_2024-07	MP_POL-P2_WS-1X_2024-07	MP_Travel_WS-1_2024-07	----	----
					Client sampling date / time	23-Jul-2024 10:15	23-Jul-2024 10:15	23-Jul-2024 10:15	----	----
						VA24B8050-001	VA24B8050-002	VA24B8050-003	--------	--------
						Result	Result	Result	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		91.4	91.5	<1.0	----	----
Conductivity	----	E100/VA	2.0	µS/cm		240	241	<2.0	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		107	108	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		120	119	<0.50	----	----
pH	----	E108/VA	0.10	pH units		7.94	7.99	5.36	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		186	181	<10	----	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		1.3	1.2	<1.1	----	----
Turbidity	----	E121/VA	0.10	NTU		0.76	0.82	<0.10	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		<0.0050	0.0053	<0.0050	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		0.82	0.82	<0.50	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.076	0.076	<0.020	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0050	<0.0050	<0.0050	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		<0.0051	<0.0051	<0.0051	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.266	0.263	<0.030	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0125	0.0093	<0.0020	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0062	0.0056	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		33.7	33.6	<0.30	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		7.38	7.00	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0190	0.0226	<0.0030	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00055	0.00056	<0.00010	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0108	0.0106	<0.00010	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_WS-1_2024-07	MP_POL-P2_WS-1X_2024-07	MP_Travel_WS-1_2024-07	----	----
					Client sampling date / time	23-Jul-2024 10:15	23-Jul-2024 10:15	23-Jul-2024 10:15	----	----
						VA24B8050-001	VA24B8050-002	VA24B8050-003	--------	--------
						Result	Result	Result	----	----
Total Metals										
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.021	0.021	<0.010	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000076	0.0000123	<0.0000050	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		39.0	38.5	<0.050	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00399	0.00427	<0.00050	----	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L		<0.030	<0.030	<0.030	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		5.41	5.61	<0.100	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00433	0.00460	<0.00010	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00624	0.00631	<0.000050	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.970	0.993	<0.050	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000457	0.000451	<0.000050	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		3.16	3.20	<0.10	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		6.98	7.16	<0.050	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.246	0.258	<0.00020	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000188	0.000192	<0.000010	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00140	0.00146	<0.00050	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0033	0.0034	----	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00054	0.00052	----	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00937	0.00973	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_WS-1_2024-07	MP_POL-P2_WS-1X_2024-07	MP_Travel_WS-1_2024-07	----	----
					Client sampling date / time	23-Jul-2024 10:15	23-Jul-2024 10:15	23-Jul-2024 10:15	----	----
						VA24B8050-001	VA24B8050-002	VA24B8050-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	----	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.022	0.022	----	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000150 DLM	<0.0000150 DLM	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		35.1	35.4	----	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00330	0.00340	----	----	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	----	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		4.71	4.74	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00178	0.00176	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.00621	0.00629	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		1.02	1.03	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000604	0.000560	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		2.91	2.87	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		6.52	6.60	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.244	0.244	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000196	0.000190	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		0.00126	0.00127	----	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B8050**	Page	: 1 of 15
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 24-Jul-2024 08:10
PO	: 5590017616	Issue Date	: 02-Aug-2024 16:48
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1_2024-07	E298	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1X_2024-07	E298	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MP_Travel_WS-1_2024-07	E298	23-Jul-2024	26-Jul-2024	3 days	3 days	✓	26-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_POL-P2_WS-1_2024-07	E235.Cl	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_POL-P2_WS-1X_2024-07	E235.Cl	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_Travel_WS-1_2024-07	E235.Cl	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_POL-P2_WS-1_2024-07	E378-U	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_POL-P2_WS-1X_2024-07	E378-U	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_Travel_WS-1_2024-07	E378-U	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_POL-P2_WS-1_2024-07	E235.F	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_POL-P2_WS-1X_2024-07	E235.F	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_Travel_WS-1_2024-07	E235.F	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_POL-P2_WS-1_2024-07	E235.NO3-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_POL-P2_WS-1X_2024-07	E235.NO3-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_Travel_WS-1_2024-07	E235.NO3-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_POL-P2_WS-1_2024-07	E235.NO2-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_POL-P2_WS-1X_2024-07	E235.NO2-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_Travel_WS-1_2024-07	E235.NO2-L	23-Jul-2024	25-Jul-2024	3 days	2 days	✓	25-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_POL-P2_WS-1_2024-07	E235.SO4	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_POL-P2_WS-1X_2024-07	E235.SO4	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_Travel_WS-1_2024-07	E235.SO4	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_POL-P2_WS-1_2024-07	E375-T	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_POL-P2_WS-1X_2024-07	E375-T	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1_2024-07	E366	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	30-Jul-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1X_2024-07	E366	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	30-Jul-2024	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved) MP_Travel_WS-1_2024-07	E366	23-Jul-2024	26-Jul-2024	3 days	3 days	✓	30-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1_2024-07	E372-U	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1X_2024-07	E372-U	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved) MP_Travel_WS-1_2024-07	E372-U	23-Jul-2024	26-Jul-2024	3 days	3 days	✓	26-Jul-2024	28 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_POL-P2_WS-1_2024-07	E421	23-Jul-2024	27-Jul-2024	180 days	4 days	✓	28-Jul-2024	180 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_POL-P2_WS-1X_2024-07	E421	23-Jul-2024	27-Jul-2024	180 days	4 days	✓	28-Jul-2024	180 days	5 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_POL-P2_WS-1_2024-07	E358-L	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_POL-P2_WS-1X_2024-07	E358-L	23-Jul-2024	26-Jul-2024	28 days	3 days	✓	26-Jul-2024	28 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_POL-P2_WS-1_2024-07	E290	23-Jul-2024	25-Jul-2024	14 days	2 days	✓	25-Jul-2024	14 days	2 days	✓

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_POL-P2_WS-1X_2024-07	E290	23-Jul-2024	25-Jul-2024	14 days	2 days	✓	25-Jul-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_Travel_WS-1_2024-07	E290	23-Jul-2024	25-Jul-2024	14 days	2 days	✓	25-Jul-2024	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_POL-P2_WS-1_2024-07	E100	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_POL-P2_WS-1X_2024-07	E100	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_Travel_WS-1_2024-07	E100	23-Jul-2024	25-Jul-2024	28 days	2 days	✓	25-Jul-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
MP_POL-P2_WS-1_2024-07	E108	23-Jul-2024	25-Jul-2024	0.25 hrs	48 hrs	✖ EHTR-FM	25-Jul-2024	0.25 hrs	50 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
MP_POL-P2_WS-1X_2024-07	E108	23-Jul-2024	25-Jul-2024	0.25 hrs	48 hrs	✖ EHTR-FM	25-Jul-2024	0.25 hrs	50 hrs	✖ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
MP_Travel_WS-1_2024-07	E108	23-Jul-2024	25-Jul-2024	0.25 hrs	48 hrs	✖ EHTR-FM	25-Jul-2024	0.25 hrs	50 hrs	✖ EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE										
MP_POL-P2_WS-1_2024-07	E162	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE MP_POL-P2_WS-1X_2024-07	E162	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_Travel_WS-1_2024-07	E162	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_POL-P2_WS-1_2024-07	E164	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_POL-P2_WS-1X_2024-07	E164	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_Travel_WS-1_2024-07	E164	23-Jul-2024	----	----	----		30-Jul-2024	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_POL-P2_WS-1_2024-07	E121	23-Jul-2024	----	----	----		26-Jul-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_POL-P2_WS-1X_2024-07	E121	23-Jul-2024	----	----	----		26-Jul-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_Travel_WS-1_2024-07	E121	23-Jul-2024	----	----	----		26-Jul-2024	3 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_POL-P2_WS-1_2024-07	E420	23-Jul-2024	29-Jul-2024	180 days	6 days	✓	30-Jul-2024	180 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_POL-P2_WS-1X_2024-07	E420	23-Jul-2024	29-Jul-2024	180 days	6 days	✓	30-Jul-2024	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_Travel_WS-1_2024-07	E420	23-Jul-2024	29-Jul-2024	180 days	6 days	✓	30-Jul-2024	180 days	7 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1563929	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1565318	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1563932	1	18	5.5	5.0	✓
Conductivity in Water	E100	1563930	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1563960	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1565319	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1563937	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1563931	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1563933	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1563934	1	20	5.0	5.0	✓
pH by Meter	E108	1563928	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1563935	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	1571542	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1565320	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1564006	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1565316	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1565317	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	1566192	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1563929	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1565318	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1563932	1	18	5.5	5.0	✓
Conductivity in Water	E100	1563930	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1563960	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1565319	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1563937	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1563931	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1563933	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1563934	1	20	5.0	5.0	✓
pH by Meter	E108	1563928	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1563935	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	1571542	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1565320	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1564006	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1565316	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1565317	1	16	6.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1571511	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1566192	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1563929	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	1565318	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1563932	1	18	5.5	5.0	✓
Conductivity in Water	E100	1563930	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1563960	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1565319	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1563937	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1563931	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1563933	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1563934	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1563935	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	1571542	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1565320	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1564006	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1565316	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1565317	1	16	6.2	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1571511	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1566192	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1565318	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	1563932	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1563960	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1565319	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1563937	1	18	5.5	5.0	✓
Fluoride in Water by IC	E235.F	1563931	1	18	5.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1563933	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1563934	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1563935	1	18	5.5	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1565320	1	15	6.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1564006	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1565316	1	17	5.8	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1565317	1	16	6.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24B8050**	Page	: 1 of 14
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
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Project	: 24-04 Task 5	Date Samples Received	: 24-Jul-2024 08:10
PO	: 5590017616	Date Analysis Commenced	: 25-Jul-2024
C-O-C number	: ----	Issue Date	: 02-Aug-2024 16:49
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Robert Nguyen	Analyst	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1563928)											
VA24B8047-001	Anonymous	pH	----	E108	0.10	pH units	7.77	7.47	3.94%	4%	----
Physical Tests (QC Lot: 1563929)											
VA24B8047-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	36.6	35.6	2.77%	20%	----
Physical Tests (QC Lot: 1563930)											
VA24B8047-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1380	1380	0.00%	10%	----
Physical Tests (QC Lot: 1566192)											
FJ2402129-001	Anonymous	Turbidity	----	E121	0.10	NTU	370	361	2.46%	15%	----
Physical Tests (QC Lot: 1571542)											
KS2402837-001	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	1830	1800	1.51%	20%	----
Anions and Nutrients (QC Lot: 1563931)											
VA24B8082-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.030	0.030	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1563932)											
VA24B8082-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.58	4.53	0.05	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1563933)											
VA24B8082-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0116	0.0122	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1563934)											
VA24B8082-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1563935)											
VA24B8082-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	5.10	5.07	0.581%	20%	----
Anions and Nutrients (QC Lot: 1563937)											
VA24B8047-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0011	<0.0010	0.00007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1565316)											
VA24B7419-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.174	0.174	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1565317)											
VA24B7419-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0050	0.0070	0.0020	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1565318)											
VA24B7419-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0119	0.0125	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1565320)											
VA24B7419-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0026	0.0024	0.0002	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1565319)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 1565319) - continued											
VA24B7419-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	3.57	3.88	0.30	Diff <2x LOR	----
Total Metals (QC Lot: 1564006)											
VA24B7997-021	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	1.00	0.946	5.66%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00022	0.00021	0.00002	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00399	0.00388	2.99%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0425	0.0472	10.4%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000086	0.000082	0.000004	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.044	0.042	0.001	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000457	0.0000404	0.0000053	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	153	148	3.42%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00172	0.00170	0.00002	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00091	0.00091	0.000004	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00396	0.00339	0.00057	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	3.71	3.68	0.802%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.00123	0.00126	2.09%	20%	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0100	0.0097	0.0003	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	69.2	69.3	0.244%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.483	0.489	1.22%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00178	0.00176	1.14%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00268	0.00264	0.00003	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	3.96	3.87	2.45%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	0.000068	0.000006	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	7.30	7.21	1.24%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	0.000061	0.000068	0.000006	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	15.8	15.6	1.40%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	1.32	1.34	1.78%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	0.000022	0.000023	0.000001	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	0.00076	0.00069	0.00007	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.0134	0.0121	9.96%	20%	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00116	0.00116	0.271%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00252	0.00238	0.00014	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0084	0.0079	0.0005	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1563960)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1563960) - continued											
VA24B8010-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0440	0.0438	0.595%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00012	0.00011	0.000010	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00405	0.00404	0.362%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.87	2.87	0.240%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00050	0.00051	0.00001	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.043	0.043	0.0004	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.262	0.262	0.102%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00161	0.00169	4.55%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000492	0.000517	4.89%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.340	0.333	0.007	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.81	4.69	2.52%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.82	1.79	1.79%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0159	0.0161	1.03%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000064	0.000063	0.0000008	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1563929)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1563930)						
Conductivity	----	E100	1	µS/cm	1.5	----
Physical Tests (QCLot: 1566192)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1571511)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1571542)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1563931)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1563932)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1563933)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1563934)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1563935)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1563937)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1565316)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1565317)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1565318)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1565320)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1565319)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1564006)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1563960)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1563960) - continued						
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1563928)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1563929)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1563930)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	99.0	90.0	110	----
Physical Tests (QCLot: 1566192)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.0	85.0	115	----
Physical Tests (QCLot: 1571511)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	94.0	85.0	115	----
Physical Tests (QCLot: 1571542)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	108	85.0	115	----
Anions and Nutrients (QCLot: 1563931)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1563932)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1563933)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1563934)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1563935)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1563937)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	92.1	80.0	120	----
Anions and Nutrients (QCLot: 1565316)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.2	75.0	125	----
Anions and Nutrients (QCLot: 1565317)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	97.0	80.0	120	----
Anions and Nutrients (QCLot: 1565318)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1565320)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	95.5	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1565319)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
Total Metals (QCLot: 1564006)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.8	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.0	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.1	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.3	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.7	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	112	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	98.6	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	95.6	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.4	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	99.5	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	101	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1563960)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.0	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	108	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	93.9	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.4	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.9	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	96.4	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	94.1	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.0	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	105	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	95.4	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.5	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.6	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.4	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	97.0	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	96.4	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.0	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	90.6	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.2	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	91.8	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1563931)										
VA24B8082-002	Anonymous	Fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1563932)										
VA24B8082-002	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1563933)										
VA24B8082-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1563934)										
VA24B8082-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.507 mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1563935)										
VA24B8082-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1563937)										
VA24B8047-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0281 mg/L	0.03 mg/L	93.6	70.0	130	----
Anions and Nutrients (QCLot: 1565316)										
VA24B7419-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.390 mg/L	0.4 mg/L	97.6	70.0	130	----
Anions and Nutrients (QCLot: 1565317)										
VA24B7419-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0482 mg/L	0.05 mg/L	96.4	70.0	130	----
Anions and Nutrients (QCLot: 1565318)										
VA24B7419-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.113 mg/L	0.1 mg/L	113	75.0	125	----
Anions and Nutrients (QCLot: 1565320)										
VA24B7419-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0463 mg/L	0.05 mg/L	92.5	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1565319)										
VA24B7419-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.06 mg/L	5 mg/L	101	70.0	130	----
Total Metals (QCLot: 1564006)										
VA24B7997-022	Anonymous	Aluminum, total	7429-90-5	E420	0.196 mg/L	0.2 mg/L	97.9	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, total	7440-39-3	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00941 mg/L	0.01 mg/L	94.1	70.0	130	----
		Boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	93.0	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		Calcium, total	7440-70-2	E420	3.93 mg/L	4 mg/L	98.2	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0197 mg/L	0.02 mg/L	98.3	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1564006) - continued										
VA24B7997-022	Anonymous	Copper, total	7440-50-8	E420	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		Iron, total	7439-89-6	E420	1.90 mg/L	2 mg/L	95.2	70.0	130	----
		Lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0960 mg/L	0.1 mg/L	96.0	70.0	130	----
		Magnesium, total	7439-95-4	E420	0.972 mg/L	1 mg/L	97.2	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		Potassium, total	7440-09-7	E420	3.88 mg/L	4 mg/L	97.0	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		Silicon, total	7440-21-3	E420	10.1 mg/L	10 mg/L	101	70.0	130	----
		Silver, total	7440-22-4	E420	0.00431 mg/L	0.004 mg/L	108	70.0	130	----
		Sodium, total	7440-23-5	E420	2.00 mg/L	2 mg/L	99.9	70.0	130	----
		Strontium, total	7440-24-6	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00361 mg/L	0.004 mg/L	90.2	70.0	130	----
		Tin, total	7440-31-5	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0376 mg/L	0.04 mg/L	93.9	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00365 mg/L	0.004 mg/L	91.3	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Zinc, total	7440-66-6	E420	0.410 mg/L	0.4 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 1563960)										
VA24B8010-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.197 mg/L	0.2 mg/L	98.6	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00918 mg/L	0.01 mg/L	91.8	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	94.3	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00400 mg/L	0.004 mg/L	100	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.95 mg/L	2 mg/L	97.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	0.934 mg/L	1 mg/L	93.4	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.12 mg/L	4 mg/L	103	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.67 mg/L	10 mg/L	96.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00419 mg/L	0.004 mg/L	105	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1563960) - continued										
VA24B8010-002	Anonymous	Sodium, dissolved	7440-23-5	E421	1.81 mg/L	2 mg/L	90.4	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00379 mg/L	0.004 mg/L	94.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00381 mg/L	0.004 mg/L	95.3	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0991 mg/L	0.1 mg/L	99.1	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.378 mg/L	0.4 mg/L	94.6	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Vancouver
Work Order Reference
VA24B8050

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge min
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge min
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge min
Street:	PO BOX 12	Email 1 or Fax gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.c	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge min
City/Province:	Likely, BC	Email 2 slatimer@minnow.ca; kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surchar
Postal Code:	V0L 1N0	Email 3 simone.derosemond@minnow.ca	Additional fees may apply to rush requests on weeker
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please
Company:		Email 1 or Fax On File	Analysis R
Contact:	On File	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-007	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 5	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	8050	ALS Contact: Can Dang	Sampler:

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1	Total Metals	Dissolved Metals	TN, NH3	DOC	TSS (Whole Bottle)	TN/NH3	Hardness	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~MP_POL-P2_WS-1_2024-07~~	~~July-24~~		~~Water~~	~~6~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~					
	MP_POL-P2_WS-1_2024-07	23-July-24	10:15	Water	6	R	R	R	R	R	R					
	MP_POL-P2_WS-1X_2024-07	23-July-24	10:15	Water	6	R	R	R	R	R	R					
	~~MP_POL-P2_WS-1_2024-07~~ MP_TRAVEL_WS-1_2024-07	23-July-24	10:15	Water	4	R	R		●	●	R	R	R			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	Please also report N+N Calc.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					8

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: SALLY JU	Date: 23-JULY-24	Time: 11:15	Received by:	Date:	Time:	Received by: Rcvd jc 24Jul2024	Date	Time: 8:10am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the wh

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WATER QUALITY

ALS Laboratory Report VA24B8516

(Finalized September 20, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B8516**	Page	: 1 of 6
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 26-Jul-2024 10:35
PO	: 5590017616	Date Analysis Commenced	: 27-Jul-2024
C-O-C number	: ----	Issue Date	: 20-Sep-2024 11:53
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Marianne Jensen	Analyst- General	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (20/09/2024): This report has been amended as a result of a request to change sample identification numbers (IDs) received by ALS for sample ALS ID -03. All analysis results are as per the previous report.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-07	MP_QUL-ZOO-7_WS-1_2024-07	MP_BOL-B2-1_WS-1_2024-07	MP_FIELD_WS-1_2024-07	----
					Client sampling date / time	24-Jul-2024 12:30	24-Jul-2024 08:00	25-Jul-2024 10:30	25-Jul-2024 10:30	----
						VA24B8516-001	VA24B8516-002	VA24B8516-003	VA24B8516-004	--------
						Result	Result	Result	Result	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		46.3	45.4	42.9	<1.0	----
Conductivity	----	E100/VA	2.0	µS/cm		101	99.2	103	<2.0	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		47.4	45.4	46.1	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		52.7	49.6	49.4	<0.50	----
pH	----	E108/VA	0.10	pH units		7.93	7.94	7.67	5.63	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		82	68	78	<10	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		1.2	<1.0	2.8	<1.0	----
Turbidity	----	E121/VA	0.10	NTU		0.46	0.71	1.50	<0.10	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0093	0.0052	0.0056	<0.0050	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		<0.50	<0.50	0.54	<0.50	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.028	0.028	0.050	<0.020	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.0584	0.0455	<0.0050	<0.0050	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		0.0584	0.0455	<0.0051	<0.0051	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.161	0.155	0.341	<0.030	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	0.0021	<0.0010	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0037	0.0087	0.0269	<0.0020	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		<0.0020	<0.0020	0.0106	<0.0020	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		5.55	5.56	8.50	<0.30	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		2.44	3.12	7.52	<0.50	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0261	0.0341	0.0503	<0.0030	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00012	0.00014	0.00041	<0.00010	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00562	0.00628	0.0183	<0.00010	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-07	MP_QUL-ZOO-7_WS-1_2024-07	MP_BOL-B2-1_WS-1_2024-07	MP_FIELD_WS-1_2024-07	----
					Client sampling date / time	24-Jul-2024 12:30	24-Jul-2024 08:00	25-Jul-2024 10:30	25-Jul-2024 10:30	----
						VA24B8516-001	VA24B8516-002	VA24B8516-003	VA24B8516-004	--------
						Result	Result	Result	Result	----
Total Metals										
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	0.046	<0.010	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	0.0000088	0.0000060	<0.0000050	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		17.8	16.6	15.1	<0.050	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00100 DLM	<0.00050	<0.00050	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00126	0.00155	0.00486	<0.00050	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L		<0.030	0.040	0.082	<0.030	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		2.00	1.98	2.83	<0.100	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00190	0.00304	0.0725	<0.00010	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000356	0.000384	0.000966	<0.000050	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	0.00070	0.00061	<0.00050	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.502	0.515	0.475	<0.050	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000142	0.000136	0.000229	<0.000050	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.58	1.56	1.31	<0.10	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		0.965	0.968	2.76	<0.050	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.126	0.117	0.130	<0.00020	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000147	0.000141	0.000040	<0.000010	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	0.0050	<0.0030	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0102	0.0102	0.0060	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-07	MP_QUL-ZOO-7_WS-1_2024-07	MP_BOL-B2-1_WS-1_2024-07	MP_FIELD_WS-1_2024-07	----
					Client sampling date / time	24-Jul-2024 12:30	24-Jul-2024 08:00	25-Jul-2024 10:30	25-Jul-2024 10:30	----
						VA24B8516-001	VA24B8516-002	VA24B8516-003	VA24B8516-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00010	0.00013	0.00035	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00551	0.00555	0.0166	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	<0.010	0.041	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	0.0000088	<0.0000050	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		15.9	15.1	14.2	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00059	0.00066	0.00199	----	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		1.88	1.87	2.58	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00039	0.00067	0.0476	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000351	0.000391	0.000969	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	0.00051	<0.00050	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.502	0.510	0.486	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000106	0.000113	0.000194	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.48	1.50	1.21	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		0.900	0.911	2.57	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.124	0.119	0.133	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000137	0.000133	0.000038	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	0.0040	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B8516**	Page	: 1 of 17
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 26-Jul-2024 10:35
PO	: 5590017616	Issue Date	: 20-Sep-2024 11:50
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_BOL-B2-1_WS-1_2024-07	E298	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	03-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_FIELD_WS-1_2024-07	E298	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	03-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-07	E298	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	03-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-07	E298	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	03-Aug-2024	28 days	11 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_BOL-B2-1_WS-1_2024-07	E235.Cl	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_FIELD_WS-1_2024-07	E235.Cl	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1_2024-07	E235.Cl	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E235.Cl	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E378-U	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_FIELD_WS-1_2024-07	E378-U	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E378-U	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E378-U	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E235.F	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_FIELD_WS-1_2024-07	E235.F	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E235.F	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E235.F	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E235.NO3-L	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_FIELD_WS-1_2024-07	E235.NO3-L	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E235.NO3-L	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E235.NO3-L	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E235.NO2-L	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_FIELD_WS-1_2024-07	E235.NO2-L	25-Jul-2024	27-Jul-2024	3 days	2 days	✓	27-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E235.NO2-L	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E235.NO2-L	24-Jul-2024	27-Jul-2024	3 days	3 days	✓	27-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E235.SO4	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_FIELD_WS-1_2024-07	E235.SO4	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E235.SO4	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E235.SO4	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_BOL-B2-1_WS-1_2024-07	E375-T	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	07-Aug-2024	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_FIELD_WS-1_2024-07	E375-T	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	07-Aug-2024	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-1_WS-1_2024-07	E375-T	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	07-Aug-2024	28 days	14 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-ZOO-7_WS-1_2024-07	E375-T	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	07-Aug-2024	28 days	14 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_BOL-B2-1_WS-1_2024-07	E366	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	03-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_FIELD_WS-1_2024-07	E366	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	03-Aug-2024	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-07	E366	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	03-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-07	E366	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	03-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_BOL-B2-1_WS-1_2024-07	E372-U	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	07-Aug-2024	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_FIELD_WS-1_2024-07	E372-U	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	07-Aug-2024	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-07	E372-U	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	07-Aug-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-07	E372-U	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	07-Aug-2024	28 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_BOL-B2-1_WS-1_2024-07	E421	25-Jul-2024	31-Jul-2024	180 days	6 days	✓	03-Aug-2024	180 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-ZOO-1_WS-1_2024-07	E421	24-Jul-2024	31-Jul-2024	180 days	7 days	✓	03-Aug-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-ZOO-7_WS-1_2024-07	E421	24-Jul-2024	31-Jul-2024	180 days	7 days	✓	03-Aug-2024	180 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_BOL-B2-1_WS-1_2024-07	E358-L	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	02-Aug-2024	28 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_FIELD_WS-1_2024-07	E358-L	25-Jul-2024	02-Aug-2024	28 days	8 days	✓	02-Aug-2024	28 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-07	E358-L	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	02-Aug-2024	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-07	E358-L	24-Jul-2024	02-Aug-2024	28 days	9 days	✓	02-Aug-2024	28 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_BOL-B2-1_WS-1_2024-07	E290	25-Jul-2024	27-Jul-2024	14 days	2 days	✓	27-Jul-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_FIELD_WS-1_2024-07	E290	25-Jul-2024	27-Jul-2024	14 days	2 days	✓	27-Jul-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-1_WS-1_2024-07	E290	24-Jul-2024	27-Jul-2024	14 days	3 days	✓	27-Jul-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-7_WS-1_2024-07	E290	24-Jul-2024	27-Jul-2024	14 days	3 days	✓	27-Jul-2024	14 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_BOL-B2-1_WS-1_2024-07	E100	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE MP_FIELD_WS-1_2024-07	E100	25-Jul-2024	27-Jul-2024	28 days	2 days	✓	27-Jul-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-1_WS-1_2024-07	E100	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-7_WS-1_2024-07	E100	24-Jul-2024	27-Jul-2024	28 days	3 days	✓	27-Jul-2024	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE MP_BOL-B2-1_WS-1_2024-07	E108	25-Jul-2024	27-Jul-2024	0.25 hrs	48 hrs	× EHTR-FM	27-Jul-2024	0.25 hrs	50 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_FIELD_WS-1_2024-07	E108	25-Jul-2024	27-Jul-2024	0.25 hrs	48 hrs	× EHTR-FM	27-Jul-2024	0.25 hrs	50 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-1_WS-1_2024-07	E108	24-Jul-2024	27-Jul-2024	0.25 hrs	70 hrs	× EHTR-FM	27-Jul-2024	0.25 hrs	72 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-7_WS-1_2024-07	E108	24-Jul-2024	27-Jul-2024	0.25 hrs	75 hrs	× EHTR-FM	27-Jul-2024	0.25 hrs	77 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_BOL-B2-1_WS-1_2024-07	E162	25-Jul-2024	----	----	----		01-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_FIELD_WS-1_2024-07	E162	25-Jul-2024	----	----	----		01-Aug-2024	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E162	24-Jul-2024	----	----	----		31-Jul-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E162	24-Jul-2024	----	----	----		31-Jul-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_BOL-B2-1_WS-1_2024-07	E164	25-Jul-2024	----	----	----		01-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_FIELD_WS-1_2024-07	E164	25-Jul-2024	----	----	----		01-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_QUL-ZOO-1_WS-1_2024-07	E164	24-Jul-2024	----	----	----		31-Jul-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_QUL-ZOO-7_WS-1_2024-07	E164	24-Jul-2024	----	----	----		31-Jul-2024	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_BOL-B2-1_WS-1_2024-07	E121	25-Jul-2024	----	----	----		28-Jul-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_FIELD_WS-1_2024-07	E121	25-Jul-2024	----	----	----		28-Jul-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-ZOO-1_WS-1_2024-07	E121	24-Jul-2024	----	----	----		27-Jul-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-ZOO-7_WS-1_2024-07	E121	24-Jul-2024	----	----	----		27-Jul-2024	3 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_BOL-B2-1_WS-1_2024-07	E420	25-Jul-2024	31-Jul-2024	180 days	6 days	✓	02-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_FIELD_WS-1_2024-07	E420	25-Jul-2024	31-Jul-2024	180 days	6 days	✓	02-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-ZOO-7_WS-1_2024-07	E420	24-Jul-2024	31-Jul-2024	180 days	7 days	✓	02-Aug-2024	180 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-ZOO-1_WS-1_2024-07	E420	24-Jul-2024	31-Jul-2024	180 days	7 days	✓	02-Aug-2024	180 days	9 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1567760	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1576885	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1567766	1	20	5.0	5.0	✓
Conductivity in Water	E100	1567761	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1569391	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1576881	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1567771	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1567765	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1567767	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1567768	1	20	5.0	5.0	✓
pH by Meter	E108	1567759	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1567769	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1573986	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1576884	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1570603	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1576882	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1576883	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	1567787	2	29	6.9	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1567760	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1576885	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1567766	1	20	5.0	5.0	✓
Conductivity in Water	E100	1567761	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1569391	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1576881	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1567771	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1567765	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1567767	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1567768	1	20	5.0	5.0	✓
pH by Meter	E108	1567759	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1567769	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1573986	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1576884	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1570603	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1576882	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1576883	1	13	7.6	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1573482	2	24	8.3	5.0	✓
Turbidity by Nephelometry	E121	1567787	2	29	6.9	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1567760	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1576885	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1567766	1	20	5.0	5.0	✓
Conductivity in Water	E100	1567761	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1569391	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1576881	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1567771	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1567765	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1567767	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1567768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1567769	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1573986	2	30	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1576884	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1570603	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1576882	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1576883	1	13	7.6	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1573482	2	24	8.3	5.0	✓
Turbidity by Nephelometry	E121	1567787	2	29	6.9	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1576885	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1567766	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1569391	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1576881	1	20	5.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1567771	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1567765	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1567767	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1567768	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1567769	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1576884	1	13	7.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1570603	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1576882	1	13	7.6	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1576883	1	13	7.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

QUALITY CONTROL REPORT

Work Order	: **VA24B8516**	Page	: 1 of 17
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 26-Jul-2024 10:35
PO	: 5590017616	Date Analysis Commenced	: 27-Jul-2024
C-O-C number	: ----	Issue Date	: 20-Sep-2024 11:49
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Marianne Jensen	Analyst- General	Vancouver Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1567759)											
VA24B8493-002	Anonymous	pH	----	E108	0.10	pH units	7.85	7.85	0.00%	4%	----
Physical Tests (QC Lot: 1567760)											
VA24B8493-002	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	158	161	1.57%	20%	----
Physical Tests (QC Lot: 1567761)											
VA24B8493-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	1210	1230	1.80%	10%	----
Physical Tests (QC Lot: 1567787)											
VA24B8505-007	Anonymous	Turbidity	----	E121	0.10	NTU	18.6	17.2	8.38%	15%	----
Physical Tests (QC Lot: 1568601)											
VA24B8440-003	Anonymous	Turbidity	----	E121	0.10	NTU	1.56	1.46	6.64%	15%	----
Physical Tests (QC Lot: 1573986)											
VA24B8511-005	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	2270	2270	0.154%	20%	----
Physical Tests (QC Lot: 1574711)											
KS2402928-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	406	399	1.74%	20%	----
Anions and Nutrients (QC Lot: 1567765)											
VA24B8493-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.306	0.300	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1567766)											
VA24B8493-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	54.2	53.9	0.482%	20%	----
Anions and Nutrients (QC Lot: 1567767)											
VA24B8493-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.836	0.833	0.290%	20%	----
Anions and Nutrients (QC Lot: 1567768)											
VA24B8493-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0053	0.0059	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1567769)											
VA24B8493-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	435	432	0.494%	20%	----
Anions and Nutrients (QC Lot: 1567771)											
VA24B8501-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0100	mg/L	0.0684	0.0675	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1576882)											
VA24B8511-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.150	mg/L	4.28	4.25	0.520%	20%	----
Anions and Nutrients (QC Lot: 1576883)											
VA24B8511-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0028	0.0028	0.00004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1576884)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1576884) - continued											
VA24B8511-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1576885)											
KS2402999-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100	mg/L	3.36	3.38	0.727%	20%	----
Organic / Inorganic Carbon (QC Lot: 1576881)											
KS2402999-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.34	6.68	5.30%	20%	----
Total Metals (QC Lot: 1570603)											
VA24B8428-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	1.23	1.23	0.164%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00023	0.00025	0.00001	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00010	0.00011	0.000009	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0168	0.0172	2.44%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	0.000313	0.000316	0.000003	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00325	0.00326	0.321%	20%	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	46.2	46.0	0.280%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.0107	0.0110	2.35%	20%	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.0212	0.0211	0.617%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.016	0.024	0.009	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0112	0.0111	1.12%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	9.43	9.39	0.348%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.286	0.286	0.0329%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00441	0.00469	6.18%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.108	0.109	1.68%	20%	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.975	0.976	0.146%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.00308	0.00314	2.19%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	3.15	3.28	4.00%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	1.46	1.46	0.286%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.290	0.302	3.99%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	0.000076	0.000077	0.0000005	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1570603) - continued											
VA24B8428-001	Anonymous	Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00580	0.00591	1.95%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00079	0.00081	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.409	0.419	2.34%	20%	----
Dissolved Metals (QC Lot: 1569391)											
VA24B8462-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0014	0.0016	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00076	0.00076	0.000007	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00782	0.00798	2.08%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0154	0.0162	4.69%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.205	0.208	1.40%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000350	mg/L	<0.0000350	<0.0000350	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	190	188	1.05%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00065	0.00068	0.00002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.018	0.018	0.0005	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0051	0.0050	0.00009	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	48.5	49.5	2.15%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.153	0.157	2.47%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0446	0.0454	1.76%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00535	0.00555	3.61%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.548	0.575	4.85%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00115	0.00121	4.86%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.6	13.8	1.31%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	8.60	8.92	3.63%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.14	1.18	3.47%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000015	0.000014	0.000001	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00377	0.00395	4.71%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00065	0.00064	0.00001	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1569391) - continued											
VA24B8462-001	Anonymous	Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0047	0.0053	0.0006	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1567760)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1567761)						
Conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 1567787)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1568601)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1573482)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1573986)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1574710)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1574711)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1567765)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1567766)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1567767)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1567768)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1567769)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1567771)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1576882)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1576883)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1576884)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1576884) - continued						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1576885)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 1576881)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1570603)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1570603) - continued						
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1569391)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1567759)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1567760)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1567761)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	95.2	90.0	110	----
Physical Tests (QCLot: 1567787)									
Turbidity	----	E121	0.1	NTU	200 NTU	98.5	85.0	115	----
Physical Tests (QCLot: 1568601)									
Turbidity	----	E121	0.1	NTU	200 NTU	99.5	85.0	115	----
Physical Tests (QCLot: 1573482)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	109	85.0	115	----
Physical Tests (QCLot: 1573986)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1574710)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	97.2	85.0	115	----
Physical Tests (QCLot: 1574711)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	111	85.0	115	----
Anions and Nutrients (QCLot: 1567765)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1567766)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1567767)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 1567768)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1567769)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1567771)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	91.6	80.0	120	----
Anions and Nutrients (QCLot: 1576882)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	105	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1576883)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	94.1	80.0	120	----
Anions and Nutrients (QCLot: 1576884)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	89.9	80.0	120	----
Anions and Nutrients (QCLot: 1576885)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.2	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1576881)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	111	80.0	120	----
Total Metals (QCLot: 1570603)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.2	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.3	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	99.4	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.7	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	94.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	97.1	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	98.2	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.0	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	89.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	114	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	107	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1570603) - continued									
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.1	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	95.2	80.0	120	----
Dissolved Metals (QCLot: 1569391)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.0	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	89.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.7	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.6	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.5	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.7	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.8	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	94.8	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	93.8	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	94.6	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	94.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1569391) - continued									
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	98.1	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1567765)										
VA24B8493-002	Anonymous	Fluoride	16984-48-8	E235.F	4.96 mg/L	5 mg/L	99.3	75.0	125	----
Anions and Nutrients (QCLot: 1567766)										
VA24B8493-002	Anonymous	Chloride	16887-00-6	E235.Cl	498 mg/L	500 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 1567767)										
VA24B8493-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.4 mg/L	12.5 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 1567768)										
VA24B8493-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1567769)										
VA24B8493-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	495 mg/L	500 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 1567771)										
VA24B8501-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0280 mg/L	0.03 mg/L	93.3	70.0	130	----
Anions and Nutrients (QCLot: 1576882)										
VA24B8511-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.408 mg/L	0.4 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1576883)										
VA24B8511-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0489 mg/L	0.05 mg/L	97.8	70.0	130	----
Anions and Nutrients (QCLot: 1576884)										
VA24B8511-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0484 mg/L	0.05 mg/L	96.7	70.0	130	----
Anions and Nutrients (QCLot: 1576885)										
KS2402999-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0932 mg/L	0.1 mg/L	93.2	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1576881)										
KS2402999-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.17 mg/L	5 mg/L	103	70.0	130	----
Total Metals (QCLot: 1570603)										
VA24B8428-002	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0183 mg/L	0.02 mg/L	91.6	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0375 mg/L	0.04 mg/L	93.7	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00954 mg/L	0.01 mg/L	95.4	70.0	130	----
		Boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	98.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	ND mg/L	----	ND	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1570603) - continued										
VA24B8428-002	Anonymous	Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----
		Iron, total	7439-89-6	E420	1.97 mg/L	2 mg/L	98.5	70.0	130	----
		Lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0969 mg/L	0.1 mg/L	96.9	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Potassium, total	7440-09-7	E420	4.05 mg/L	4 mg/L	101	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, total	7440-21-3	E420	9.36 mg/L	10 mg/L	93.6	70.0	130	----
		Silver, total	7440-22-4	E420	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Sodium, total	7440-23-5	E420	2.27 mg/L	2 mg/L	114	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0985 mg/L	0.1 mg/L	98.5	70.0	130	----
		Zinc, total	7440-66-6	E420	0.360 mg/L	0.4 mg/L	90.0	70.0	130	----
Dissolved Metals (QCLot: 1569391)										
VA24B8462-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.385 mg/L	0.4 mg/L	96.2	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0791 mg/L	0.08 mg/L	98.8	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0177 mg/L	0.02 mg/L	88.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.172 mg/L	0.2 mg/L	85.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00761 mg/L	0.008 mg/L	95.2	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0771 mg/L	0.08 mg/L	96.4	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	3.82 mg/L	4 mg/L	95.4	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0355 mg/L	0.04 mg/L	88.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.203 mg/L	0.2 mg/L	102	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	----	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0722 mg/L	0.08 mg/L	90.2	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0791 mg/L	0.08 mg/L	98.9	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	20.2 mg/L	20 mg/L	101	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00763 mg/L	0.008 mg/L	95.3	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1569391) - continued										
VA24B8462-002	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00698 mg/L	0.008 mg/L	87.2	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0769 mg/L	0.08 mg/L	96.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	----	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.771 mg/L	0.8 mg/L	96.4	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca

Email 2: slatimer@minnow.ca; kbatchelar@minnow.ca;

Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA24-MPMC100-007
Job #:	
PO / AFE:	24-04 Task 5
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): 8516

ALS Contact: Can Dang Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1	Total Metals	Dissolved Metals	TN, NH3	DOC	TSS (Whole Bottle)	Hardness	PLES ON HOLD	VIDED STORAGE REQUIRED	ECTED HAZARD (see notes)
						F		F	P	F/P					
	MP_QUL-ZOO-1_WS-1_2024-07	24-July-24	12:30	Water	6	R	R	R	R	R	R	R			
	MP_QUL-ZOO-7_WS-1_2024-07	24-July-24	8:00	Water	6	R	R	R	R	R	R	R			
	~~MP_TRAVEL_WS-1_2024-07~~	~~July-24~~		Water	4	R	R		R		R				
	MP_BOL-B2-2_WS-1_2024-07	25-JULY-24	10:30	water	6	R	R	R	R	R	R	R			
	MP_FIELD_WS-1_2024-07	25-JULY-24	10:30	water	5	R	R		R	R	R	R			

Environmental Division
Vancouver
Work Order Reference
VA24B8516

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please also report N+N Calc.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	*13 5

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Sally dU	25-JUL-24	12:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	7/26/24	1035AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

(13°C cooler had warm ice pk) * Danyle Unkod warm; copy

WATER QUALITY

ALS Laboratory Report VA24C0557

(Finalized August 27, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C0557**	Page	: 1 of 10
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 14-Aug-2024 08:45
PO	: 5590017616	Date Analysis Commenced	: 15-Aug-2024
C-O-C number	: ----	Issue Date	: 27-Aug-2024 15:16
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Daniel Shabestani	Lab Assistant	Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_WS-1_2024-08	MP_HAC-R1_WS-1_2024-08	MP_HAC-U_WS-1_2024-08	MP_HAC-D_WS-1_2024-08	MP_EDC-U_WS-1_2024-08
					Client sampling date / time	12-Aug-2024 12:00	12-Aug-2024 16:14	12-Aug-2024 15:30	12-Aug-2024 14:20	12-Aug-2024 09:40
						VA24C0557-001	VA24C0557-002	VA24C0557-003	VA24C0557-004	VA24C0557-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		90.4	94.5	100	122	76.0
Conductivity	----	E100/VA	2.0	µS/cm		167	246	288	324	144
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		83.1	111	136	152	76.7
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		85.2	114	136	147	75.7
pH	----	E108/VA	0.10	pH units		8.10	8.23	8.38	8.38	8.04
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		133	170	206	221	122
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		6.2	1.6	<1.0	<1.0	1.5
Turbidity	----	E121/VA	0.10	NTU		7.10	1.50	0.40	0.43	1.47
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0214	0.0074	0.0078	0.0073	0.0140
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		<0.50	0.76	1.11	0.98	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.048	0.061	0.068	0.076	0.034
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.0431	0.0096	0.0063	<0.0050	0.0344
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		0.0431	0.0096	0.0063	<0.0051	0.0344
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.735	0.272	0.266	0.206	0.593
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		0.0181	0.0024	0.0023	<0.0010	<0.0010
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0548	0.0157	0.0123	0.0075	0.0168
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0413	0.0099	0.0107	0.0057	0.0074
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		<0.30	33.1	50.2	48.9	0.71
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		16.2	5.76	5.55	4.57	14.9
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.231	0.0706	0.0106	0.0206	0.0704
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00075	0.00064	0.00072	0.00099	0.00079
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00445	0.0112	0.0106	0.0209	0.0146

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_WS-1_2024-08	MP_HAC-R1_WS-1_2024-08	MP_HAC-U_WS-1_2024-08	MP_HAC-D_WS-1_2024-08	MP_EDC-U_WS-1_2024-08
					Client sampling date / time	12-Aug-2024 12:00	12-Aug-2024 16:14	12-Aug-2024 15:30	12-Aug-2024 14:20	12-Aug-2024 09:40
						VA24C0557-001	VA24C0557-002	VA24C0557-003	VA24C0557-004	VA24C0557-005
						Result	Result	Result	Result	Result
Total Metals										
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	0.020	0.021	0.023	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000096	<0.0000100 DLM	<0.0000100 DLM	<0.0000100 DLM	0.0000172
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		26.0	36.9	42.4	44.6	19.4
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		0.00075	<0.00050	<0.00050	<0.00050	0.00062
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		0.00025	<0.00010	<0.00010	<0.00010	0.00028
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00257	0.00548	0.00458	0.00685	0.00215
Iron, total	7439-89-6	E420/VA	0.030	mg/L		0.546	0.063	<0.030	0.034	0.289
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000081	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	0.0012	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		4.92	5.42	7.36	8.69	6.61
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.0598	0.0174	0.0213	0.0772	0.198
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000155	0.00628	0.00672	0.00615	0.000362
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00083	<0.00050	<0.00050	<0.00050	0.00150
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.247	0.938	0.936	1.12	0.868
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000106	0.000492	0.00134	0.00135	0.000151
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		6.79	3.19	3.38	3.98	3.87
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		4.99	7.16	7.98	8.75	3.07
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.0894	0.241	0.268	0.310	0.123
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000034	0.000209	0.000292	0.000421	0.000050
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00232	0.00163	0.00164	0.00144	0.00084
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.0040	<0.0030	<0.0030	<0.0030	0.0134
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0302	0.0066	0.0031	0.0038	0.0332
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_WS-1_2024-08	MP_HAC-R1_WS-1_2024-08	MP_HAC-U_WS-1_2024-08	MP_HAC-D_WS-1_2024-08	MP_EDC-U_WS-1_2024-08
					Client sampling date / time	12-Aug-2024 12:00	12-Aug-2024 16:14	12-Aug-2024 15:30	12-Aug-2024 14:20	12-Aug-2024 09:40
						VA24C0557-001	VA24C0557-002	VA24C0557-003	VA24C0557-004	VA24C0557-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00064	0.00056	0.00069	0.00096	0.00072
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00304	0.0102	0.0108	0.0210	0.0144
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	0.019	0.020	0.023	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		0.0000062	<0.0000050	<0.0000050	<0.0000100 DLM	0.0000156
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		25.4	35.0	42.6	46.3	19.6
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00052
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		0.00012	<0.00010	<0.00010	<0.00010	0.00023
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00161	0.00394	0.00412	0.00637	0.00194
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		0.299	<0.030	<0.030	<0.030	0.202
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	0.0011	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		4.77	5.69	7.30	8.91	6.74
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.0484	0.00875	0.0147	0.0638	0.187
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000147	0.00599	0.00675	0.00641	0.000330
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		0.00056	<0.00050	<0.00050	<0.00050	0.00143
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.252	0.969	0.966	1.11	0.880
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000097	0.000448	0.00136	0.00121	0.000159
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		6.54	2.99	3.21	3.90	3.71
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		5.05	7.35	7.93	8.33	3.03
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.0884	0.234	0.277	0.314	0.125
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000030	0.000200	0.000281	0.000387	0.000043
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		0.00173	0.00150	0.00151	0.00131	0.00064
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	0.0084
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	Field	Field

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_WS-1_2024-08	MP_HAC-R1_WS-1_2024-08	MP_HAC-U_WS-1_2024-08	MP_HAC-D_WS-1_2024-08	MP_EDC-U_WS-1_2024-08
					Client sampling date / time	12-Aug-2024 12:00	12-Aug-2024 16:14	12-Aug-2024 15:30	12-Aug-2024 14:20	12-Aug-2024 09:40
						VA24C0557-001	VA24C0557-002	VA24C0557-003	VA24C0557-004	VA24C0557-005
						Result	Result	Result	Result	Result
Speciated Metals										
Selenium species, unknown	----	E540/VA	0.20	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Selenium, hexavalent [Se VI]	14124-68-6	E540/VA	0.10	µg/L		<0.10	0.11	0.87	0.54	<0.10
Selenium, tetravalent [Se IV]	14124-67-5	E540/VA	0.10	µg/L		<0.10	0.12	0.26	0.30	<0.10
Selenocyanate [SeCN], as Se	3425-46-5	E540/VA	0.10	µg/L		<0.10	<0.10	<0.10	<0.10	<0.10

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_WS-1_2024-08	MP_E1_WS-1_2024-08	MP_HAC-R3_WS-1_2024-08	MP_EDC-U_WS-1X_2024-08	----
					Client sampling date / time	12-Aug-2024 13:15	12-Aug-2024 13:50	12-Aug-2024 15:00	12-Aug-2024 09:40	----
						VA24C0557-006	VA24C0557-007	VA24C0557-008	VA24C0557-009	--------
						Result	Result	Result	Result	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		175	177	100	76.1	----
Conductivity	----	E100/VA	2.0	µS/cm		328	325	295	144	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		167	160	131	74.6	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		162	164	134	68.2	----
pH	----	E108/VA	0.10	pH units		8.52	8.53	8.37	8.02	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		214	219	204	120	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		<1.0	<1.0	<1.0	1.4	----
Turbidity	----	E121/VA	0.10	NTU		0.20	0.27	0.37	1.50	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0077	0.0092	0.0067	0.0131	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		0.51	0.51	1.08	<0.50	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.088	0.091	0.068	0.035	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0050	0.0070	<0.0050	0.0356	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		<0.0051	0.0070	<0.0051	0.0356	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.259	0.275	0.264	0.580	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	0.0021	0.0010	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0062	0.0057	0.0121	0.0165	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0051	0.0054	0.0101	0.0074	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		8.87	8.85	50.7	0.77	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		8.65	8.24	5.53	14.6	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0093	0.0108	0.0082	0.0873	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00231	0.00183	0.00068	0.00079	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0281	0.0288	0.0110	0.0147	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_WS-1_2024-08	MP_E1_WS-1_2024-08	MP_HAC-R3_WS-1_2024-08	MP_EDC-U_WS-1X_2024-08	----
					Client sampling date / time	12-Aug-2024 13:15	12-Aug-2024 13:50	12-Aug-2024 15:00	12-Aug-2024 09:40	----
						VA24C0557-006	VA24C0557-007	VA24C0557-008	VA24C0557-009	--------
						Result	Result	Result	Result	----
Total Metals										
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.023	0.022	0.020	<0.010	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	0.0000061	<0.0000050	0.0000135	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		41.3	42.4	41.7	17.3	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00067	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00031	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00126	0.00178	0.00445	0.00243	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L		<0.030	<0.030	<0.030	0.326	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0013	0.0013	<0.0010	<0.0010	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		14.2	14.2	7.20	6.06	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00486	0.00354	0.0186	0.192	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00164	0.00163	0.00683	0.000378	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00061	0.00063	<0.00050	0.00151	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		1.24	1.25	0.921	0.853	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000156	0.000112	0.00138	0.000125	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		4.69	4.60	3.23	4.01	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		10.5	10.2	7.97	2.92	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.294	0.295	0.270	0.122	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000311	0.000337	0.000304	0.000053	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00061	0.00067	0.00155	0.00084	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	0.0118	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0052	0.0059	0.0030	0.0320	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00222	0.00175	0.00065	0.00069	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_WS-1_2024-08	MP_E1_WS-1_2024-08	MP_HAC-R3_WS-1_2024-08	MP_EDC-U_WS-1X_2024-08	----
					Client sampling date / time	12-Aug-2024 13:15	12-Aug-2024 13:50	12-Aug-2024 15:00	12-Aug-2024 09:40	----
						VA24C0557-006	VA24C0557-007	VA24C0557-008	VA24C0557-009	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.0279	0.0280	0.0104	0.0141	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.023	0.020	0.019	<0.010	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		0.0000053	0.0000055	<0.0000050	0.0000105	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		42.6	40.2	40.2	19.1	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00050	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00024	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00126	0.00170	0.00427	0.00193	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	0.199	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		0.0013	0.0012	<0.0010	<0.0010	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		14.7	14.4	7.50	6.53	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00360	0.00254	0.0123	0.183	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.00166	0.00155	0.00652	0.000355	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		0.00058	0.00057	<0.00050	0.00134	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		1.28	1.27	0.956	0.863	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000137	0.000173	0.00140	0.000106	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		4.96	4.63	3.20	3.79	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		10.4	10.1	7.94	2.96	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.299	0.284	0.269	0.119	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000291	0.000320	0.000293	0.000047	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		0.00055	0.00063	0.00157	0.00063	----
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	0.0081	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	Field	----
Speciated Metals										

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_WS-1_2024-08	MP_E1_WS-1_2024-08	MP_HAC-R3_WS-1_2024-08	MP_EDC-U_WS-1X_2024-08	----
					Client sampling date / time	12-Aug-2024 13:15	12-Aug-2024 13:50	12-Aug-2024 15:00	12-Aug-2024 09:40	----
						VA24C0557-006	VA24C0557-007	VA24C0557-008	VA24C0557-009	--------
						Result	Result	Result	Result	----
Speciated Metals										
Selenium species, unknown	----	E540/VA	0.20	µg/L		<0.20	<0.20	<0.20	<0.20	----
Selenium, hexavalent [Se VI]	14124-68-6	E540/VA	0.10	µg/L		<0.10	<0.10	0.86	<0.10	----
Selenium, tetravalent [Se IV]	14124-67-5	E540/VA	0.10	µg/L		<0.10	<0.10	0.26	<0.10	----
Selenocyanate [SeCN], as Se	3425-46-5	E540/VA	0.10	µg/L		<0.10	<0.10	<0.10	<0.10	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C0557**	Page	: 1 of 29
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 14-Aug-2024 08:45
PO	: 5590017616	Issue Date	: 27-Aug-2024 15:05
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_E1_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_EDC-D_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1X_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_FPC-R3_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_HAC-D_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_HAC-R1_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_HAC-R3_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_HAC-U_WS-1_2024-08	E298	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_E1_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_EDC-D_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_EDC-U_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_EDC-U_WS-1X_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_FPC-R3_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_HAC-D_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_HAC-R1_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_HAC-R3_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_HAC-U_WS-1_2024-08	E235.Cl	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_E1_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_EDC-D_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_EDC-U_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_EDC-U_WS-1X_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_FPC-R3_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_HAC-D_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_HAC-R1_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_HAC-R3_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_HAC-U_WS-1_2024-08	E378-U	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_E1_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_EDC-D_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_EDC-U_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_EDC-U_WS-1X_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_FPC-R3_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_HAC-D_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_HAC-R1_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_HAC-R3_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_HAC-U_WS-1_2024-08	E235.F	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_E1_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_EDC-D_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_EDC-U_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_EDC-U_WS-1X_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_FPC-R3_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_HAC-D_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_HAC-R1_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_HAC-R3_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_HAC-U_WS-1_2024-08	E235.NO3-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_E1_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_EDC-D_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_EDC-U_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_EDC-U_WS-1X_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_FPC-R3_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_HAC-D_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_HAC-R1_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_HAC-R3_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_HAC-U_WS-1_2024-08	E235.NO2-L	12-Aug-2024	15-Aug-2024	3 days	3 days	✓	15-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_E1_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_EDC-D_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_EDC-U_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_EDC-U_WS-1X_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_FPC-R3_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_HAC-D_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_HAC-R1_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_HAC-R3_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_HAC-U_WS-1_2024-08	E235.SO4	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	15-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_E1_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_EDC-D_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_EDC-U_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_EDC-U_WS-1X_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_FPC-R3_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_HAC-D_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_HAC-R1_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_HAC-R3_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_HAC-U_WS-1_2024-08	E375-T	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_E1_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_EDC-D_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1X_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_FPC-R3_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_HAC-D_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_HAC-R1_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_HAC-R3_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_HAC-U_WS-1_2024-08	E366	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	19-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_E1_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_EDC-D_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_EDC-U_WS-1X_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_FPC-R3_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_HAC-D_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_HAC-R1_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_HAC-R3_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_HAC-U_WS-1_2024-08	E372-U	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	20-Aug-2024	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_E1_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_EDC-D_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_EDC-U_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_EDC-U_WS-1X_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_FPC-R3_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_HAC-D_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_HAC-R1_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_HAC-R3_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_HAC-U_WS-1_2024-08	E421	12-Aug-2024	18-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_E1_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_EDC-D_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_EDC-U_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_EDC-U_WS-1X_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_FPC-R3_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_HAC-D_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_HAC-R1_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_HAC-R3_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_HAC-U_WS-1_2024-08	E358-L	12-Aug-2024	16-Aug-2024	28 days	4 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_E1_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_EDC-D_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_EDC-U_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_EDC-U_WS-1X_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_FPC-R3_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_HAC-D_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_HAC-R1_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_HAC-R3_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_HAC-U_WS-1_2024-08	E290	12-Aug-2024	15-Aug-2024	14 days	3 days	✓	16-Aug-2024	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_E1_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_EDC-D_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_EDC-U_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_EDC-U_WS-1X_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_FPC-R3_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_HAC-D_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_HAC-R1_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE MP_HAC-R3_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_HAC-U_WS-1_2024-08	E100	12-Aug-2024	15-Aug-2024	28 days	3 days	✓	16-Aug-2024	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE MP_HAC-R1_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	75 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	93 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_HAC-R3_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	76 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	94 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_HAC-U_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	76 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	94 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_HAC-D_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	77 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	95 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_E1_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	77 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	96 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_EDC-D_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	78 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	96 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_FPC-R3_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	79 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	97 hrs	× EHTR-FM

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE MP_EDC-U_WS-1_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	82 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	100 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_EDC-U_WS-1X_2024-08	E108	12-Aug-2024	15-Aug-2024	0.25 hrs	82 hrs	× EHTR-FM	16-Aug-2024	0.25 hrs	100 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_E1_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_EDC-D_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_EDC-U_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_EDC-U_WS-1X_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_FPC-R3_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_HAC-D_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_HAC-R1_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE										
MP_HAC-R3_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE										
MP_HAC-U_WS-1_2024-08	E162	12-Aug-2024	----	----	----		18-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_E1_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_EDC-D_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_HAC-D_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_HAC-R1_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_HAC-R3_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_HAC-U_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_EDC-U_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_EDC-U_WS-1X_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB]										
MP_FPC-R3_WS-1_2024-08	E164	12-Aug-2024	----	----	----		17-Aug-2024	7 days	5 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_E1_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_EDC-D_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_EDC-U_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_EDC-U_WS-1X_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_FPC-R3_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_HAC-D_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_HAC-R1_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE MP_HAC-R3_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_HAC-U_WS-1_2024-08	E121	12-Aug-2024	----	----	----		15-Aug-2024	3 days	3 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_E1_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_EDC-D_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_EDC-U_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_EDC-U_WS-1X_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_FPC-R3_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_HAC-D_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_HAC-R1_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_HAC-R3_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Speciated Metals : Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS										
Opaque HDPE-unpreserved MP_HAC-U_WS-1_2024-08	E540	12-Aug-2024	22-Aug-2024	30 days	10 days	✓	22-Aug-2024	30 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_E1_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_EDC-D_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_EDC-U_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_EDC-U_WS-1X_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_FPC-R3_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_HAC-D_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_HAC-R1_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_HAC-R3_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_HAC-U_WS-1_2024-08	E420	12-Aug-2024	19-Aug-2024	180 days	7 days	✓	20-Aug-2024	180 days	8 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1598785	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1600557	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1598788	1	17	5.8	5.0	✓
Conductivity in Water	E100	1598786	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1601556	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1600554	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1598792	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1598787	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1598789	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1598790	1	17	5.8	5.0	✓
pH by Meter	E108	1598784	1	17	5.8	5.0	✓
Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS	E540	1611632	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1598791	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1602510	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1600560	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1599123	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1600559	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1600556	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	1598815	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1598785	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1600557	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1598788	1	17	5.8	5.0	✓
Conductivity in Water	E100	1598786	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1601556	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1600554	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1598792	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1598787	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1598789	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1598790	1	17	5.8	5.0	✓
pH by Meter	E108	1598784	1	17	5.8	5.0	✓
Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS	E540	1611632	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1598791	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1602510	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1600560	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1599123	1	20	5.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	1600559	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1600556	1	13	7.6	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1601413	2	21	9.5	5.0	✓
Turbidity by Nephelometry	E121	1598815	2	40	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1598785	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	1600557	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1598788	1	17	5.8	5.0	✓
Conductivity in Water	E100	1598786	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1601556	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1600554	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1598792	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1598787	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1598789	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1598790	1	17	5.8	5.0	✓
Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS	E540	1611632	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1598791	1	17	5.8	5.0	✓
TDS by Gravimetry	E162	1602510	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1600560	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1599123	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1600559	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1600556	1	13	7.6	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1601413	2	21	9.5	5.0	✓
Turbidity by Nephelometry	E121	1598815	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1600557	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1598788	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1601556	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1600554	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1598792	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1598787	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1598789	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1598790	1	17	5.8	5.0	✓
Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS	E540	1611632	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1598791	1	17	5.8	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1600560	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1599123	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1600559	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1600556	1	13	7.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Selenium Species (SeIV, SeVI,SeCN) in Water by HPLC-ICPMS	E540 ALS Environmental - Vancouver	Water	Miekeley Spect. Acta B 60 (2005) 633-641	Instrumental analysis of Speciated Selenium (Se) is by Anion Exchange HPLC-ICPMS. Species quantified are Selenite (SeIV), Selenate (VI) and Selenocyanate (SeCN). Field filtration is recommended. Reported Total Unknown Se Species is semi-quantitative in nature and consists of a sum of all the unidentified Selenium peaks observed in the chromatogram. This included SeMet, MeSe, and DMSeO unless separately requested for identification and quantification. Undetectable unknown species indicates these other species are not present in the sample.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Selenium Species Preparation	EP540 ALS Environmental - Vancouver	Water	Miekeley Spect. Acta B 60 (2005) 633-641	Instrumental analysis of Speciated Selenium (Se) is by Anion Exchange HPLC-ICPMS. Species quantified are Selenite (SeIV), Selenate (VI) and Selenocyanate (SeCN). Field filtration is recommended. Reported Total Unknown Se Species is semi-quantitative in nature and consists of a sum of all the unknown peaks observed in the chromatogram.

QUALITY CONTROL REPORT

Work Order	: **VA24C0557**	Page	: 1 of 17
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 14-Aug-2024 08:45
PO	: 5590017616	Date Analysis Commenced	: 15-Aug-2024
C-O-C number	: ----	Issue Date	: 27-Aug-2024 15:01
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 9		
No. of samples analysed	: 9		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Daniel Shabestani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1598784)											
VA24C0554-003	Anonymous	pH	----	E108	0.10	pH units	8.29	8.30	0.120%	4%	----
Physical Tests (QC Lot: 1598785)											
VA24C0554-003	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	131	131	0.00%	20%	----
Physical Tests (QC Lot: 1598786)											
VA24C0554-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	258	257	0.388%	10%	----
Physical Tests (QC Lot: 1598815)											
KS2403215-001	Anonymous	Turbidity	----	E121	0.10	NTU	0.24	0.27	0.03	Diff <2x LOR	----
Physical Tests (QC Lot: 1598816)											
VA24C0557-007	MP_E1_WS-1_2024-08	Turbidity	----	E121	0.10	NTU	0.27	0.29	0.02	Diff <2x LOR	----
Physical Tests (QC Lot: 1602510)											
VA24C0461-003	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	20	20	0.5	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1598787)											
VA24C0554-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.076	0.070	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1598788)											
VA24C0554-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	4.98	4.96	0.02	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1598789)											
VA24C0554-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0112	0.0113	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1598790)											
VA24C0554-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1598791)											
VA24C0554-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	40.9	40.9	0.0963%	20%	----
Anions and Nutrients (QC Lot: 1598792)											
VA24C0554-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0091	0.0096	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1600556)											
VA24C0557-003	MP_HAC-U_WS-1_2024-08	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0123	0.0119	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1600557)											
VA24C0536-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1600559)											
VA24C0557-001	MP_FPC-R3_WS-1_2024-08	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.735	0.720	1.96%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1600560)											
VA24C0557-001	MP_FPC-R3_WS-1_2024-08	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0413	0.0409	0.948%	20%	----
Organic / Inorganic Carbon (QC Lot: 1600554)											
VA24C0557-003	MP_HAC-U_WS-1_2024-08	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.55	5.56	0.126%	20%	----
Total Metals (QC Lot: 1599123)											
VA24C0417-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00416	0.00434	4.12%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0314	0.0323	2.84%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.014	0.014	0.00003	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	24.1	24.3	0.778%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00285	0.00290	0.00005	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000088	0.000091	0.000002	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	18.5	18.3	1.00%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00037	0.00045	0.00008	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00458	0.00450	1.69%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.72	1.75	2.05%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000144	0.000117	0.000026	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	6.21	6.39	2.92%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	7.37	7.34	0.396%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.220	0.212	3.75%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00189	0.00192	1.67%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1599123) - continued											
VA24C0417-001	Anonymous	Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00094	0.00093	0.00001	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1601556)											
VA24C0270-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.215	0.214	0.710%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00016	0.00016	0.000003	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0159	0.0157	1.08%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.013	0.013	0.0001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000608	0.000611	0.584%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	6.37	6.45	1.26%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.122	0.124	1.38%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.0722	0.0719	0.413%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.202	0.201	0.690%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000928	0.000935	0.758%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0236	0.0235	0.337%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.74	1.72	1.37%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.202	0.202	0.126%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	3.76	3.66	2.80%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	11.6	11.8	1.64%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00299	0.00285	4.59%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.19	3.11	2.46%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.495	0.495	0.0006	Diff <2x LOR	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0117	0.0116	1.15%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000203	0.000208	2.56%	20%	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000200	0.000194	3.39%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.123	0.121	1.10%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Speciated Metals (QC Lot: 1611632)											
FJ2402453-001	Anonymous	Selenium species, unknown	----	E540	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Selenium, hexavalent [Se VI]	14124-68-6	E540	0.10	µg/L	24.8	24.4	1.61%	20%	----
		Selenium, tetravalent [Se IV]	14124-67-5	E540	0.10	µg/L	0.82	0.81	0.02	Diff <2x LOR	----
		Selenocyanate [SeCN], as Se	3425-46-5	E540	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1598785)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1598786)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1598815)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1598816)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1601413)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1601414)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1602510)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1598787)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1598788)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1598789)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1598790)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1598791)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1598792)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1600556)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1600557)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1600559)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1600560)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1600560) - continued						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1600554)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1599123)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1601556)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Speciated Metals (QCLot: 1611632)						
Selenium species, unknown	----	E540	0.2	µg/L	<0.20	----
Selenium, hexavalent [Se VI]	14124-68-6	E540	0.1	µg/L	<0.10	----
Selenium, tetravalent [Se IV]	14124-67-5	E540	0.1	µg/L	<0.10	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Speciated Metals (QCLot: 1611632) - continued						
Selenocyanate [SeCN], as Se	3425-46-5	E540	0.1	µg/L	<0.10	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1598784)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1598785)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1598786)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	99.5	90.0	110	----
Physical Tests (QCLot: 1598815)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
Physical Tests (QCLot: 1598816)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
Physical Tests (QCLot: 1601413)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1601414)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	97.7	85.0	115	----
Physical Tests (QCLot: 1602510)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 1598787)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1598788)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1598789)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1598790)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1598791)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1598792)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.4	80.0	120	----
Anions and Nutrients (QCLot: 1600556)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	94.4	80.0	120	----
Anions and Nutrients (QCLot: 1600557)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.4	85.0	115	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1600559)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1600560)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	93.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1600554)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Total Metals (QCLot: 1599123)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	102	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	106	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.8	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.6	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	97.2	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	111	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.0	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1599123) - continued									
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	109	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	98.7	80.0	120	----
Dissolved Metals (QCLot: 1601556)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.7	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	95.8	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	92.8	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.9	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.9	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	96.9	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.5	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	93.8	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.4	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	110	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.5	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	94.7	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.7	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.8	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.5	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.9	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Speciated Metals (QCLot: 1611632)									
Selenium, hexavalent [Se VI]	14124-68-6	E540	0.1	µg/L	10 µg/L	96.1	80.0	120	----
Selenium, tetravalent [Se IV]	14124-67-5	E540	0.1	µg/L	10 µg/L	86.6	80.0	120	----
Selenocyanate [SeCN], as Se	3425-46-5	E540	0.1	µg/L	10 µg/L	104	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1598787)										
VA24C0554-002	Anonymous	Fluoride	16984-48-8	E235.F	1.07 mg/L	1 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 1598788)										
VA24C0554-002	Anonymous	Chloride	16887-00-6	E235.Cl	107 mg/L	100 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 1598789)										
VA24C0554-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.61 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1598790)										
VA24C0554-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.532 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1598791)										
VA24C0554-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1598792)										
VA24C0554-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0301 mg/L	0.03 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 1600556)										
VA24C0557-004	MP_HAC-D_WS-1_2024-08	Phosphorus, total	7723-14-0	E372-U	0.0484 mg/L	0.05 mg/L	96.7	70.0	130	----
Anions and Nutrients (QCLot: 1600557)										
VA24C0536-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0989 mg/L	0.1 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 1600559)										
VA24C0557-002	MP_HAC-R1_WS-1_2024-08	Nitrogen, total	7727-37-9	E366	0.406 mg/L	0.4 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1600560)										
VA24C0557-002	MP_HAC-R1_WS-1_2024-08	Phosphorus, total dissolved	7723-14-0	E375-T	0.0468 mg/L	0.05 mg/L	93.5	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1600554)										
VA24C0557-004	MP_HAC-D_WS-1_2024-08	Carbon, dissolved organic [DOC]	----	E358-L	4.86 mg/L	5 mg/L	97.1	70.0	130	----
Total Metals (QCLot: 1599123)										
VA24C0417-002	Anonymous	Aluminum, total	7429-90-5	E420	0.195 mg/L	0.2 mg/L	97.5	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00949 mg/L	0.01 mg/L	94.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.094 mg/L	0.1 mg/L	93.8	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1599123) - continued										
VA24C0417-002	Anonymous	Chromium, total	7440-47-3	E420	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Copper, total	7440-50-8	E420	0.0184 mg/L	0.02 mg/L	92.3	70.0	130	----
		Iron, total	7439-89-6	E420	1.86 mg/L	2 mg/L	93.1	70.0	130	----
		Lead, total	7439-92-1	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0944 mg/L	0.1 mg/L	94.4	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0169 mg/L	0.02 mg/L	84.7	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		Potassium, total	7440-09-7	E420	3.65 mg/L	4 mg/L	91.2	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
		Silicon, total	7440-21-3	E420	9.63 mg/L	10 mg/L	96.3	70.0	130	----
		Silver, total	7440-22-4	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00364 mg/L	0.004 mg/L	90.9	70.0	130	----
		Tin, total	7440-31-5	E420	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00400 mg/L	0.004 mg/L	99.9	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0981 mg/L	0.1 mg/L	98.1	70.0	130	----
		Zinc, total	7440-66-6	E420	0.378 mg/L	0.4 mg/L	94.4	70.0	130	----
Dissolved Metals (QCLot: 1601556)										
VA24C0270-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	ND mg/L	----	ND	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0197 mg/L	0.02 mg/L	98.5	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00972 mg/L	0.01 mg/L	97.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.093 mg/L	0.1 mg/L	92.8	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00410 mg/L	0.004 mg/L	102	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	ND mg/L	----	ND	70.0	130	----
		Copper, dissolved	7440-50-8	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0912 mg/L	0.1 mg/L	91.2	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	ND mg/L	----	ND	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1601556) - continued										
VA24C0270-002	Anonymous	Silicon, dissolved	7440-21-3	E421	9.80 mg/L	10 mg/L	98.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00394 mg/L	0.004 mg/L	98.6	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.99 mg/L	2 mg/L	99.7	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00377 mg/L	0.004 mg/L	94.2	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00400 mg/L	0.004 mg/L	100	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0983 mg/L	0.1 mg/L	98.3	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.385 mg/L	0.4 mg/L	96.3	70.0	130	----
Speciated Metals (QCLot: 1611632)										
FJ2402453-002	Anonymous	Selenium, hexavalent [Se VI]	14124-68-6	E540	26.0 µg/L	25 µg/L	104	70.0	130	----
		Selenium, tetravalent [Se IV]	14124-67-5	E540	20.1 µg/L	25 µg/L	80.4	70.0	130	----
		Selenocyanate [SeCN], as Se	3425-46-5	E540	27.3 µg/L	25 µg/L	109	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Vancouver
Work Order Reference
VA24C0557

Telephone : + 1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely. BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbc
Email 2: slatimer@minnow.ca; kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimu
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimu
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimu
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimu
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends.
Date and Time Required for all E&P TATs:
For all tests with rush TATs requested, please cor

Project Information

ALS Account # / Quote #: VA24-MPMC100-007
Job #:
PO / AFE: 24-04 Task 600
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): 0557
ALS Contact: Can Dang
Sampler: SJ, SdR

Analysis Requ

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1 (F)	Total Metals	Dissolved Metals (F)	TN, NH3 (P)	DOC (F/P)	TSS (Whole Bottle)	Selenium Speciation (F)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_FPC-R3_WS-1_2024-08	12 -Aug-24	12:00	Water	7	R	R	R	R	R	R	R			
	MP_HAC-R1_WS-1_2024-08	12 -Aug-24	16:14	Water	7	R	R	R	R	R	R	R			
	MP_HAC-U_WS-1_2024-08	12 -Aug-24	15:30	Water	7	R	R	R	R	R	R	R			
	MP_HAC-D_WS-1_2024-08	12 -Aug-24	14:20	Water	7	R	R	R	R	R	R	R			
	MP_EDC-U_WS-1_2024-08	12 -Aug-24	9:40	Water	7	R	R	R	R	R	R	R			
	MP_EDC-D_WS-1_2024-08	12 -Aug-24	13:15	Water	7	R	R	R	R	R	R	R			
	MP_E1_WS-1_2024-08	12 -Aug-24	13:50	Water	7	R	R	R	R	R	R	R			
	MP_HAC-R3_WS-1_2024-08	12 -Aug-24	15:00	Water	7	R	R	R	R	R	R	R			
	MP_EDC-U_WS-1X_2024-08	12 -Aug-24	9:40	Water	7	R	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please also report N+N Calc.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☑ NO
Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				12°C, 9°C, 7°C			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Katharina Batchelar	13-Aug-24	13:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	14 Aug	8.45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

WATER QUALITY

ALS Laboratory Report VA24C1387

(Finalized September 3, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C1387**	Page	: 1 of 6
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 24-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 10:10
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Daniel Shabestani	Lab Assistant	Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LNF1_WS-1_2024-08	MP_QUL-LNF1_WS-2_2024-08	MP_QUL-LNF1_WS-3_2024-08	MP_QUL-LNF1_WS-4_2024-08	MP_QUL-LNF1_WS-5_2024-08
					Client sampling date / time	19-Aug-2024 13:27	19-Aug-2024 14:13	19-Aug-2024 14:35	19-Aug-2024 15:10	19-Aug-2024 15:27
						VA24C1387-001	VA24C1387-002	VA24C1387-003	VA24C1387-004	VA24C1387-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		47.1	47.0	46.9	46.8	47.0
Conductivity	----	E100/VA	2.0	µS/cm		105	104	104	105	104
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		48.4	47.5	48.3	47.8	47.8
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		47.6	47.5	48.7	48.1	46.2
pH	----	E108/VA	0.10	pH units		7.99	8.00	8.00	8.00	8.00
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		66	61	61	61	66
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		1.3	1.5	1.4	1.1	<1.0
Turbidity	----	E121/VA	0.10	NTU		0.17	0.17	0.19	0.20	0.19
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		<0.0050	<0.0050	0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.032	0.032	0.032	0.032	0.032
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.0386	0.0397	0.0385	0.0387	0.0388
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		0.0386	0.0397	0.0385	0.0387	0.0388
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.140	0.133	0.145	0.134	0.145
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		<0.0020	<0.0020	0.0029	<0.0020	<0.0020
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0020	<0.0020	<0.0020	0.0020	<0.0020
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		6.20	6.18	6.20	6.25	6.24
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		2.20	2.10	2.12	1.97	2.02
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0112	0.0095	0.0125	0.0102	0.0092
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00013	0.00012	0.00014	0.00012	0.00013
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00547	0.00530	0.00561	0.00558	0.00534

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LNF1_WS-1_2024-08	MP_QUL-LNF1_WS-2_2024-08	MP_QUL-LNF1_WS-3_2024-08	MP_QUL-LNF1_WS-4_2024-08	MP_QUL-LNF1_WS-5_2024-08
					Client sampling date / time	19-Aug-2024 13:27	19-Aug-2024 14:13	19-Aug-2024 14:35	19-Aug-2024 15:10	19-Aug-2024 15:27
						VA24C1387-001	VA24C1387-002	VA24C1387-003	VA24C1387-004	VA24C1387-005
						Result	Result	Result	Result	Result
Total Metals										
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		15.7	15.7	16.1	15.9	15.3
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00061	0.00051	0.00066	0.00059	0.00054
Iron, total	7439-89-6	E420/VA	0.030	mg/L		<0.030	<0.030	<0.030	<0.030	<0.030
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		2.04	2.02	2.06	2.04	1.95
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00129	0.00111	0.00118	0.00146	0.00126
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000387	0.000373	0.000375	0.000386	0.000384
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.515	0.505	0.520	0.521	0.483
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000109	0.000120	0.000118	0.000138	0.000148
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.59	1.56	1.56	1.54	1.53
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		0.939	0.931	0.955	0.952	0.896
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.125	0.127	0.124	0.127	0.121
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000142	0.000143	0.000151	0.000152	0.000147
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0071	0.0071	0.0074	0.0077	0.0075
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LNF1_WS-1_2024-08	MP_QUL-LNF1_WS-2_2024-08	MP_QUL-LNF1_WS-3_2024-08	MP_QUL-LNF1_WS-4_2024-08	MP_QUL-LNF1_WS-5_2024-08
					Client sampling date / time	19-Aug-2024 13:27	19-Aug-2024 14:13	19-Aug-2024 14:35	19-Aug-2024 15:10	19-Aug-2024 15:27
						VA24C1387-001	VA24C1387-002	VA24C1387-003	VA24C1387-004	VA24C1387-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00011	0.00012	<0.00010	0.00010	0.00011
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00532	0.00530	0.00524	0.00528	0.00533
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		16.2	15.8	16.2	16.0	16.0
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00051	<0.00050
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	<0.030	<0.030
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		1.92	1.96	1.90	1.92	1.90
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00089	0.00045	0.00055	0.00071	0.00068
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000364	0.000360	0.000369	0.000356	0.000359
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.545	0.543	0.519	0.521	0.519
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000091	0.000081	0.000096	0.000134	0.000121
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.38	1.39	1.40	1.41	1.41
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		0.899	0.905	0.875	0.890	0.877
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.125	0.128	0.126	0.126	0.121
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000148	0.000146	0.000143	0.000144	0.000146
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		0.0049	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C1387**	Page	: 1 of 20
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Issue Date	: 03-Sep-2024 10:10
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Silver, dissolved	7440-22-4	E421	47.5 % MS-Ag	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MS-Ag	*MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-1_2024-08	E298	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-2_2024-08	E298	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-3_2024-08	E298	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-4_2024-08	E298	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-5_2024-08	E298	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LNF1_WS-1_2024-08	E235.Cl	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LNF1_WS-2_2024-08	E235.Cl	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LNF1_WS-3_2024-08	E235.Cl	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LNF1_WS-4_2024-08	E235.Cl	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LNF1_WS-5_2024-08	E235.Cl	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LNF1_WS-1_2024-08	E378-U	19-Aug-2024	25-Aug-2024	3 days	5 days	× EHT	25-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LNF1_WS-2_2024-08	E378-U	19-Aug-2024	25-Aug-2024	3 days	5 days	× EHT	25-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LNF1_WS-3_2024-08	E378-U	19-Aug-2024	25-Aug-2024	3 days	5 days	× EHT	25-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LNF1_WS-4_2024-08	E378-U	19-Aug-2024	25-Aug-2024	3 days	5 days	× EHT	25-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LNF1_WS-5_2024-08	E378-U	19-Aug-2024	25-Aug-2024	3 days	5 days	× EHT	25-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-LNF1_WS-1_2024-08	E235.F	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-LNF1_WS-2_2024-08	E235.F	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-LNF1_WS-3_2024-08	E235.F	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-LNF1_WS-4_2024-08	E235.F	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-LNF1_WS-5_2024-08	E235.F	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LNF1_WS-1_2024-08	E235.NO3-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LNF1_WS-2_2024-08	E235.NO3-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LNF1_WS-3_2024-08	E235.NO3-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LNF1_WS-4_2024-08	E235.NO3-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LNF1_WS-5_2024-08	E235.NO3-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-LNF1_WS-1_2024-08	E235.NO2-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-LNF1_WS-2_2024-08	E235.NO2-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-LNF1_WS-3_2024-08	E235.NO2-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-LNF1_WS-4_2024-08	E235.NO2-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
MP_QUL-LNF1_WS-5_2024-08	E235.NO2-L	19-Aug-2024	25-Aug-2024	3 days	5 days	✗ EHT	25-Aug-2024	3 days	5 days	✗ EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-LNF1_WS-1_2024-08	E235.SO4	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-LNF1_WS-2_2024-08	E235.SO4	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-LNF1_WS-3_2024-08	E235.SO4	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-LNF1_WS-4_2024-08	E235.SO4	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
MP_QUL-LNF1_WS-5_2024-08	E235.SO4	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-4_2024-08	E375-T	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-5_2024-08	E375-T	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-1_2024-08	E375-T	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-2_2024-08	E375-T	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-3_2024-08	E375-T	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-LNF1_WS-1_2024-08	E366	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-LNF1_WS-2_2024-08	E366	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_QUL-LNF1_WS-3_2024-08	E366	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-4_2024-08	E366	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-5_2024-08	E366	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-4_2024-08	E372-U	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-5_2024-08	E372-U	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-1_2024-08	E372-U	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-2_2024-08	E372-U	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LNF1_WS-3_2024-08	E372-U	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	28-Aug-2024	28 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LNF1_WS-1_2024-08	E421	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	30-Aug-2024	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LNF1_WS-2_2024-08	E421	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	30-Aug-2024	180 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-LNF1_WS-3_2024-08	E421	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	30-Aug-2024	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-LNF1_WS-4_2024-08	E421	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	30-Aug-2024	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_QUL-LNF1_WS-5_2024-08	E421	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	30-Aug-2024	180 days	11 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-1_2024-08	E358-L	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-2_2024-08	E358-L	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-3_2024-08	E358-L	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-4_2024-08	E358-L	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_QUL-LNF1_WS-5_2024-08	E358-L	19-Aug-2024	24-Aug-2024	28 days	5 days	✓	26-Aug-2024	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_QUL-LNF1_WS-1_2024-08	E290	19-Aug-2024	25-Aug-2024	14 days	6 days	✓	25-Aug-2024	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LNF1_WS-2_2024-08	E290	19-Aug-2024	25-Aug-2024	14 days	6 days	✓	25-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LNF1_WS-3_2024-08	E290	19-Aug-2024	25-Aug-2024	14 days	6 days	✓	25-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LNF1_WS-4_2024-08	E290	19-Aug-2024	25-Aug-2024	14 days	6 days	✓	25-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LNF1_WS-5_2024-08	E290	19-Aug-2024	25-Aug-2024	14 days	6 days	✓	25-Aug-2024	14 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LNF1_WS-1_2024-08	E100	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LNF1_WS-2_2024-08	E100	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LNF1_WS-3_2024-08	E100	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LNF1_WS-4_2024-08	E100	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LNF1_WS-5_2024-08	E100	19-Aug-2024	25-Aug-2024	28 days	6 days	✓	25-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE MP_QUL-LNF1_WS-5_2024-08	E108	19-Aug-2024	25-Aug-2024	0.25 hrs	139 hrs	× EHTR-FM	25-Aug-2024	0.25 hrs	143 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-LNF1_WS-4_2024-08	E108	19-Aug-2024	25-Aug-2024	0.25 hrs	139 hrs	× EHTR-FM	25-Aug-2024	0.25 hrs	144 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-LNF1_WS-3_2024-08	E108	19-Aug-2024	25-Aug-2024	0.25 hrs	140 hrs	× EHTR-FM	25-Aug-2024	0.25 hrs	144 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-LNF1_WS-2_2024-08	E108	19-Aug-2024	25-Aug-2024	0.25 hrs	140 hrs	× EHTR-FM	25-Aug-2024	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-LNF1_WS-1_2024-08	E108	19-Aug-2024	25-Aug-2024	0.25 hrs	141 hrs	× EHTR-FM	25-Aug-2024	0.25 hrs	145 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LNF1_WS-1_2024-08	E162	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LNF1_WS-2_2024-08	E162	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LNF1_WS-3_2024-08	E162	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LNF1_WS-4_2024-08	E162	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LNF1_WS-5_2024-08	E162	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LNF1_WS-1_2024-08	E164	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LNF1_WS-2_2024-08	E164	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LNF1_WS-3_2024-08	E164	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LNF1_WS-4_2024-08	E164	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LNF1_WS-5_2024-08	E164	19-Aug-2024	----	----	----		26-Aug-2024	7 days	7 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LNF1_WS-1_2024-08	E121	19-Aug-2024	----	----	----		25-Aug-2024	3 days	5 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LNF1_WS-2_2024-08	E121	19-Aug-2024	----	----	----		25-Aug-2024	3 days	5 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LNF1_WS-3_2024-08	E121	19-Aug-2024	----	----	----		25-Aug-2024	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-LNF1_WS-4_2024-08	E121	19-Aug-2024	----	----	----		25-Aug-2024	3 days	5 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-LNF1_WS-5_2024-08	E121	19-Aug-2024	----	----	----		25-Aug-2024	3 days	5 days	× EHT
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LNF1_WS-1_2024-08	E420	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	29-Aug-2024	180 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LNF1_WS-2_2024-08	E420	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	29-Aug-2024	180 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LNF1_WS-3_2024-08	E420	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	29-Aug-2024	180 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LNF1_WS-4_2024-08	E420	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	29-Aug-2024	180 days	10 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LNF1_WS-5_2024-08	E420	19-Aug-2024	28-Aug-2024	180 days	9 days	✓	29-Aug-2024	180 days	10 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1615176	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	1614959	1	16	6.2	5.0	✓
Chloride in Water by IC	E235.Cl	1615181	1	18	5.5	5.0	✓
Conductivity in Water	E100	1615177	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1618433	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1614960	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1615174	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1615180	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1615182	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1615183	1	19	5.2	5.0	✓
pH by Meter	E108	1615175	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1615184	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	1617129	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1614958	1	16	6.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1618340	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1614956	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1614957	1	16	6.2	5.0	✓
Turbidity by Nephelometry	E121	1615230	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1615176	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	1614959	1	16	6.2	5.0	✓
Chloride in Water by IC	E235.Cl	1615181	1	18	5.5	5.0	✓
Conductivity in Water	E100	1615177	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1618433	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1614960	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1615174	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1615180	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1615182	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1615183	1	19	5.2	5.0	✓
pH by Meter	E108	1615175	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	1615184	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	1617129	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1614958	1	16	6.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1618340	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1614956	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1614957	1	16	6.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1616356	1	11	9.0	5.0	✓
Turbidity by Nephelometry	E121	1615230	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1615176	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	1614959	1	16	6.2	5.0	✓
Chloride in Water by IC	E235.Cl	1615181	1	18	5.5	5.0	✓
Conductivity in Water	E100	1615177	1	17	5.8	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1618433	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1614960	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1615174	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1615180	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1615182	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1615183	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1615184	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	1617129	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1614958	1	16	6.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1618340	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1614956	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1614957	1	16	6.2	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1616356	1	11	9.0	5.0	✓
Turbidity by Nephelometry	E121	1615230	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1614959	1	16	6.2	5.0	✓
Chloride in Water by IC	E235.Cl	1615181	1	18	5.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1618433	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1614960	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1615174	1	11	9.0	5.0	✓
Fluoride in Water by IC	E235.F	1615180	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1615182	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1615183	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1615184	1	15	6.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1614958	1	16	6.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1618340	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1614956	1	16	6.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1614957	1	16	6.2	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

QUALITY CONTROL REPORT

Work Order	: **VA24C1387**	Page	: 1 of 14
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 24-Aug-2024
C-O-C number	: ----	Issue Date	: 03-Sep-2024 10:10
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Daniel Shabestani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1615175)											
VA24C1546-006	Anonymous	pH	----	E108	0.10	pH units	6.52	6.53	0.153%	4%	----
Physical Tests (QC Lot: 1615176)											
VA24C1546-006	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	2.1	2.2	0.1	Diff <2x LOR	----
Physical Tests (QC Lot: 1615177)											
VA24C1546-006	Anonymous	Conductivity	----	E100	2.0	µS/cm	8.5	8.5	0.05	Diff <2x LOR	----
Physical Tests (QC Lot: 1615230)											
VA24C1387-001	MP_QUL-LNF1_WS-1_2024-08	Turbidity	----	E121	0.10	NTU	0.17	0.18	0.009	Diff <2x LOR	----
Physical Tests (QC Lot: 1617129)											
KS2403344-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	168	173	6	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1614956)											
VA24C1383-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	0.421	0.426	1.29%	20%	----
Anions and Nutrients (QC Lot: 1614957)											
VA24C1383-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0842	0.0854	1.37%	20%	----
Anions and Nutrients (QC Lot: 1614958)											
VA24C1383-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0728	0.0713	2.01%	20%	----
Anions and Nutrients (QC Lot: 1614959)											
VA24C1383-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.276	0.276	0.0223%	20%	----
Anions and Nutrients (QC Lot: 1615174)											
VA24C1387-001	MP_QUL-LNF1_WS-1_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1615180)											
VA24C1546-006	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1615181)											
VA24C1546-006	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.57	0.57	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1615182)											
VA24C1546-006	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0402	0.0401	0.00004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1615183)											
VA24C1546-006	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1615184)											
VA24C1546-006	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.35	0.35	0.0004	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 1614960)											
VA24C1383-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	8.42	8.83	4.72%	20%	----
Total Metals (QC Lot: 1618340)											
VA24C1387-001	MP_QUL-LNF1_WS-1_2024-08	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0112	0.0126	0.0014	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00013	0.00017	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.00547	0.00535	2.14%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	0.000090	0.000040	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	15.7	16.1	2.19%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00061	0.00079	0.00018	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	0.000134	0.000084	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	0.0012	0.0002	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.100	mg/L	2.04	2.00	2.00%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00129	0.00144	11.0%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000387	0.000446	0.000058	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	0.00110	0.00060	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.515	0.524	1.80%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000109	0.000126	0.000018	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.59	1.52	5.05%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	0.939	0.955	1.71%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.125	0.127	1.75%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000142	0.000156	8.96%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	0.0062	0.0032	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1618433)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1618433) - continued											
VA24C1379-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	0.0077	0.0067	0.0009	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	0.0309	0.0314	1.56%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0756	0.0752	0.467%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000250	mg/L	0.0486	0.0498	2.42%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.250	mg/L	310	310	0.0384%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00050	mg/L	0.0248	0.0248	0.0637%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00100	mg/L	0.0221	0.0226	2.26%	20%	----
		Iron, dissolved	7439-89-6	E421	0.050	mg/L	6.88	7.00	1.70%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0054	0.0053	0.00008	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0250	mg/L	81.4	81.9	0.633%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00050	mg/L	22.1	22.7	2.58%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.000559	0.000599	0.000040	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00250	mg/L	0.0206	0.0210	0.00047	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.250	mg/L	6.73	6.76	0.440%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.250	mg/L	8.83	9.05	2.44%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.250	mg/L	21.0	21.8	3.61%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00100	mg/L	0.974	0.950	2.52%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.00144	0.00148	2.62%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0050	mg/L	5.27	5.34	1.40%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1615176)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1615177)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1615230)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1616356)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1617129)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1614956)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1614957)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1614958)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1614959)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1615174)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1615180)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1615181)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1615182)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1615183)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1615184)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 1614960)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1618340)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1618433)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1618433) - continued						
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1615175)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1615176)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Physical Tests (QCLot: 1615177)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1615230)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.5	85.0	115	----
Physical Tests (QCLot: 1616356)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	103	85.0	115	----
Physical Tests (QCLot: 1617129)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	98.2	85.0	115	----
Anions and Nutrients (QCLot: 1614956)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	94.6	75.0	125	----
Anions and Nutrients (QCLot: 1614957)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	95.9	80.0	120	----
Anions and Nutrients (QCLot: 1614958)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	96.7	80.0	120	----
Anions and Nutrients (QCLot: 1614959)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.9	85.0	115	----
Anions and Nutrients (QCLot: 1615174)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.2	80.0	120	----
Anions and Nutrients (QCLot: 1615180)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1615181)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1615182)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1615183)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1615184)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1614960)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	94.3	80.0	120	----
Total Metals (QCLot: 1618340)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	108	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	109	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	112	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	97.6	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	99.7	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	110	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	99.6	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	108	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	112	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	113	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	115	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	99.3	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	110	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.2	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1618433)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.3	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.0	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	93.6	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	93.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.1	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	95.5	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	95.1	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.4	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	93.9	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.6	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.8	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.3	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.3	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	96.6	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.6	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.8	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	89.5	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.7	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.1	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	96.6	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1614956)										
VA24C1383-002	Anonymous	Nitrogen, total	7727-37-9	E366	0.385 mg/L	0.4 mg/L	96.3	70.0	130	----
Anions and Nutrients (QCLot: 1614957)										
VA24C1383-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0496 mg/L	0.05 mg/L	99.3	70.0	130	----
Anions and Nutrients (QCLot: 1614958)										
VA24C1383-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0515 mg/L	0.05 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 1614959)										
VA24C1383-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0966 mg/L	0.1 mg/L	96.6	75.0	125	----
Anions and Nutrients (QCLot: 1615174)										
VA24C1387-002	MP_QUL-LNF1_WS-2_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0307 mg/L	0.03 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 1615180)										
VA24C1605-001	Anonymous	Fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1615181)										
VA24C1605-001	Anonymous	Chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1615182)										
VA24C1605-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1615183)										
VA24C1605-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.528 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1615184)										
VA24C1605-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1614960)										
VA24C1383-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.28 mg/L	5 mg/L	106	70.0	130	----
Total Metals (QCLot: 1618340)										
VA24C1387-002	MP_QUL-LNF1_WS-2_2024-08	Aluminum, total	7429-90-5	E420	0.198 mg/L	0.2 mg/L	99.1	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, total	7440-39-3	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00960 mg/L	0.01 mg/L	96.0	70.0	130	----
		Boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	93.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00396 mg/L	0.004 mg/L	99.1	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1618340) - continued										
VA24C1387-002	MP_QUL-LNF1_WS-2_2024-08	Cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		Copper, total	7440-50-8	E420	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		Iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	98.8	70.0	130	----
		Lead, total	7439-92-1	E420	0.0195 mg/L	0.02 mg/L	97.3	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0890 mg/L	0.1 mg/L	89.0	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		Potassium, total	7440-09-7	E420	4.02 mg/L	4 mg/L	100	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0429 mg/L	0.04 mg/L	107	70.0	130	----
		Silicon, total	7440-21-3	E420	9.82 mg/L	10 mg/L	98.2	70.0	130	----
		Silver, total	7440-22-4	E420	0.00398 mg/L	0.004 mg/L	99.5	70.0	130	----
		Sodium, total	7440-23-5	E420	1.92 mg/L	2 mg/L	96.3	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00378 mg/L	0.004 mg/L	94.5	70.0	130	----
		Tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00387 mg/L	0.004 mg/L	96.9	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0982 mg/L	0.1 mg/L	98.2	70.0	130	----
		Zinc, total	7440-66-6	E420	0.377 mg/L	0.4 mg/L	94.4	70.0	130	----
Dissolved Metals (QCLot: 1618433)										
VA24C1379-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0183 mg/L	0.02 mg/L	91.7	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0354 mg/L	0.04 mg/L	88.6	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00890 mg/L	0.01 mg/L	89.0	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.086 mg/L	0.1 mg/L	85.6	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0170 mg/L	0.02 mg/L	84.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.87 mg/L	2 mg/L	93.7	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0180 mg/L	0.02 mg/L	89.9	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0910 mg/L	0.1 mg/L	91.0	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0350 mg/L	0.04 mg/L	87.6	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.28 mg/L	10 mg/L	92.8	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1618433) - continued										
VA24C1379-002	Anonymous	Silver, dissolved	7440-22-4	E421	0.00190 mg/L	0.004 mg/L	47.5	70.0	130	MS-Ag
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00353 mg/L	0.004 mg/L	88.3	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0976 mg/L	0.1 mg/L	97.6	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.349 mg/L	0.4 mg/L	87.3	70.0	130	----

Qualifiers

Qualifier	Description
MS-Ag	MS-Ag: Matrix Spike recovery for silver was marginally below DQO (40 to <60%) due to its instability in the sample matrix. Silver was not detected. Reported result (< LOR) is reliable

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbc
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-007
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): C 1387

ALS Contact: Can Dang

Sampler: Sla ROs

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUTRIENTS-1 (F)	Total Metals (ICPMS) (P)	Dissolved Metals (ICPMS) (F)	Total Nitrogen Ammonia (P)	DOC (F/P)	TSS (Whole bottle)	Number of Containers
	MP_QUL-LNF1_WS-1_2024-08	19 -Aug-24	13:27	Water	R	R	R	R	R	R	
	MP_QUL-LNF1_WS-2_2024-08	19 -Aug-24	14:13	Water	R	R	R	R	R	R	
	MP_QUL-LNF1_WS-3_2024-08	19 -Aug-24	14:35	Water	R	R	R	R	R	R	
	MP_QUL-LNF1_WS-4_2024-08	19 -Aug-24	15:10	Water	R	R	R	R	R	R	
	MP_QUL-LNF1_WS-5_2024-08	19 -Aug-24	15:27	Water	R	R	R	R	R	R	
	~~MP_QUL-LREF1_WS-1_2024-08~~	~~20 -Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
	~~MP_QUL-LREF1_WS-2_2024-08~~	~~20 -Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
	~~MP_QUL-LREF1_WS-3_2024-08~~	~~20 -Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
	~~MP_QUL-LREF1_WS-4_2024-08~~	~~20 -Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
	~~MP_QUL-LREF1_WS-5_2024-08~~	~~20 -Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
	~~MP_QUL-LREF1_WS-X_2024-08~~	~~-Aug-24~~		~~Water~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	
											6

Environmental Division
Vancouver
Work Order Reference
VA24C1387

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	Regular analytes for Mount Polley Mine water sample package. Please also report ANIONS-N+N-CALC-VA (calculated nitrate and nitrite)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐ No ☐
Ice Packs ☑	Ice Cubes ☐	Custody seal intact	Yes ☐ No ☐
Cooling Initiated ☐			N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			6.7	8.9	5.5	7

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 20 -Aug-24	Time: 1215	Received by:	Date:	Time:	Received by: JC	Date: 21-8-24	Time: 945am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WATER QUALITY

ALS Laboratory Report VA24C1718

(Finalized September 13, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C1718**	Page	: 1 of 10
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 23-Aug-2024 13:00
PO	: 5590017616	Date Analysis Commenced	: 26-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Sep-2024 17:54
Sampler	: Sla RDS		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (13/09/2024): This report has been amended as a result of a request to change the sample collection time for, VA24C1718-001. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_WS-1_2024-08	MP_QUL-LREF1_WS-2_2024-08	MP_QUL-LREF1_WS-3_2024-08	MP_QUL-LREF1_WS-4_2024-08	MP_QUL-LREF1_WS-5_2024-08
					Client sampling date / time	21-Aug-2024 12:00	21-Aug-2024 13:00	21-Aug-2024 12:25	21-Aug-2024 13:15	21-Aug-2024 12:40
						VA24C1718-001	VA24C1718-002	VA24C1718-003	VA24C1718-004	VA24C1718-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		47.5	46.2	46.6	46.9	45.8
Conductivity	----	E100/VA	2.0	µS/cm		107	106	108	107	104
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		46.0	46.2	45.9	45.8	44.6
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		48.6	47.2	47.2	47.8	46.8
pH	----	E108/VA	0.10	pH units		7.98	7.97	7.94	7.95	8.05
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		64	59	66	77	64
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		1.2	<1.0	<1.0	1.2	1.1
Turbidity	----	E121/VA	0.10	NTU		0.40	0.35	0.44	0.43	0.37
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		<0.0050	0.0059	<0.0050	<0.0050	0.0056
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.032	0.032	0.032	0.034	0.033
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.0079	0.0110	0.0150	0.0072	0.0066
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		0.0079	0.0110	0.0150	0.0072	0.0066
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.089	0.087	0.095	0.104	0.157
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	0.0020	0.0029
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0051	0.0050	0.0062	0.0231	0.0070
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0021	<0.0020	<0.0020	0.0022	0.0024
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		6.23	6.17	6.19	6.22	6.17
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		2.30	2.44	2.15	2.16	2.21
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0230	0.0141	0.0140	0.0302	0.0153
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00020	0.00021	0.00020	0.00024	0.00026

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_WS-1_2024-08	MP_QUL-LREF1_WS-2_2024-08	MP_QUL-LREF1_WS-3_2024-08	MP_QUL-LREF1_WS-4_2024-08	MP_QUL-LREF1_WS-5_2024-08
					Client sampling date / time	21-Aug-2024 12:00	21-Aug-2024 13:00	21-Aug-2024 12:25	21-Aug-2024 13:15	21-Aug-2024 12:40
						VA24C1718-001	VA24C1718-002	VA24C1718-003	VA24C1718-004	VA24C1718-005
						Result	Result	Result	Result	Result
Total Metals										
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00670	0.00660	0.00678	0.00689	0.00671
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000053	<0.0000050	<0.0000050	0.0000063	<0.0000050
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		15.8	15.2	15.2	15.3	15.0
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00063	0.00063	0.00062	0.00070	0.00059
Iron, total	7439-89-6	E420/VA	0.030	mg/L		0.055	0.040	0.035	0.069	0.049
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		2.21	2.24	2.25	2.34	2.27
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00429	0.00333	0.00335	0.00582	0.00393
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000527	0.000504	0.000510	0.000508	0.000489
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.449	0.461	0.487	0.458	0.403
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000195	0.000181	0.000184	0.000221	0.000167
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.81	1.74	1.82	1.79	1.72
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	0.000010	<0.000010	<0.000010
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		1.03	1.02	1.03	1.08	1.04
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.111	0.112	0.112	0.108	0.105
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000136	0.000138	0.000139	0.000137	0.000134
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved Metals										

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_WS-1_2024-08	MP_QUL-LREF1_WS-2_2024-08	MP_QUL-LREF1_WS-3_2024-08	MP_QUL-LREF1_WS-4_2024-08	MP_QUL-LREF1_WS-5_2024-08
					Client sampling date / time	21-Aug-2024 12:00	21-Aug-2024 13:00	21-Aug-2024 12:25	21-Aug-2024 13:15	21-Aug-2024 12:40
						VA24C1718-001	VA24C1718-002	VA24C1718-003	VA24C1718-004	VA24C1718-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0109	0.0151	0.0078	0.0078	0.0073
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00018	0.00018	0.00016	0.00020	0.00020
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00651	0.00645	0.00630	0.00635	0.00668
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		14.7	14.9	14.7	14.6	14.2
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00059	0.00060	<0.00050	0.00062	0.00059
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	<0.030	<0.030
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		2.26	2.19	2.23	2.26	2.23
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00068	0.00065	0.00065	0.00072	0.00062
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000491	0.000486	0.000488	0.000525	0.000496
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.534	0.514	0.558	0.491	0.448
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000138	0.000142	0.000147	0.000204	0.000168
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.69	1.65	1.68	1.65	1.64
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		1.12	1.07	1.10	1.13	1.10
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.106	0.111	0.110	0.106	0.106
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000133	0.000131	0.000133	0.000131	0.000125

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_QUL-LREF1_WS-1_2024-08	MP_QUL-LREF1_WS-2_2024-08	MP_QUL-LREF1_WS-3_2024-08	MP_QUL-LREF1_WS-4_2024-08	MP_QUL-LREF1_WS-5_2024-08
				Client sampling date / time	21-Aug-2024 12:00	21-Aug-2024 13:00	21-Aug-2024 12:25	21-Aug-2024 13:15	21-Aug-2024 12:40
					VA24C1718-001	**VA24C1718-002**	**VA24C1718-003**	**VA24C1718-004**	**VA24C1718-005**
					Result	Result	Result	Result	Result
Dissolved Metals									
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L	0.0031	<0.0030	<0.0030	<0.0030	<0.0030
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_WS-1X_2024-08	----	----	----	----
					Client sampling date / time	21-Aug-2024 12:00	----	----	----	----
						VA24C1718-006	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		46.4	----	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		106	----	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		45.3	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		48.2	----	----	----	----
pH	----	E108/VA	0.10	pH units		7.98	----	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		65	----	----	----	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		<1.0	----	----	----	----
Turbidity	----	E121/VA	0.10	NTU		0.43	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		<0.0050	----	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		<0.50	----	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.033	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		0.0076	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		0.0076	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	----	----	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.088	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		<0.0010	----	----	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0040	----	----	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0027	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		6.20	----	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		2.19	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0241	----	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00023	----	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00682	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_QUL-LREF1_WS-1X_2024-08	----	----	----	----
					Client sampling date / time: 21-Aug-2024 12:00	----	----	----	----
					VA24C1718-006	--------	--------	--------	--------
					Result	----	----	----	----
Total Metals									
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	----	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	----	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	<0.0000050	----	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	15.5	----	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	0.00063	----	----	----	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L	0.052	----	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	----	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	<0.0010	----	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L	2.30	----	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00428	----	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	0.000511	----	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	0.473	----	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	0.000196	----	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	1.89	----	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	1.05	----	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.111	----	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	----	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L	<0.0100	----	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	0.000133	----	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	<0.00050	----	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	<0.0030	----	----	----	----
Dissolved Metals									
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L	0.0078	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_WS-1X_2024-08	----	----	----	----
					Client sampling date / time	21-Aug-2024 12:00	----	----	----	----
						VA24C1718-006	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00018	----	----	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00637	----	----	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	----	----	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	----	----	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		14.5	----	----	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	----	----	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00056	----	----	----	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	----	----	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		2.22	----	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00060	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000494	----	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.510	----	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000147	----	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.68	----	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		1.10	----	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.108	----	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	----	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000133	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MP_QUL-LREF1_WS-1X_2024-08	----	----	----	----
					Client sampling date / time	21-Aug-2024 12:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C1718-006	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	----	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C1718**	Page	: 1 of 21
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 23-Aug-2024 13:00
PO	: 5590017616	Issue Date	: 13-Sep-2024 17:54
C-O-C number	: ----		
Sampler	: Sla RDS		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1X_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-2_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-3_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-4_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-5_2024-08	E298	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	01-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-1_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-2_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-3_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-4_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-LREF1_WS-5_2024-08	E235.Cl	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LREF1_WS-1_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	28-Aug-2024	3 days	7 days	✗ EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	28-Aug-2024	3 days	7 days	✗ EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LREF1_WS-2_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	28-Aug-2024	3 days	7 days	✗ EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-LREF1_WS-3_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	28-Aug-2024	3 days	7 days	✗ EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-LREF1_WS-4_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	28-Aug-2024	3 days	7 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE										
MP_QUL-LREF1_WS-5_2024-08	E378-U	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	28-Aug-2024	3 days	7 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-1_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-1X_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-2_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-3_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-4_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
MP_QUL-LREF1_WS-5_2024-08	E235.F	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
MP_QUL-LREF1_WS-1_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-2_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-3_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-4_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-5_2024-08	E235.NO3-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-1_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-2_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-3_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	× EHT	27-Aug-2024	3 days	6 days	× EHT

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-4_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	27-Aug-2024	3 days	6 days	✗ EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-LREF1_WS-5_2024-08	E235.NO2-L	21-Aug-2024	27-Aug-2024	3 days	6 days	✗ EHT	27-Aug-2024	3 days	6 days	✗ EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-1_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-2_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-3_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-4_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-LREF1_WS-5_2024-08	E235.SO4	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-1_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-1X_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-2_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-3_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-4_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-5_2024-08	E375-T	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1X_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-2_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-3_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-4_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-5_2024-08	E366	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-1X_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-2_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-3_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-4_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-LREF1_WS-5_2024-08	E372-U	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	04-Sep-2024	28 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-1_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-1X_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-2_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-3_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-4_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-LREF1_WS-5_2024-08	E421	21-Aug-2024	31-Aug-2024	180 days	10 days	✓	04-Sep-2024	180 days	14 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-1_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-1X_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-2_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-3_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-4_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-LREF1_WS-5_2024-08	E358-L	21-Aug-2024	30-Aug-2024	28 days	9 days	✓	31-Aug-2024	28 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-1_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-2_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-3_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-4_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-LREF1_WS-5_2024-08	E290	21-Aug-2024	27-Aug-2024	14 days	6 days	✓	27-Aug-2024	14 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-LREF1_WS-1_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Conductivity in Water										
HDPE										
MP_QUL-LREF1_WS-1X_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_QUL-LREF1_WS-2_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_QUL-LREF1_WS-3_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_QUL-LREF1_WS-4_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE										
MP_QUL-LREF1_WS-5_2024-08	E100	21-Aug-2024	27-Aug-2024	28 days	6 days	✓	27-Aug-2024	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE										
MP_QUL-LREF1_WS-4_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	133 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	144 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
MP_QUL-LREF1_WS-2_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	134 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	144 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
MP_QUL-LREF1_WS-3_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	134 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	144 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
MP_QUL-LREF1_WS-5_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	134 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	144 hrs	✗ EHTR-FM

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE MP_QUL-LREF1_WS-1_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	135 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	145 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E108	21-Aug-2024	27-Aug-2024	0.25 hrs	135 hrs	✗ EHTR-FM	27-Aug-2024	0.25 hrs	145 hrs	✗ EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-1_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-1X_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-2_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-3_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-4_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-LREF1_WS-5_2024-08	E162	21-Aug-2024	----	----	----		28-Aug-2024	7 days	7 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-1_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-1X_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-2_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-3_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-4_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-LREF1_WS-5_2024-08	E164	21-Aug-2024	----	----	----		27-Aug-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LREF1_WS-1_2024-08	E121	21-Aug-2024	----	----	----		26-Aug-2024	3 days	5 days	✗ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LREF1_WS-2_2024-08	E121	21-Aug-2024	----	----	----		26-Aug-2024	3 days	5 days	✗ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LREF1_WS-3_2024-08	E121	21-Aug-2024	----	----	----		26-Aug-2024	3 days	5 days	✗ EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-LREF1_WS-4_2024-08	E121	21-Aug-2024	----	----	----		26-Aug-2024	3 days	5 days	✗ EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-LREF1_WS-1X_2024-08	E121	21-Aug-2024	----	----	----		27-Aug-2024	3 days	6 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_QUL-LREF1_WS-5_2024-08	E121	21-Aug-2024	----	----	----		27-Aug-2024	3 days	6 days	× EHT
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-1_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-1X_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-2_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-3_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-4_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_QUL-LREF1_WS-5_2024-08	E420	21-Aug-2024	03-Sep-2024	180 days	13 days	✓	04-Sep-2024	180 days	14 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1617463	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1626903	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	1617465	1	20	5.0	5.0	✓
Conductivity in Water	E100	1617464	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1622053	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1626904	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1617471	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1617469	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1617466	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1617467	1	20	5.0	5.0	✓
pH by Meter	E108	1617462	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1617468	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1621450	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1626906	1	14	7.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1621869	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1626901	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626902	1	18	5.5	5.0	✓
Turbidity by Nephelometry	E121	1617225	2	39	5.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1617463	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1626903	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	1617465	1	20	5.0	5.0	✓
Conductivity in Water	E100	1617464	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1622053	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1626904	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1617471	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1617469	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1617466	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1617467	1	20	5.0	5.0	✓
pH by Meter	E108	1617462	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1617468	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1621450	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1626906	1	14	7.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1621869	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1626901	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626902	1	18	5.5	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1620186	1	11	9.0	5.0	✓
Turbidity by Nephelometry	E121	1617225	2	39	5.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1617463	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1626903	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	1617465	1	20	5.0	5.0	✓
Conductivity in Water	E100	1617464	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1622053	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1626904	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1617471	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1617469	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1617466	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1617467	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1617468	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1621450	1	14	7.1	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1626906	1	14	7.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1621869	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1626901	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626902	1	18	5.5	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1620186	1	11	9.0	5.0	✓
Turbidity by Nephelometry	E121	1617225	2	39	5.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1626903	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	1617465	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1622053	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1626904	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1617471	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	1617469	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1617466	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1617467	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1617468	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1626906	1	14	7.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1621869	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1626901	1	18	5.5	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1626902	1	18	5.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

QUALITY CONTROL REPORT

Work Order	: **VA24C1718**	Page	: 1 of 15
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 23-Aug-2024 13:00
PO	: 5590017616	Date Analysis Commenced	: 26-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Sep-2024 17:54
Sampler	: Sla RDS		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 6		
No. of samples analysed	: 6		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1617225)											
VA24C1573-003	Anonymous	Turbidity	----	E121	0.10	NTU	5.07	5.24	3.30%	15%	----
Physical Tests (QC Lot: 1617462)											
KS2403417-001	Anonymous	pH	----	E108	0.10	pH units	8.46	8.46	0.00%	4%	----
Physical Tests (QC Lot: 1617463)											
KS2403417-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	218	216	0.553%	20%	----
Physical Tests (QC Lot: 1617464)											
KS2403417-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	548	546	0.366%	10%	----
Physical Tests (QC Lot: 1619526)											
VA24C1688-007	Anonymous	Turbidity	----	E121	0.10	NTU	1.45	1.43	1.39%	15%	----
Physical Tests (QC Lot: 1621450)											
KS2403422-002	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	424	373	12.7%	20%	----
Anions and Nutrients (QC Lot: 1617465)											
KS2403417-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	13.7	13.7	0.307%	20%	----
Anions and Nutrients (QC Lot: 1617466)											
KS2403417-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0166	0.0161	0.0005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1617467)											
KS2403417-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1617468)											
KS2403417-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	57.6	57.5	0.272%	20%	----
Anions and Nutrients (QC Lot: 1617469)											
KS2403417-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.139	0.134	0.005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1617471)											
KS2403417-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0229	0.0238	4.06%	20%	----
Anions and Nutrients (QC Lot: 1626901)											
VA24C1700-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.150	mg/L	2.88	2.86	0.375%	20%	----
Anions and Nutrients (QC Lot: 1626902)											
VA24C1700-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0097	0.0097	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1626903)											
VA24C1700-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1626906)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1626906) - continued											
VA24C1716-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.106	0.105	0.751%	20%	----
Organic / Inorganic Carbon (QC Lot: 1626904)											
VA24C1700-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Total Metals (QC Lot: 1621869)											
VA24C1673-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0094	0.0090	0.0004	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00065	0.00066	0.00001	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00036	0.00037	0.00001	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	2.12	2.04	4.10%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.019	0.020	0.0005	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000210	0.0000183	0.0000027	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	66.6	69.4	4.09%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00044	0.00042	0.00002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.230	0.220	4.53%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0038	0.0039	0.0001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	49.0	47.8	2.33%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0224	0.0220	1.70%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00898	0.00936	4.11%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00379	0.00368	0.00011	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	3.17	3.12	1.52%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000215	0.000178	0.000037	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.36	1.35	0.906%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	21.0	20.8	0.867%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.582	0.597	2.50%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	0.00012	0.00011	0.00001	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000537	0.000555	3.38%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00172	0.00171	0.000005	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1621869) - continued											
VA24C1673-001	Anonymous	Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1622053)											
VA24C1673-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0012	0.0013	0.0001	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00058	0.00056	0.00002	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00029	0.00029	0.000006	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.466	0.445	4.66%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.016	0.016	0.0002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000152	0.0000170	0.0000018	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	61.9	60.9	1.53%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00017	0.00016	0.000010	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0036	0.0036	0.00008	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	45.7	46.3	1.20%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00587	0.00575	2.00%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00859	0.00840	2.30%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00219	0.00213	0.00006	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	3.52	3.50	0.779%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000209	0.000218	0.000009	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.20	1.21	1.32%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	20.9	21.2	1.28%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.646	0.624	3.41%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00010	<0.00010	0.000001	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000389	0.000395	1.52%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00130	0.00130	0.0000002	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1617225)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1617463)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1617464)						
Conductivity	----	E100	1	µS/cm	1.0	----
Physical Tests (QCLot: 1619526)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1620186)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1621450)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1617465)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1617466)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1617467)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1617468)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1617469)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1617471)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1626901)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1626902)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1626903)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1626906)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Organic / Inorganic Carbon (QCLot: 1626904)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1621869)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	MBRR
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1622053)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1622053) - continued						
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Qualifiers

Qualifier	Description
MBRR	Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1617225)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.0	85.0	115	----
Physical Tests (QCLot: 1617462)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1617463)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	97.0	85.0	115	----
Physical Tests (QCLot: 1617464)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1619526)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.0	85.0	115	----
Physical Tests (QCLot: 1620186)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	97.7	85.0	115	----
Physical Tests (QCLot: 1621450)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1617465)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1617466)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1617467)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1617468)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1617469)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1617471)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	109	80.0	120	----
Anions and Nutrients (QCLot: 1626901)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	93.4	75.0	125	----
Anions and Nutrients (QCLot: 1626902)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.0	80.0	120	----
Anions and Nutrients (QCLot: 1626903)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1626903) - continued									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.1	85.0	115	----
Anions and Nutrients (QCLot: 1626906)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	90.7	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1626904)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	92.8	80.0	120	----
Total Metals (QCLot: 1621869)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	97.7	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	94.0	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	93.6	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	88.1	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	94.6	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	96.7	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	94.8	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	88.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.1	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	110	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	89.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	96.4	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.8	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.9	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.0	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1621869) - continued									
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	98.5	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	99.2	80.0	120	----
Dissolved Metals (QCLot: 1622053)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100.0	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.5	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.4	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	85.7	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	93.1	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	95.7	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.6	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	93.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.9	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	96.7	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.4	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.5	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	93.8	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.4	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.7	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.3	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.9	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.0	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1617465)										
KS2403417-002	Anonymous	Chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1617466)										
KS2403417-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1617467)										
KS2403417-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.531 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1617468)										
KS2403417-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1617469)										
KS2403417-002	Anonymous	Fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1617471)										
KS2403417-002	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1626901)										
VA24C1700-002	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1626902)										
VA24C1700-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0488 mg/L	0.05 mg/L	97.5	70.0	130	----
Anions and Nutrients (QCLot: 1626903)										
VA24C1700-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0935 mg/L	0.1 mg/L	93.5	75.0	125	----
Anions and Nutrients (QCLot: 1626906)										
VA24C1716-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0470 mg/L	0.05 mg/L	94.1	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1626904)										
VA24C1700-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	5.08 mg/L	5 mg/L	102	70.0	130	----
Total Metals (QCLot: 1621869)										
VA24C1673-002	Anonymous	Aluminum, total	7429-90-5	E420	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0180 mg/L	0.02 mg/L	90.1	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0351 mg/L	0.04 mg/L	87.7	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00859 mg/L	0.01 mg/L	85.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.082 mg/L	0.1 mg/L	82.5	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00364 mg/L	0.004 mg/L	91.1	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1621869) - continued										
VA24C1673-002	Anonymous	Copper, total	7440-50-8	E420	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		Iron, total	7439-89-6	E420	1.87 mg/L	2 mg/L	93.4	70.0	130	----
		Lead, total	7439-92-1	E420	0.0177 mg/L	0.02 mg/L	88.5	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0811 mg/L	0.1 mg/L	81.1	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Potassium, total	7440-09-7	E420	3.96 mg/L	4 mg/L	99.1	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
		Silicon, total	7440-21-3	E420	9.19 mg/L	10 mg/L	91.9	70.0	130	----
		Silver, total	7440-22-4	E420	0.00362 mg/L	0.004 mg/L	90.5	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00346 mg/L	0.004 mg/L	86.6	70.0	130	----
		Tin, total	7440-31-5	E420	0.0186 mg/L	0.02 mg/L	93.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00375 mg/L	0.004 mg/L	93.8	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Zinc, total	7440-66-6	E420	0.372 mg/L	0.4 mg/L	92.9	70.0	130	----
Dissolved Metals (QCLot: 1622053)										
VA24C1673-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.189 mg/L	0.2 mg/L	94.3	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0184 mg/L	0.02 mg/L	92.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00829 mg/L	0.01 mg/L	82.9	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.078 mg/L	0.1 mg/L	78.2	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0367 mg/L	0.04 mg/L	91.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0181 mg/L	0.02 mg/L	90.5	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0174 mg/L	0.02 mg/L	87.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.81 mg/L	2 mg/L	90.4	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0181 mg/L	0.02 mg/L	90.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0903 mg/L	0.1 mg/L	90.3	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0182 mg/L	0.02 mg/L	91.3	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0349 mg/L	0.04 mg/L	87.2	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.51 mg/L	4 mg/L	87.7	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.14 mg/L	10 mg/L	91.4	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00311 mg/L	0.004 mg/L	77.9	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1622053) - continued										
VA24C1673-002	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00366 mg/L	0.004 mg/L	91.5	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0187 mg/L	0.02 mg/L	93.3	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0365 mg/L	0.04 mg/L	91.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0933 mg/L	0.1 mg/L	93.3	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.375 mg/L	0.4 mg/L	93.7	70.0	130	----

Chain of Custody (COC) / [illegible] Request Form

COC Number: 20 -

Page 1 of

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Vancouver
Work Order Reference
VA24C1718

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients		Turnaround Time (TAT)
Company:	Mount Polley Mining Corp.	Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surch
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked		☐ 3 day [P3] if received by 3pm M-F - 25% rush
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush
Street:	PO BOX 12	Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca	☐ 1 day [E] if received by 3pm M-F - 100% rush
City/Province:	Likely, BC	Email 2	slatimer@minnow.ca;kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200
Postal Code:	V0L 1N0	Email 3	simone.derosemond@minnow.ca	* Additional fees may apply to rush re
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Recipients**		Date and Time Required for all E&P TAT
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs
Company:		Email 1 or Fax	On File	
Contact:	On File	Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-007	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task7	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	1718	ALS Contact: Can Dang	Sampler: SLa ROS

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: Moisture Content by Gravimetry (ETAR)	Mercury in Biota by CVAAS (CRV soils, Routine) E510	Mercury in Biota by CVAAS (WET ormis, Routine) E510A	Metals in Biota by CRC ICPMS (DRY soils, Routine) E440	Silver in Biota by CRC ICPMS (DRY soils, Routine) E440-Ag	Tantalum in Biota by CRC ICPMS (DRY ormis, Routine) E440-Ta	NUTRIENTS-1	Total Metals (ICPMS)	Dissolved Metals (ICPMS) F	Total Nitrogen Ammonia P	DOC F/P	TSS (Whole bottle)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_HAC- S _RB-WB-1_2024-08 MP_QUL-LREF1_WS-1_2024-08	21-Aug-24	12:00	~~Tissue~~ water	6	R	R	R	R	R	R	R	R	R	R	R	R			
	MP_HAC- S _RB-WB-2_2024-08 MP_QUL-LREF1_WS-2_2024-08	21-Aug-24	13:00	~~Tissue~~	6	R	R	R	R	R	R	R	R	R	R	R	R			
	MP_HAC- S _RB-WB-3_2024-08 MP_QUL-LREF1_WS-3_2024-08	21-Aug-24	12:25	~~Tissue~~	6	R	R	R	R	R	R	R	R	R	R	R	R			
	MP_HAC- S _RB-WB-4_2024-08 MP_QUL-LREF1_WS-4_2024-08	21-Aug-24	13:15	~~Tissue~~	6	R	R	R	R	R	R	R	R	R	R	R	R			
	MP_HAC- S _RB-WB-5_2024-08 MP_QUL-LREF1_WS-5_2024-08	21-Aug-24	12:40	~~Tissue~~	6	R	R	R	R	R	R	R	R	R	R	R	R			
	MP_HAC- S _RB-WB-6_2024-08 MP_QUL-LREF1_WS-1X_2024-08	21-Aug-24	12:00	~~Tissue~~ water	6	R	R	R	R	R	R	R	R	R	R	R	R			
	~~MP_HAC- S _RB-WB-7_2024-08~~	~~Aug-24~~		~~Tissue~~	6	R	R	R	R	R	R	R	R	R	R	R	R			
	~~MP_HAC- S _RB-WB-8_2024-08~~	~~Aug-24~~		~~Tissue~~	1	R	R	R	R	R	R									
	~~MP_HAC-R5_RB-WB-1_2024-08~~	~~Aug-24~~		~~Tissue~~	1	R	R	R	R	R	R									
	~~MP_HAC-R5_RB-WB-2_2024-08~~	~~Aug-24~~		~~Tissue~~	1	R	R	R	R	R	R									
	~~MP_HAC-R5_RB-WB-3_2024-08~~	~~Aug-24~~		Tissue	1	R	R	R	R	R	R									
	~~MP_HAC-R5_RB-WB-4_2024-08~~	~~Aug-24~~		Tissue	1	R	R	R	R	R	R									

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	Regular analytes for Mt Polley Mine water sample package. Pls also report ANIONS-NH4-N-CALC-VA (Calculated nitrate nitrite)
Are samples for human consumption/ use? ☐ YES ☐ NO	~~If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICRMS). Report in dry weight except mercury (both wet and dry).~~

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
						8	5.4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
S.Latimer SL	22-Aug-24 ~~0815~~	6:15				JC	Rcvd 23Aug2024	1300

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WATER QUALITY

ALS Laboratory Report VA24C2066

(Finalized October 31, 2024)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C2066**			
Amendment	:	**1**			
Client	:	**Mount Polley Mining Corporation**	Laboratory	:	ALS Environmental - Vancouver
Contact	:	Mr. Gabriel Holmes	Account Manager	:	Can Dang
Address	:	PO Box 12 Likely British Columbia Canada V0L 1N0	Address	:	8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	250-790-2215 ext 2171	Telephone	:	+1 604 253 4188
Project	:	24-04 Task 5	Date Samples Received	:	27-Aug-2024 11:30
PO	:	5590017616	Date Analysis Commenced	:	30-Aug-2024
C-O-C number	:	----	Issue Date	:	31-Oct-2024 11:20
Sampler	:	----			
Site	:	----			
Quote number	:	Mount Polley Standing Offer 2024			
No. of samples received	:	3			
No. of samples analysed	:	3			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units
µS/cm	microsiemens per centimetre
-	no units

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (31/10/YYYY): This report has been amended as a result of a request to change sample identification numbers for all samples. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	MP_QUL-ZOO-1_WS-1_2024-08	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	----	----
				Client sampling date / time	25-Aug-2024 13:30	25-Aug-2024 09:35	25-Aug-2024 09:35	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C2066-001	VA24C2066-002	VA24C2066-003	----	----
					Result	Result	Result	----	----
Physical Tests									
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	48.2	48.1	47.9	----	----
Conductivity	----	E100/VA	2.0	µS/cm	103	108	108	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L	48.5	49.1	50.5	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L	45.6	47.3	48.1	----	----
pH	----	E108/VA	0.10	pH units	7.99	7.97	7.99	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	78	70	74	----	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L	<1.0	<1.0	1.5	----	----
Turbidity	----	E121/VA	0.10	NTU	0.67	0.60	1.09	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	0.0072	0.0077	0.0071	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	<0.50	<0.50	<0.50	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	0.032	0.035	0.032	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L	0.0464	0.0411	0.0413	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L	0.0464	0.0411	0.0413	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L	0.134	0.143	0.131	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	0.0032	0.0033	0.0034	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L	<0.0020	<0.0020	0.0026	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	5.98	6.15	6.12	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-08	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	----	----
					Client sampling date / time	25-Aug-2024 13:30	25-Aug-2024 09:35	25-Aug-2024 09:35	----	----
						VA24C2066-001	VA24C2066-002	VA24C2066-003	----	----
						Result	Result	Result	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		2.18	2.40	2.32	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0338	0.0676	0.0286	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00012	0.00016	0.00013	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.00576	0.00688	0.00554	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		<0.010	<0.010	<0.010	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000054	0.0000134	0.0000099	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		15.0	15.6	16.0	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00156	0.00447	0.00209	----	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L		<0.030	0.063	<0.030	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		<0.000050	0.000073	<0.000050	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		1.98	2.03	1.97	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.00164	0.00290	0.00200	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.000355	0.000360	0.000346	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-08	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	----	----
					Client sampling date / time	25-Aug-2024 13:30	25-Aug-2024 09:35	25-Aug-2024 09:35	----	----
						VA24C2066-001	VA24C2066-002	VA24C2066-003	----	----
						Result	Result	Result	----	----
Total Metals										
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.486	0.515	0.497	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000141	0.000108	0.000119	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.48	1.59	1.46	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	<0.000010	0.000010	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		0.913	1.04	0.979	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.123	0.126	0.131	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000162	0.000160	0.000166	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	0.0035	<0.0030	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0080	0.0087	0.0106	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00011	0.00011	0.00011	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.00527	0.00552	0.00577	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		<0.010	<0.010	<0.010	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	0.0000137	0.0000087	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_WS-1_2024-08	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	----	----
					Client sampling date / time	25-Aug-2024 13:30	25-Aug-2024 09:35	25-Aug-2024 09:35	----	----
						VA24C2066-001	VA24C2066-002	VA24C2066-003	----	----
						Result	Result	Result	----	----
Dissolved Metals										
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		16.2	16.3	16.9	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00056	0.00121	0.00116	----	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		<0.030	<0.030	<0.030	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		1.96	2.03	2.01	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.00070	0.00072	0.00072	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.000369	0.000349	0.000357	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.480	0.530	0.514	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000112	0.000129	0.000101	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.46	1.46	1.46	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		0.867	1.04	0.956	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.135	0.133	0.136	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	<0.0100	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000150	0.000149	0.000148	----	----

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

					Client sample ID	MP_QUL-ZOO-1_WS-1_2024-08	MP_QUL-ZOO-7_WS-1_2024-08	MP_QUL-ZOO-7_WS-1X_2024-08	----	----
					Client sampling date / time	25-Aug-2024 13:30	25-Aug-2024 09:35	25-Aug-2024 09:35	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	VA24C2066-001	VA24C2066-002	VA24C2066-003	----	----	
					Result	Result	Result	----	----	
Dissolved Metals										
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L	<0.0030	<0.0030	<0.0030	----	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2066**	Page	: 1 of 15
Amendment	: **1**		
Client	: **Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	: Mr. Gabriel Holmes	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 250-790-2215 ext 2171	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 27-Aug-2024 11:30
PO	: 5590017616	Issue Date	: 31-Oct-2024 11:19
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Mount Polley Standing Offer 2024		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-08	E298	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-08	E298	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1X_2024-08	E298	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E235.Cl	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E235.Cl	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E235.Cl	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E378-U	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	31-Aug-2024	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E378-U	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	31-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E378-U	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	31-Aug-2024	3 days	6 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E235.F	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E235.F	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E235.F	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E235.NO3-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E235.NO3-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E235.NO3-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E235.NO2-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E235.NO2-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E235.NO2-L	25-Aug-2024	30-Aug-2024	3 days	5 days	× EHT	30-Aug-2024	3 days	5 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E235.SO4	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E235.SO4	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E235.SO4	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	30-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-08	E375-T	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-08	E375-T	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-7_WS-1X_2024-08	E375-T	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-08	E366	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-08	E366	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1X_2024-08	E366	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	11 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-08	E372-U	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-08	E372-U	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP_QUL-ZOO-7_WS-1X_2024-08	E372-U	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	04-Sep-2024	28 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-ZOO-1_WS-1_2024-08	E421	25-Aug-2024	05-Sep-2024	180 days	11 days	✓	06-Sep-2024	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-ZOO-7_WS-1_2024-08	E421	25-Aug-2024	05-Sep-2024	180 days	11 days	✓	06-Sep-2024	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved) MP_QUL-ZOO-7_WS-1X_2024-08	E421	25-Aug-2024	05-Sep-2024	180 days	11 days	✓	06-Sep-2024	180 days	12 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-1_WS-1_2024-08	E358-L	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	03-Sep-2024	28 days	9 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-7_WS-1_2024-08	E358-L	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	03-Sep-2024	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) MP_QUL-ZOO-7_WS-1X_2024-08	E358-L	25-Aug-2024	02-Sep-2024	28 days	8 days	✓	03-Sep-2024	28 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E290	25-Aug-2024	30-Aug-2024	14 days	5 days	✓	02-Sep-2024	14 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E290	25-Aug-2024	30-Aug-2024	14 days	5 days	✓	02-Sep-2024	14 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E290	25-Aug-2024	30-Aug-2024	14 days	5 days	✓	02-Sep-2024	14 days	8 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E100	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	02-Sep-2024	28 days	8 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E100	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	02-Sep-2024	28 days	8 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E100	25-Aug-2024	30-Aug-2024	28 days	5 days	✓	02-Sep-2024	28 days	8 days	✓
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E108	25-Aug-2024	30-Aug-2024	0.25 hrs	122 hrs	× EHTR-FM	02-Sep-2024	0.25 hrs	188 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E108	25-Aug-2024	30-Aug-2024	0.25 hrs	126 hrs	× EHTR-FM	02-Sep-2024	0.25 hrs	192 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E108	25-Aug-2024	30-Aug-2024	0.25 hrs	126 hrs	× EHTR-FM	02-Sep-2024	0.25 hrs	192 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E162	25-Aug-2024	----	----	----		31-Aug-2024	7 days	5 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E162	25-Aug-2024	----	----	----		31-Aug-2024	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E162	25-Aug-2024	----	----	----		31-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-ZOO-1_WS-1_2024-08	E164	25-Aug-2024	----	----	----		31-Aug-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-ZOO-7_WS-1_2024-08	E164	25-Aug-2024	----	----	----		31-Aug-2024	7 days	6 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_QUL-ZOO-7_WS-1X_2024-08	E164	25-Aug-2024	----	----	----		31-Aug-2024	7 days	6 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-ZOO-1_WS-1_2024-08	E121	25-Aug-2024	----	----	----		03-Sep-2024	3 days	9 days	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-ZOO-7_WS-1_2024-08	E121	25-Aug-2024	----	----	----		03-Sep-2024	3 days	9 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE MP_QUL-ZOO-7_WS-1X_2024-08	E121	25-Aug-2024	----	----	----		03-Sep-2024	3 days	9 days	× EHT
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_QUL-ZOO-1_WS-1_2024-08	E420	25-Aug-2024	04-Sep-2024	180 days	10 days	✓	06-Sep-2024	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_QUL-ZOO-7_WS-1_2024-08	E420	25-Aug-2024	04-Sep-2024	180 days	10 days	✓	06-Sep-2024	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) MP_QUL-ZOO-7_WS-1X_2024-08	E420	25-Aug-2024	04-Sep-2024	180 days	10 days	✓	06-Sep-2024	180 days	12 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1626883	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1628905	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	1626886	1	16	6.2	5.0	✓
Conductivity in Water	E100	1626884	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1631894	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1628906	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1626892	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	1626885	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1626887	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1626888	1	16	6.2	5.0	✓
pH by Meter	E108	1626882	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1626889	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	1627459	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1628911	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1628068	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1628909	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1628910	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1630216	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1626883	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1628905	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	1626886	1	16	6.2	5.0	✓
Conductivity in Water	E100	1626884	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1631894	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1628906	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1626892	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	1626885	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1626887	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1626888	1	16	6.2	5.0	✓
pH by Meter	E108	1626882	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1626889	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	1627459	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1628911	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1628068	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1628909	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1628910	1	9	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
TSS by Gravimetry (Whole Bottle)	E164	1627457	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1630216	1	16	6.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1626883	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1628905	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	1626886	1	16	6.2	5.0	✓
Conductivity in Water	E100	1626884	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1631894	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1628906	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1626892	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	1626885	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1626887	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1626888	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1626889	1	16	6.2	5.0	✓
TDS by Gravimetry	E162	1627459	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1628911	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1628068	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1628909	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1628910	1	9	11.1	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1627457	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1630216	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1628905	1	12	8.3	5.0	✓
Chloride in Water by IC	E235.Cl	1626886	1	16	6.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1631894	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1628906	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1626892	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	1626885	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1626887	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1626888	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1626889	1	16	6.2	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1628911	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1628068	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1628909	1	9	11.1	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1628910	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	ALS Environmental - Vancouver			

QUALITY CONTROL REPORT

Work Order	: **VA24C2066**	Page	: 1 of 14
Amendment	: **1**		
Client	: Mount Polley Mining Corporation	Laboratory	: ALS Environmental - Vancouver
Contact	: Mr. Gabriel Holmes	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: 250-790-2215 ext 2171	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 27-Aug-2024 11:30
PO	: 5590017616	Date Analysis Commenced	: 30-Aug-2024
C-O-C number	: ----	Issue Date	: 31-Oct-2024 11:19
Sampler	: ----		
Site	: ----		
Quote number	: Mount Polley Standing Offer 2024		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1626882)											
VA24C2066-001	MP_QUL-ZOO-1_WS-1_2024-08	pH	----	E108	0.10	pH units	7.99	7.99	0.00%	4%	----
Physical Tests (QC Lot: 1626883)											
VA24C2066-003	MP_QUL-ZOO-7_WS-1X_2024-08	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	47.9	48.0	0.208%	20%	----
Physical Tests (QC Lot: 1626884)											
VA24C2066-001	MP_QUL-ZOO-1_WS-1_2024-08	Conductivity	----	E100	2.0	µS/cm	103	106	2.76%	10%	----
Physical Tests (QC Lot: 1627459)											
VA24C1891-006	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	2710	2670	1.52%	20%	----
Physical Tests (QC Lot: 1630216)											
FJ2402588-005	Anonymous	Turbidity	----	E121	0.10	NTU	14.4	14.2	1.40%	15%	----
Anions and Nutrients (QC Lot: 1626885)											
VA24C2071-002	Anonymous	Fluoride	16984-48-8	E235.F	0.200	mg/L	<0.200	<0.200	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1626886)											
VA24C2071-002	Anonymous	Chloride	16887-00-6	E235.Cl	5.00	mg/L	149	152	1.88%	20%	----
Anions and Nutrients (QC Lot: 1626887)											
VA24C2071-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0500	mg/L	28.5	29.0	1.81%	20%	----
Anions and Nutrients (QC Lot: 1626888)											
VA24C2071-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0100	mg/L	1.61	1.65	2.37%	20%	----
Anions and Nutrients (QC Lot: 1626889)											
VA24C2071-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	3.00	mg/L	131	134	2.36%	20%	----
Anions and Nutrients (QC Lot: 1626892)											
VA24C2066-001	MP_QUL-ZOO-1_WS-1_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1628905)											
FJ2402599-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.100	mg/L	3.62	3.68	1.71%	20%	----
Anions and Nutrients (QC Lot: 1628909)											
VA24C2052-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1628910)											
VA24C2052-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1628911)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Anions and Nutrients (QC Lot: 1628911) - continued											
VA24C2052-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1628906)											
VA24C1975-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.03	1.96	0.07	Diff <2x LOR	----
Total Metals (QC Lot: 1628068)											
FJ2402583-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0062	0.0058	0.0004	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00010	<0.00010	0.000003	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.149	0.145	2.98%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000245	0.0000246	0.0000002	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	34.5	34.4	0.144%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0063	0.0066	0.0003	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	10.1	10.2	1.17%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00015	0.00014	0.00001	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000332	0.000358	0.000026	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.421	0.424	0.003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.00122	0.00120	1.42%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.98	1.95	1.18%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	2.62	2.62	0.0805%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0771	0.0760	1.38%	20%	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000272	0.000263	3.30%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1628068) - continued											
FJ2402583-001	Anonymous	Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1631894)											
VA24C1963-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0016	0.0015	0.00010	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00012	0.00011	0.00002	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00020	0.00019	0.000009	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.159	0.162	1.74%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000151	0.0000144	0.0000007	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	44.0	45.0	2.22%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.078	0.079	0.001	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0060	0.0061	0.00009	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	10.8	10.7	0.912%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0134	0.0135	0.593%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00128	0.00128	0.750%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.403	0.397	0.006	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000454	0.000449	0.000005	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.36	1.37	0.654%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.74	1.72	1.44%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.132	0.132	0.167%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00011	<0.00010	0.00001	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000284	0.000292	2.74%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1626883)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1626884)						
Conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 1627457)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1627459)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1630216)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Anions and Nutrients (QCLot: 1626885)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1626886)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1626887)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1626888)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1626889)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1626892)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1628905)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1628909)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 1628910)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1628911)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 1628906)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1628068)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1631894)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1631894) - continued						
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1626882)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1626883)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.3	85.0	115	----
Physical Tests (QCLot: 1626884)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	96.1	90.0	110	----
Physical Tests (QCLot: 1627457)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1627459)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	112	85.0	115	----
Physical Tests (QCLot: 1630216)									
Turbidity	----	E121	0.1	NTU	200 NTU	98.5	85.0	115	----
Anions and Nutrients (QCLot: 1626885)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.9	90.0	110	----
Anions and Nutrients (QCLot: 1626886)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 1626887)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.9	90.0	110	----
Anions and Nutrients (QCLot: 1626888)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1626889)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1626892)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	101	80.0	120	----
Anions and Nutrients (QCLot: 1628905)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.3	85.0	115	----
Anions and Nutrients (QCLot: 1628909)									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.2	75.0	125	----
Anions and Nutrients (QCLot: 1628910)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	89.7	80.0	120	----
Anions and Nutrients (QCLot: 1628911)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	91.2	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1628906)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.8	80.0	120	----
Total Metals (QCLot: 1628068)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	94.6	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	96.6	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	93.4	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	97.4	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100.0	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	96.0	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.0	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.2	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.6	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	93.6	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	94.5	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	96.6	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.5	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.6	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	93.2	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.2	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1631894)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	97.5	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	90.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	91.8	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	93.4	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.0	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.8	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	103	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.9	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.1	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	93.0	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.0	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	103	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1626885)										
VA24C2071-003	Anonymous	Fluoride	16984-48-8	E235.F	10.00 mg/L	10 mg/L	100.0	75.0	125	----
Anions and Nutrients (QCLot: 1626886)										
VA24C2071-003	Anonymous	Chloride	16887-00-6	E235.Cl	1020 mg/L	1000 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1626887)										
VA24C2071-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1626888)										
VA24C2071-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	5.04 mg/L	5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1626889)										
VA24C2071-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1020 mg/L	1000 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1626892)										
VA24C2066-002	MP_QUL-ZOO-7_WS-1_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0300 mg/L	0.03 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 1628905)										
VA24C2052-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0938 mg/L	0.1 mg/L	93.8	75.0	125	----
Anions and Nutrients (QCLot: 1628909)										
VA24C2055-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.390 mg/L	0.4 mg/L	97.5	70.0	130	----
Anions and Nutrients (QCLot: 1628910)										
VA24C2055-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0460 mg/L	0.05 mg/L	92.0	70.0	130	----
Anions and Nutrients (QCLot: 1628911)										
VA24C2055-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0460 mg/L	0.05 mg/L	91.9	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1628906)										
VA24C1975-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Total Metals (QCLot: 1628068)										
FJ2402583-002	Anonymous	Aluminum, total	7429-90-5	E420	0.185 mg/L	0.2 mg/L	92.3	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0186 mg/L	0.02 mg/L	93.3	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		Barium, total	7440-39-3	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0352 mg/L	0.04 mg/L	87.9	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		Boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	93.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00399 mg/L	0.004 mg/L	99.8	70.0	130	----
		Calcium, total	7440-70-2	E420	3.57 mg/L	4 mg/L	89.3	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0389 mg/L	0.04 mg/L	97.2	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1628068) - continued										
FJ2402583-002	Anonymous	Cobalt, total	7440-48-4	E420	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Copper, total	7440-50-8	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Iron, total	7439-89-6	E420	1.96 mg/L	2 mg/L	98.1	70.0	130	----
		Lead, total	7439-92-1	E420	0.0185 mg/L	0.02 mg/L	92.7	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0835 mg/L	0.1 mg/L	83.5	70.0	130	----
		Magnesium, total	7439-95-4	E420	0.962 mg/L	1 mg/L	96.2	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0396 mg/L	0.04 mg/L	98.9	70.0	130	----
		Potassium, total	7440-09-7	E420	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		Silicon, total	7440-21-3	E420	9.19 mg/L	10 mg/L	91.9	70.0	130	----
		Silver, total	7440-22-4	E420	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		Sodium, total	7440-23-5	E420	2.02 mg/L	2 mg/L	101	70.0	130	----
		Strontium, total	7440-24-6	E420	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00397 mg/L	0.004 mg/L	99.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0365 mg/L	0.04 mg/L	91.3	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00423 mg/L	0.004 mg/L	106	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0952 mg/L	0.1 mg/L	95.2	70.0	130	----
		Zinc, total	7440-66-6	E420	0.393 mg/L	0.4 mg/L	98.3	70.0	130	----
Dissolved Metals (QCLot: 1631894)										
VA24C1963-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.192 mg/L	0.2 mg/L	96.2	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0382 mg/L	0.04 mg/L	95.5	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00911 mg/L	0.01 mg/L	91.1	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.092 mg/L	0.1 mg/L	92.5	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00395 mg/L	0.004 mg/L	98.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	92.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.3	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0960 mg/L	0.1 mg/L	96.0	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0374 mg/L	0.04 mg/L	93.4	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.96 mg/L	4 mg/L	99.1	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.63 mg/L	10 mg/L	96.3	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1631894) - continued										
VA24C1963-002	Anonymous	Silver, dissolved	7440-22-4	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00379 mg/L	0.004 mg/L	94.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0370 mg/L	0.04 mg/L	92.5	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00386 mg/L	0.004 mg/L	96.5	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0985 mg/L	0.1 mg/L	98.5	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.406 mg/L	0.4 mg/L	102	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: 20 -

Environmental Division Vancouver
Work Order Reference
VA24C2066

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, st

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #: VA24-MPMC100-007
Job #:
PO / AFE: 24-04 Task 5
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1	Total Metals	Dissolved Metals	TN, NH3	DOC	TSS (Whole Bottle)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~MP_POL-P2_WS-1_2024-08~~	~~Aug-24~~		~~Water~~	~~6~~	R	R	R	R	R	R			
	~~MP_POL-P2_WS-1_2024-08~~	~~Aug-24~~		~~Water~~	~~6~~	R	R	R	R	R	R			
	MP_QUL-ZOO-1_WS-1_2024-08	25-Aug-24	13:30	Water	6	R	R	R	R	R	R			
	MP_QUL-ZOO-7_WS-1_2024-08	25-Aug-24	9:35	Water	6	R	R	R	R	R	R			
	MP_QUL-ZOO-7_WS-1X_2024-08	25-Aug-24	9:35	Water	6	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Please also report N+N Calc.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				8°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date: Aug 27	Time: 11:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WATER QUALITY

ALS Laboratory Report VA24C2329

(Finalized September 18, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C2329**	Page	: 1 of 6
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 18-Sep-2024 12:56
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-08	MP_POL-P2_WS-1_2024-08	----	----	----
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	----	----	----
						VA24C2329-001	VA24C2329-002	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L		44.3	92.2	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm		109	246	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.50	mg/L		48.8	115	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.50	mg/L		50.1	111	----	----	----
pH	----	E108/VA	0.10	pH units		7.79	8.23	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		85	172	----	----	----
Solids, total suspended [TSS]	----	E164/VA	1.0	mg/L		1.5	1.1	----	----	----
Turbidity	----	E121/VA	0.10	NTU		1.24	1.14	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		0.0156	<0.0050	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		0.57	0.84	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.056	0.057	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0050	<0.0050	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		<0.0051	<0.0051	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Nitrogen, total	7727-37-9	E366/VA	0.030	mg/L		0.311	0.299	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/VA	0.0010	mg/L		0.0168	0.0013	----	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		0.0361	0.0127	----	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		0.0218	0.0045	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		8.78	33.4	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		7.69	7.05	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0302	0.0552	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		0.00013	0.00012	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.00050	0.00053	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0176	0.0101	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_WS-1_2024-08	MP_POL-P2_WS-1_2024-08	----	----	----
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	----	----	----
						VA24C2329-001	VA24C2329-002	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.049	0.021	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		<0.0000050	0.0000052	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		15.2	35.5	----	----	----
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		0.00346	0.00689	----	----	----
Iron, total	7439-89-6	E420/VA	0.030	mg/L		0.135	0.049	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000066	0.000098	----	----	----
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L		2.95	5.48	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.201	0.00602	----	----	----
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00105	0.00598	----	----	----
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		0.465	0.973	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000228	0.000554	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		1.75	3.15	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	0.000013	----	----	----
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		2.78	7.39	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.134	0.234	----	----	----
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, total	7440-32-6	E420/VA	0.0100	mg/L		<0.0100	<0.0100	----	----	----
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.000038	0.000200	----	----	----
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		<0.00050	0.00151	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		0.0039	0.0046	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0030	mg/L		0.0038	0.0036	----	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		0.00010	<0.00010	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MP_BOL-B2_WS-1_2024-08	MP_POL-P2_WS-1_2024-08	----	----	----
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C2329-001	VA24C2329-002	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.00050	0.00055	----	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.0167	0.00994	----	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	----	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.042	0.019	----	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	<0.0000100 DLM	----	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		14.9	36.8	----	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00050	mg/L		0.00228	0.00445	----	----	----
Iron, dissolved	7439-89-6	E421/VA	0.030	mg/L		0.040	<0.030	----	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		<0.000050	<0.000050	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		<0.0010	<0.0010	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L		2.83	5.64	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.185	0.00159	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		0.00108	0.00612	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		<0.00050	<0.00050	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		0.496	1.05	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000257	0.000431	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		1.71	3.05	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		2.58	7.02	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.142	0.239	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	----	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	<0.00010	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.0100	mg/L		<0.0100	<0.0100	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.000037	0.000205	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	0.00130	----	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-		Laboratory	Laboratory	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MP_BOL-B2_WS-1_2024-08	MP_POL-P2_WS-1_2024-08	----	----	----
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C2329-001	VA24C2329-002	--------	--------	--------
						Result	Result	----	----	----
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg/L		0.791	0.606	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2329**	Page	: 1 of 14
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Issue Date	: 18-Sep-2024 12:56
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Dissolved Metals	QC-1627034-001	----	Sodium, dissolved	7440-23-5	E421	0.076 B mg/L	0.05 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_BOL-B2_WS-1_2024-08	E298	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP_POL-P2_WS-1_2024-08	E298	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_BOL-B2_WS-1_2024-08	E235.Cl	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE MP_POL-P2_WS-1_2024-08	E235.Cl	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_BOL-B2_WS-1_2024-08	E378-U	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE MP_POL-P2_WS-1_2024-08	E378-U	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	4 days	× EHT
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_BOL-B2_WS-1_2024-08	E235.F	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE MP_POL-P2_WS-1_2024-08	E235.F	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_BOL-B2_WS-1_2024-08	E235.NO3-L	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MP_POL-P2_WS-1_2024-08	E235.NO3-L	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	4 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_BOL-B2_WS-1_2024-08	E235.NO2-L	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MP_POL-P2_WS-1_2024-08	E235.NO2-L	26-Aug-2024	29-Aug-2024	3 days	3 days	✓	29-Aug-2024	3 days	4 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_BOL-B2_WS-1_2024-08	E235.SO4	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE MP_POL-P2_WS-1_2024-08	E235.SO4	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	29-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_BOL-B2_WS-1_2024-08	E375-T	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) MP_POL-P2_WS-1_2024-08	E375-T	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_BOL-B2_WS-1_2024-08	E366	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
MP_POL-P2_WS-1_2024-08	E366	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_BOL-B2_WS-1_2024-08	E372-U	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
MP_POL-P2_WS-1_2024-08	E372-U	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_BOL-B2_WS-1_2024-08	E421	26-Aug-2024	02-Sep-2024	180 days	7 days	✓	03-Sep-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
MP_POL-P2_WS-1_2024-08	E421	26-Aug-2024	02-Sep-2024	180 days	7 days	✓	03-Sep-2024	180 days	8 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_BOL-B2_WS-1_2024-08	E358-L	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
MP_POL-P2_WS-1_2024-08	E358-L	26-Aug-2024	03-Sep-2024	28 days	8 days	✓	05-Sep-2024	28 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
MP_BOL-B2_WS-1_2024-08	E290	26-Aug-2024	29-Aug-2024	14 days	3 days	✓	30-Aug-2024	14 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE MP_POL-P2_WS-1_2024-08	E290	26-Aug-2024	29-Aug-2024	14 days	3 days	✓	30-Aug-2024	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_BOL-B2_WS-1_2024-08	E100	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	30-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE MP_POL-P2_WS-1_2024-08	E100	26-Aug-2024	29-Aug-2024	28 days	3 days	✓	30-Aug-2024	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE MP_BOL-B2_WS-1_2024-08	E108	26-Aug-2024	29-Aug-2024	0.25 hrs	79 hrs	× EHTR-FM	30-Aug-2024	0.25 hrs	91 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE MP_POL-P2_WS-1_2024-08	E108	26-Aug-2024	29-Aug-2024	0.25 hrs	83 hrs	× EHTR-FM	30-Aug-2024	0.25 hrs	95 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE MP_BOL-B2_WS-1_2024-08	E162	26-Aug-2024	----	----	----		31-Aug-2024	7 days	4 days	✓
Physical Tests : TDS by Gravimetry										
HDPE MP_POL-P2_WS-1_2024-08	E162	26-Aug-2024	----	----	----		31-Aug-2024	7 days	5 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_BOL-B2_WS-1_2024-08	E164	26-Aug-2024	----	----	----		30-Aug-2024	7 days	4 days	✓
Physical Tests : TSS by Gravimetry (Whole Bottle)										
HDPE [TSS-WB] MP_POL-P2_WS-1_2024-08	E164	26-Aug-2024	----	----	----		30-Aug-2024	7 days	4 days	✓

Matrix: **Water**

Evaluation: ✖ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_BOL-B2_WS-1_2024-08	E121	26-Aug-2024	----	----	----		29-Aug-2024	3 days	3 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE										
MP_POL-P2_WS-1_2024-08	E121	26-Aug-2024	----	----	----		29-Aug-2024	3 days	3 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
HDPE										
MP_BOL-B2_WS-1_2024-08	E870	26-Aug-2024	17-Sep-2024	2 days	22 days	✖ EHTL	17-Sep-2024	2 days	22 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
HDPE										
MP_POL-P2_WS-1_2024-08	E870	26-Aug-2024	17-Sep-2024	2 days	22 days	✖ EHTL	17-Sep-2024	2 days	22 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_BOL-B2_WS-1_2024-08	E420	26-Aug-2024	06-Sep-2024	180 days	11 days	✓	06-Sep-2024	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
MP_POL-P2_WS-1_2024-08	E420	26-Aug-2024	06-Sep-2024	180 days	11 days	✓	06-Sep-2024	180 days	11 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1624860	1	9	11.1	5.0	✓
Ammonia by Fluorescence	E298	1630533	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	1624864	1	20	5.0	5.0	✓
Conductivity in Water	E100	1624861	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1627034	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1630535	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1624869	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1624863	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1624865	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1624866	1	20	5.0	5.0	✓
pH by Meter	E108	1624859	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1624867	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1627460	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1630537	1	12	8.3	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1632258	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1630539	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1630532	1	12	8.3	5.0	✓
Turbidity by Nephelometry	E121	1624840	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1624860	1	9	11.1	5.0	✓
Ammonia by Fluorescence	E298	1630533	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	1624864	1	20	5.0	5.0	✓
Chlorophyll-a by Fluorometry	E870	1656617	1	15	6.6	5.0	✓
Conductivity in Water	E100	1624861	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1627034	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1630535	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1624869	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1624863	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1624865	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1624866	1	20	5.0	5.0	✓
pH by Meter	E108	1624859	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1624867	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1627460	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1630537	1	12	8.3	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1632258	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1630539	1	12	8.3	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1630532	1	12	8.3	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1625836	1	8	12.5	5.0	✓
Turbidity by Nephelometry	E121	1624840	1	9	11.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1624860	1	9	11.1	5.0	✓
Ammonia by Fluorescence	E298	1630533	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	1624864	1	20	5.0	5.0	✓
Chlorophyll-a by Fluorometry	E870	1656617	1	15	6.6	5.0	✓
Conductivity in Water	E100	1624861	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1627034	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1630535	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1624869	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1624863	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1624865	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1624866	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1624867	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1627460	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1630537	1	12	8.3	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1632258	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1630539	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1630532	1	12	8.3	5.0	✓
TSS by Gravimetry (Whole Bottle)	E164	1625836	1	8	12.5	5.0	✓
Turbidity by Nephelometry	E121	1624840	1	9	11.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1630533	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	1624864	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1627034	1	16	6.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1630535	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1624869	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1624863	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1624865	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1624866	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1624867	1	20	5.0	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1630537	1	12	8.3	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1632258	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	1630539	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1630532	1	12	8.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
TSS by Gravimetry (Whole Bottle)	E164 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Nitrogen by Colourimetry	E366 ALS Environmental - Vancouver	Water	Chinchilla Scientific Nitrate Method, 2011	Following digestion, total nitrogen is is determined colourimetrically using a discrete analyzer utilizing the vanadium chloride reduction method. This method of analysis is approved under US EPA 40 CFR Part 136 (May 2021).
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Vancouver	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Chlorophyll-a by Fluorometry	E870 ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Nitrogen in water	EP366 ALS Environmental - Vancouver	Water	APHA 4500-P J (mod)	Samples for total nitrogen analysis are digested using a heated persulfate digestion. Nitrogen compounds are converted to nitrate in this digestion.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Chlorophyll-a Extraction	EP870 ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

QUALITY CONTROL REPORT

Work Order	: **VA24C2329**	Page	: 1 of 15
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Date Analysis Commenced	: 29-Aug-2024
C-O-C number	: ----	Issue Date	: 18-Sep-2024 12:56
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-007 (Minnow/Mt. Polley)		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1624840)											
VA24C2310-004	Anonymous	Turbidity	----	E121	0.10	NTU	<0.10	<0.10	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1624859)											
YL2401302-001	Anonymous	pH	----	E108	0.10	pH units	7.85	7.86	0.127%	4%	----
Physical Tests (QC Lot: 1624860)											
YL2401302-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	96.4	97.5	1.04%	20%	----
Physical Tests (QC Lot: 1624861)											
YL2401302-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	306	307	0.326%	10%	----
Physical Tests (QC Lot: 1627460)											
VA24C2096-001	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	54	51	3	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624863)											
YL2401307-001	Anonymous	Fluoride	16984-48-8	E235.F	2.00	mg/L	<2.00	<2.00	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624864)											
YL2401307-001	Anonymous	Chloride	16887-00-6	E235.Cl	50.0	mg/L	9280	9500	2.27%	20%	----
Anions and Nutrients (QC Lot: 1624865)											
YL2401307-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624866)											
YL2401307-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1624867)											
YL2401307-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	30.0	mg/L	1240	1250	1.14%	20%	----
Anions and Nutrients (QC Lot: 1624869)											
VA24C2329-001	MP_BOL-B2_WS-1_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0168	0.0172	1.77%	20%	----
Anions and Nutrients (QC Lot: 1630532)											
VA24C2159-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.448	0.448	0.141%	20%	----
Anions and Nutrients (QC Lot: 1630533)											
KS2403503-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.330	0.334	1.05%	20%	----
Anions and Nutrients (QC Lot: 1630537)											
KS2403503-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0400	mg/L	5.04	5.03	0.281%	20%	----
Anions and Nutrients (QC Lot: 1630539)											
KS2403503-001	Anonymous	Nitrogen, total	7727-37-9	E366	0.600	mg/L	15.2	15.2	0.0877%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Organic / Inorganic Carbon (QC Lot: 1630535)											
VA24C2172-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	11.7	12.4	6.37%	20%	----
Total Metals (QC Lot: 1632258)											
VA24C2367-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0170	0.0181	0.0011	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	0.00139	0.00138	0.000009	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00422	0.00411	2.70%	20%	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	0.00852	0.00838	1.68%	20%	----
		Beryllium, total	7440-41-7	E420	0.000040	mg/L	<0.000040	<0.000040	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	0.057	0.056	0.0009	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000100	mg/L	0.000190	0.000203	6.48%	20%	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	292	282	3.69%	20%	----
		Chromium, total	7440-47-3	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	0.00280	0.00271	3.50%	20%	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	0.00164	0.00158	0.00006	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.020	mg/L	0.191	0.187	0.004	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0066	0.0065	0.00003	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0100	mg/L	81.0	80.0	1.23%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.954	0.963	0.931%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.000627	0.000631	0.000005	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	0.00369	0.00362	0.00008	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	13.4	12.6	6.17%	20%	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	<0.000100	0.000100	0.0000003	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	2.56	2.57	0.464%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	26.6	26.1	1.90%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	0.804	0.818	1.71%	20%	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.000736	0.000724	1.66%	20%	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	0.0297	0.0297	0.00002	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1627034)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1627034) - continued											
VA24C1943-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0332	0.0304	8.53%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00093	0.00090	0.00002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0353	0.0359	1.76%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	23.2	23.1	0.135%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00064	0.00061	0.00003	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.018	0.018	0.0004	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0011	0.0012	0.00001	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	4.34	4.32	0.540%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00115	0.00109	4.87%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00184	0.00187	1.95%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	2.00	mg/L	<2.00	<2.00	0	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000136	0.000134	0.000002	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.46	5.49	0.593%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	2.00	mg/L	4.20	4.17	0.033	Diff <2x LOR	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.147	0.139	5.92%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00050	0.00048	0.00002	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000416	0.000422	1.44%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00076	0.00070	0.00006	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1624840)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1624860)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1624861)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1625836)						
Solids, total suspended [TSS]	----	E164	1	mg/L	<1.0	----
Physical Tests (QCLot: 1627460)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1624863)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1624864)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1624865)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1624866)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1624867)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1624869)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1630532)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1630533)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1630537)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1630539)						
Nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 1630535)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1632258)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Dissolved Metals (QCLot: 1627034)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1627034) - continued						
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	# 0.076	B
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Plant Pigments (QCLot: 1656617)						
Chlorophyll a	479-61-8	E870	0.01	µg/L	<0.010	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1624840)									
Turbidity	----	E121	0.1	NTU	200 NTU	97.0	85.0	115	----
Physical Tests (QCLot: 1624859)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1624860)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1624861)									
Conductivity	----	E100	1	µS/cm	147 µS/cm	98.4	90.0	110	----
Physical Tests (QCLot: 1625836)									
Solids, total suspended [TSS]	----	E164	1	mg/L	150 mg/L	91.0	85.0	115	----
Physical Tests (QCLot: 1627460)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	107	85.0	115	----
Anions and Nutrients (QCLot: 1624863)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 1624864)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.8	90.0	110	----
Anions and Nutrients (QCLot: 1624865)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1624866)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 1624867)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1624869)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 1630532)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	92.7	80.0	120	----
Anions and Nutrients (QCLot: 1630533)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.4	85.0	115	----
Anions and Nutrients (QCLot: 1630537)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	93.4	80.0	120	----
Anions and Nutrients (QCLot: 1630539)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1630539) - continued									
Nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.6	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1630535)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Metals (QCLot: 1632258)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	94.9	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.0	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.8	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	97.2	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	94.9	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	95.8	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	106	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.2	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.2	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	99.3	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.5	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.0	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	107	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	95.7	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.0	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	94.6	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1632258) - continued									
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	98.5	80.0	120	----
Dissolved Metals (QCLot: 1627034)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.3	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	105	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.0	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	102	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.5	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	106	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.8	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	104	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.5	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.8	80.0	120	----
Plant Pigments (QCLot: 1656617)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Plant Pigments (QCLot: 1656617) - continued									
Chlorophyll a	479-61-8	E870	0.01	µg/L	5 µg/L	95.6	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1624863)										
YL2401307-002	Anonymous	Fluoride	16984-48-8	E235.F	93.3 mg/L	100 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 1624864)										
YL2401307-002	Anonymous	Chloride	16887-00-6	E235.Cl	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1624865)										
YL2401307-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	245 mg/L	250 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 1624866)										
YL2401307-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	51.9 mg/L	50 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1624867)										
YL2401307-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	9910 mg/L	10000 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 1624869)										
VA24C2329-002	MP_POL-P2_WS-1_2024-08	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0288 mg/L	0.03 mg/L	95.8	70.0	130	----
Anions and Nutrients (QCLot: 1630532)										
VA24C2172-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1630533)										
KS2403503-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0944 mg/L	0.1 mg/L	94.4	75.0	125	----
Anions and Nutrients (QCLot: 1630537)										
KS2403503-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0463 mg/L	0.05 mg/L	92.7	70.0	130	----
Anions and Nutrients (QCLot: 1630539)										
KS2403503-002	Anonymous	Nitrogen, total	7727-37-9	E366	ND mg/L	----	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1630535)										
VA24C2273-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	4.40 mg/L	5 mg/L	88.0	70.0	130	----
Total Metals (QCLot: 1632258)										
VA24C2367-002	Anonymous	Aluminum, total	7429-90-5	E420	0.376 mg/L	0.4 mg/L	94.0	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		Arsenic, total	7440-38-2	E420	ND mg/L	----	ND	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0786 mg/L	0.08 mg/L	98.2	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0182 mg/L	0.02 mg/L	90.9	70.0	130	----
		Boron, total	7440-42-8	E420	0.200 mg/L	0.2 mg/L	99.8	70.0	130	----
		Cadmium, total	7440-43-9	E420	ND mg/L	----	ND	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0765 mg/L	0.08 mg/L	95.6	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0381 mg/L	0.04 mg/L	95.4	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1632258) - continued										
VA24C2367-002	Anonymous	Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0365 mg/L	0.04 mg/L	91.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.200 mg/L	0.2 mg/L	100.0	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0769 mg/L	0.08 mg/L	96.1	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0839 mg/L	0.08 mg/L	105	70.0	130	----
		Silicon, total	7440-21-3	E420	18.8 mg/L	20 mg/L	94.1	70.0	130	----
		Silver, total	7440-22-4	E420	0.00767 mg/L	0.008 mg/L	95.9	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00726 mg/L	0.008 mg/L	90.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0376 mg/L	0.04 mg/L	94.1	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0777 mg/L	0.08 mg/L	97.1	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00803 mg/L	0.008 mg/L	100	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.199 mg/L	0.2 mg/L	99.3	70.0	130	----
		Zinc, total	7440-66-6	E420	ND mg/L	----	ND	70.0	130	----
Dissolved Metals (QCLot: 1627034)										
VA24C2142-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	97.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00983 mg/L	0.01 mg/L	98.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.091 mg/L	0.1 mg/L	90.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.95 mg/L	2 mg/L	97.4	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.95 mg/L	4 mg/L	98.7	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.40 mg/L	10 mg/L	94.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00414 mg/L	0.004 mg/L	103	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1627034) - continued										
VA24C2142-001	Anonymous	Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0988 mg/L	0.1 mg/L	98.8	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.385 mg/L	0.4 mg/L	96.3	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Vancouver

Work Order Reference VA24C2329

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	PO BOX 12	Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Likely, BC	Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Postal Code:	V0L 1N0	Email 3: simone.derosemond@minnow.ca	Additional fees may apply to rush requests on weekends, st
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please conta
Company:		Email 1 or Fax: On File	
Contact:	On File	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-007	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 5	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	2329	ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Nutrients-1 (F)	Total Metals (P)	Dissolved Metals (F)	TN, NH3 (P)	DOC (F/P)	TSS (Whole Bottle)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_BOL-B2_WS-1_2024-08	26-Aug-24	13:15	Water	6	R	R	R	R	R	R			
	MP_POL-P2_WS-1_2024-08	26-Aug-24	8:55	Water	6	R	R	R	R	R	R			
	~~MP_QUL-ZOO-1_WS-1_2024-08~~	~~Aug-24~~		~~Water~~	~~6~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MP_QUL-ZOO-7_WS-1_2024-0~~	~~-Aug-24~~		~~Water~~	~~6~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MP_ WS-1X_2024-08~~	~~Aug-24~~		~~Water~~	~~6~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	Please also report N+N Calc.
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: nt	Date: 8,20	Time: 12:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

SEDIMENT QUALITY

ALS Laboratory Report VA24C0980

(Finalized September 13, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C0980**	Page	: 1 of 12
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 16-Aug-2024 10:20
PO	: 5590017616	Date Analysis Commenced	: 26-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Sep-2024 18:17
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 88		
No. of samples analysed	: 22		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (13/09/2024): This report has been amended and re-released to allow the reporting of additional analytical data. Includes additional Total Nitrogen and Total Sulfur analysis on bulk fraction.

PSAL:Sample:004,008,012,016,020,084 Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

Qualifiers

Qualifier	*Description*
FR4	*As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:4 due to high soil organic content.*

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	MP_HAC-U_SE-2_2024-08 (Comp A+B+C)	MP_HAC-U_SE-3_2024-08 (Comp A+B+C)	MP_HAC-U_SE-4_2024-08 (Comp A+B+C)	MP_HAC-U_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C0980-004	VA24C0980-008	VA24C0980-012	VA24C0980-016	VA24C0980-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		87.1	85.1	84.1	88.0	89.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.44 FR4	7.45	7.34	7.45 FR4	7.53 FR4
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		5.2	7.4	4.5	5.9	9.4
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		75.2	75.8	74.9	72.6	72.4
Clay (<0.004mm)	----	EC184E/SK	1.0	%		19.6	16.8	20.6	21.2	18.2
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.776	0.642	0.791	0.883	0.818
Nitrogen, total, <63µm	7727-37-9	E366A/SK	0.020	%		0.759	0.653	0.708	0.843	0.832
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		6.75	5.76	6.07	6.91	6.80
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		5830	4440	5110	4190	4020
Sulfur, total, <63µm	7704-34-9	E399A/SK	500	mg/kg		6590	5900	6180	5030	5380
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		19100	20800	19900	16900	16600
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.38	0.43	0.28	0.38	0.35
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		8.22	9.78	8.96	9.11	8.60
Barium	7440-39-3	E440A/VA	0.50	mg/kg		277	330	293	367	301
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.57	0.58	0.58	0.52	0.50
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Boron	7440-42-8	E440A/VA	5.0	mg/kg		17.8	15.7	15.2	21.7	24.6
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.572	0.547	0.526	0.574	0.508
Calcium	7440-70-2	E440A/VA	50	mg/kg		26800	26300	22400	34300	34600
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		27.7	35.9	24.0	24.0	24.7
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		17.0	18.2	17.3	16.6	15.1
Copper	7440-50-8	E440A/VA	0.50	mg/kg		549	528	542	506	482

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	MP_HAC-U_SE-2_2024-08 (Comp A+B+C)	MP_HAC-U_SE-3_2024-08 (Comp A+B+C)	MP_HAC-U_SE-4_2024-08 (Comp A+B+C)	MP_HAC-U_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C0980-004	VA24C0980-008	VA24C0980-012	VA24C0980-016	VA24C0980-020
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E440A/VA	50	mg/kg		36400	40000	36400	32300	33200
Lead	7439-92-1	E440A/VA	0.10	mg/kg		6.34	6.77	6.41	6.07	5.81
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		14.1	15.0	14.8	12.7	12.1
Magnesium	7439-95-4	E440A/VA	10	mg/kg		10200	10800	10600	9410	8930
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		2040	2550	2450	7290	4560
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.130	0.0828	0.0836	0.128	0.0998
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		4.96	6.72	5.48	5.25	5.62
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		28.4	32.5	28.4	25.6	24.6
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1620	1660	1700	1710	1680
Potassium	7440-09-7	E440A/VA	100	mg/kg		1450	1580	1500	1430	1410
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		7.91	7.20	7.66	8.08	8.51
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.232	0.228	0.234	0.215	0.203
Sodium	7440-23-5	E440A/VA	50	mg/kg		553	576	536	537	546
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		154	156	144	163	163
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.058	0.058	0.056	<0.050	0.050
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.81	0.84	0.73	0.62	0.70
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		828	998	762	674	707
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		0.867	0.955	0.972	0.799	0.966
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		109	129	108	96.2	100
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		113	93.6	87.3	77.7	98.8
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		2.5	3.2	2.9	1.6	1.9

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_SE-1_2024-08 (Comp A+B+C)	MP_HAC-D_SE-2_2024-08 (Comp A+B+C)	MP_HAC-D_SE-3_2024-08 (Comp A+B+C)	MP_HAC-D_SE-4_2024-08 (Comp A+B+C)	MP_HAC-D_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C0980-024	VA24C0980-028	VA24C0980-032	VA24C0980-036	VA24C0980-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		58.8	64.0	64.4	64.8	71.9
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.63	7.69	7.58	7.56	7.36
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		35.9	9.3	10.8	9.1	3.7
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		49.0	75.1	74.5	76.8	78.9
Clay (<0.004mm)	----	EC184E/SK	1.0	%		15.1	15.6	14.6	14.1	17.3
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.168	0.236	0.259	0.270	0.344
Nitrogen, total, <63µm	7727-37-9	E366A/SK	0.020	%		0.191	0.234	0.259	0.257	0.300
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		1.69	1.95	1.98	2.12	2.30
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		1150	1510	1430	1370	1640
Sulfur, total, <63µm	7704-34-9	E399A/SK	500	mg/kg		1610	1580	1480	1620	1570
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		18000	18500	18300	22200	24000
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.56	0.54	0.50	0.57	0.66
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		43.7	25.2	21.8	23.0	24.7
Barium	7440-39-3	E440A/VA	0.50	mg/kg		201	224	206	249	297
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.60	0.62	0.60	0.66	0.72
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.19	0.20	0.18	0.19	0.20
Boron	7440-42-8	E440A/VA	5.0	mg/kg		9.0	10.6	10.1	13.0	12.6
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.437	0.412	0.354	0.406	0.471
Calcium	7440-70-2	E440A/VA	50	mg/kg		18600	20700	21300	20800	20100
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		37.5	37.4	36.0	41.2	45.1
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		17.4	16.5	15.4	17.7	19.2
Copper	7440-50-8	E440A/VA	0.50	mg/kg		227	286	278	378	342
Iron	7439-89-6	E440A/VA	50	mg/kg		38400	39200	38000	43800	43800

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_SE-1_2024-08 (Comp A+B+C)	MP_HAC-D_SE-2_2024-08 (Comp A+B+C)	MP_HAC-D_SE-3_2024-08 (Comp A+B+C)	MP_HAC-D_SE-4_2024-08 (Comp A+B+C)	MP_HAC-D_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C0980-024	VA24C0980-028	VA24C0980-032	VA24C0980-036	VA24C0980-040
						Result	Result	Result	Result	Result
Metals										
Lead	7439-92-1	E440A/VA	0.10	mg/kg		11.5	12.2	10.6	11.4	11.9
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		14.9	15.7	15.5	17.6	20.4
Magnesium	7439-95-4	E440A/VA	10	mg/kg		8970	9230	8820	9970	11100
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		903	852	821	1120	2700
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0883	0.102	0.106	0.110	0.146
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		1.40	1.34	1.62	1.65	2.51
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		37.3	34.3	32.2	34.9	40.9
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1190	1210	1210	1460	1420
Potassium	7440-09-7	E440A/VA	100	mg/kg		1910	1990	1890	2160	2410
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		1.67	1.96	1.99	2.83	3.46
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.185	0.208	0.179	0.225	0.220
Sodium	7440-23-5	E440A/VA	50	mg/kg		325	355	341	387	440
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		167	190	172	189	184
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.242	0.220	0.188	0.195	0.218
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.61	0.67	0.64	0.77	0.75
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		632	751	752	1020	982
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.10	1.20	1.12	1.19	1.30
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		99.8	102	97.7	122	108
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		94.4	95.3	86.6	102	108
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		2.5	2.7	2.5	3.0	2.5

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_SE-1_2024-08 (Comp A+B+C)	MP_EDC-U_SE-2_2024-08 (Comp A+B+C)	MP_EDC-U_SE-3_2024-08 (Comp A+B+C)	MP_EDC-U_SE-4_2024-08 (Comp A+B+C)	MP_EDC-U_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C0980-044	VA24C0980-048	VA24C0980-052	VA24C0980-056	VA24C0980-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		72.6	76.4	59.1	47.0	47.2
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.77	6.03	7.32	7.29	6.46
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		2.0	<1.0	<1.0	2.0	2.2
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		44.4	20.3	62.9	42.2	65.4
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		46.1	68.4	30.4	42.4	26.4
Clay (<0.004mm)	----	EC184E/SK	1.0	%		7.5	11.2	6.2	13.4	6.0
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.471	0.519	0.281	0.182	0.196
Nitrogen, total, <63µm	7727-37-9	E366A/SK	0.020	%		0.470	0.555	0.475	0.202	0.451
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		6.32	7.97	6.35	2.22	6.42
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		1240	1060	670	540	520
Sulfur, total, <63µm	7704-34-9	E399A/SK	500	mg/kg		1390	1320	1140	680	890
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		21200	19300	22500	22900	22300
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.32	0.29	0.37	0.32	0.35
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		10.3	11.5	14.1	12.8	12.6
Barium	7440-39-3	E440A/VA	0.50	mg/kg		168	161	159	154	156
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.51	0.48	0.56	0.53	0.53
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.12	0.12	0.13	0.14	0.12
Boron	7440-42-8	E440A/VA	5.0	mg/kg		5.5	<5.0	<5.0	<5.0	5.4
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.586	0.611	0.512	0.345	0.446
Calcium	7440-70-2	E440A/VA	50	mg/kg		10800	9580	10600	7540	9230
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		59.2	52.9	62.4	65.7	62.7
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		16.2	15.8	18.5	16.4	17.6
Copper	7440-50-8	E440A/VA	0.50	mg/kg		48.8	45.3	41.1	39.2	41.3
Iron	7439-89-6	E440A/VA	50	mg/kg		31700	32100	35200	34900	35200

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_SE-1_2024-08 (Comp A+B+C)	MP_EDC-U_SE-2_2024-08 (Comp A+B+C)	MP_EDC-U_SE-3_2024-08 (Comp A+B+C)	MP_EDC-U_SE-4_2024-08 (Comp A+B+C)	MP_EDC-U_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C0980-044	VA24C0980-048	VA24C0980-052	VA24C0980-056	VA24C0980-060
						Result	Result	Result	Result	Result
Metals										
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.26	6.59	7.74	7.66	7.69
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		15.4	14.7	16.2	17.6	16.4
Magnesium	7439-95-4	E440A/VA	10	mg/kg		8480	7250	8930	8650	8500
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		1000	1120	2180	1460	1070
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0945	0.0929	0.105	0.0790	0.106
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		0.76	0.63	1.02	0.77	0.70
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		38.4	35.0	39.2	37.8	37.5
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1370	1220	1370	1180	1370
Potassium	7440-09-7	E440A/VA	100	mg/kg		1500	1330	1380	1450	1460
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		0.76	0.61	0.68	0.43	0.68
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.206	0.192	0.196	0.176	0.186
Sodium	7440-23-5	E440A/VA	50	mg/kg		298	239	291	266	304
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		89.7	79.4	93.8	72.0	81.4
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.150	0.131	0.149	0.140	0.146
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.45	0.41	0.49	0.46	0.46
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		618	553	616	719	690
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.65	1.50	1.71	1.90	1.60
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		83.5	73.7	92.2	89.2	91.6
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		94.3	82.0	87.4	81.2	88.5
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		1.6	1.3	1.4	1.1	1.3

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_SE-1_2024-08 (Comp A+B+C)	MP_EDC-D_SE-2_2024-08 (Comp A+B+C)	MP_EDC-D_SE-3_2024-08 (Comp A+B+C)	MP_EDC-D_SE-4_2024-08 (Comp A+B+C)	MP_EDC-D_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C0980-064	VA24C0980-068	VA24C0980-072	VA24C0980-076	VA24C0980-080
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		65.3	56.3	76.8	53.1	53.7
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.92	7.15	6.49	7.40	7.73
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	3.8	1.0	2.3	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		53.8	50.7	34.2	55.1	50.9
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		39.2	39.4	57.2	36.9	42.3
Clay (<0.004mm)	----	EC184E/SK	1.0	%		6.9	6.1	7.6	5.7	6.8
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.242	0.231	0.388	0.285	0.220
Nitrogen, total, <63µm	7727-37-9	E366A/SK	0.020	%		0.350	0.330	0.452	0.336	0.267
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		4.63	4.68	6.58	4.33	3.59
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		820	690	1050	780	630
Sulfur, total, <63µm	7704-34-9	E399A/SK	500	mg/kg		1040	820	1720	1340	1370
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		17200	16500	18600	16500	16200
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.35	0.36	0.37	0.35	0.35
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		14.5	13.9	11.5	12.1	14.0
Barium	7440-39-3	E440A/VA	0.50	mg/kg		156	172	166	140	137
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.40	0.38	0.41	0.39	0.38
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.13	0.12	0.14	0.12	0.12
Boron	7440-42-8	E440A/VA	5.0	mg/kg		6.5	7.0	6.4	5.7	5.1
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.355	0.352	0.426	0.333	0.300
Calcium	7440-70-2	E440A/VA	50	mg/kg		9650	9660	10000	9230	9300
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		46.7	46.3	48.2	49.0	47.9
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		14.0	13.8	13.7	13.8	13.8
Copper	7440-50-8	E440A/VA	0.50	mg/kg		40.3	38.0	48.3	36.4	34.8
Iron	7439-89-6	E440A/VA	50	mg/kg		30800	30800	31600	30600	31600

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_SE-1_2024-08 (Comp A+B+C)	MP_EDC-D_SE-2_2024-08 (Comp A+B+C)	MP_EDC-D_SE-3_2024-08 (Comp A+B+C)	MP_EDC-D_SE-4_2024-08 (Comp A+B+C)	MP_EDC-D_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C0980-064	VA24C0980-068	VA24C0980-072	VA24C0980-076	VA24C0980-080
						Result	Result	Result	Result	Result
Metals										
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.42	7.12	7.99	7.28	7.35
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		15.2	15.0	16.4	15.2	15.7
Magnesium	7439-95-4	E440A/VA	10	mg/kg		7900	7400	8550	7620	7650
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		974	730	486	786	1020
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0594	0.111	0.0717	0.0642	0.0598
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		0.66	0.64	0.89	0.63	0.67
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		33.9	32.2	37.1	33.3	32.5
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1170	1180	1150	1150	1100
Potassium	7440-09-7	E440A/VA	100	mg/kg		1540	1460	1660	1350	1360
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		0.75	1.07	0.93	0.65	0.70
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.125	0.120	0.154	0.124	0.124
Sodium	7440-23-5	E440A/VA	50	mg/kg		330	362	328	312	307
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		89.7	85.0	92.0	85.1	86.7
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.118	0.109	0.129	0.111	0.106
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.43	0.43	0.44	0.40	0.41
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		732	800	713	737	747
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.03	1.00	1.34	0.981	0.919
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		71.3	72.0	69.9	73.5	72.0
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		75.8	72.0	84.1	74.1	72.6
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		1.6	1.6	1.9	1.8	1.6

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	MP_HAC-D_SE-4 X_2024-08 (Comp A+B+C)	----	----	----
					Client sampling date / time	13-Aug-2024 00:00	09-Aug-2024 00:00	----	----	----
						VA24C0980-084	VA24C0980-088	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		84.7	69.0	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.57	7.64	----	----	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	----	----	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		6.6	13.3	----	----	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		73.4	73.2	----	----	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		20.0	13.5	----	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.791	0.229	----	----	----
Nitrogen, total, <63µm	7727-37-9	E366A/SK	0.020	%		0.734	0.227	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		6.37	2.05	----	----	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		5010	1670	----	----	----
Sulfur, total, <63µm	7704-34-9	E399A/SK	500	mg/kg		5310	1250	----	----	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		20100	20200	----	----	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.48	0.57	----	----	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		8.84	22.3	----	----	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		315	233	----	----	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.57	0.59	----	----	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		<0.10	0.23	----	----	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		18.6	11.3	----	----	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.500	0.370	----	----	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		22700	20500	----	----	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		28.6	38.6	----	----	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		16.6	16.0	----	----	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		514	325	----	----	----
Iron	7439-89-6	E440A/VA	50	mg/kg		35500	40400	----	----	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	MP_HAC-D_SE-4 X_2024-08 (Comp A+B+C)	----	----	----
					Client sampling date / time	13-Aug-2024 00:00	09-Aug-2024 00:00	----	----	----
						VA24C0980-084	VA24C0980-088	--------	--------	--------
						Result	Result	----	----	----
Metals										
Lead	7439-92-1	E440A/VA	0.10	mg/kg		6.46	11.1	----	----	----
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		14.9	16.0	----	----	----
Magnesium	7439-95-4	E440A/VA	10	mg/kg		10100	9380	----	----	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		3020	1000	----	----	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.125	0.105	----	----	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		5.38	1.66	----	----	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		27.0	32.5	----	----	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1580	1330	----	----	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		1530	1960	----	----	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		7.67	2.39	----	----	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.238	0.194	----	----	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		523	356	----	----	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		147	170	----	----	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.062	0.183	----	----	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.82	0.66	----	----	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		901	957	----	----	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		0.996	1.14	----	----	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		116	108	----	----	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		98.6	94.2	----	----	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		2.8	2.8	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C0980**	Page	: 1 of 25
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 16-Aug-2024 10:20
PO	: 5590017616	Issue Date	: 13-Sep-2024 18:19
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 88		
No. of samples analysed	: 22		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E366A	13-Aug-2024	27-Aug-2024	28 days	14 days	✓	27-Aug-2024	28 days	14 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E366A	13-Aug-2024	27-Aug-2024	28 days	14 days	✓	27-Aug-2024	28 days	14 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E366A	13-Aug-2024	27-Aug-2024	28 days	14 days	✓	27-Aug-2024	28 days	14 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E366A	13-Aug-2024	27-Aug-2024	28 days	14 days	✓	27-Aug-2024	28 days	14 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E366A	13-Aug-2024	27-Aug-2024	28 days	14 days	✓	27-Aug-2024	28 days	14 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E366A	12-Aug-2024	27-Aug-2024	28 days	15 days	✓	27-Aug-2024	28 days	15 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E366A	11-Aug-2024	27-Aug-2024	28 days	16 days	✓	27-Aug-2024	28 days	16 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E366A	11-Aug-2024	27-Aug-2024	28 days	16 days	✓	27-Aug-2024	28 days	16 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E366A	11-Aug-2024	27-Aug-2024	28 days	16 days	✓	27-Aug-2024	28 days	16 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E366A	11-Aug-2024	27-Aug-2024	28 days	16 days	✓	27-Aug-2024	28 days	16 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E366A	11-Aug-2024	27-Aug-2024	28 days	16 days	✓	27-Aug-2024	28 days	16 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E366A	10-Aug-2024	27-Aug-2024	28 days	17 days	✓	27-Aug-2024	28 days	17 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E366A	10-Aug-2024	27-Aug-2024	28 days	17 days	✓	27-Aug-2024	28 days	17 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E366A	09-Aug-2024	27-Aug-2024	28 days	18 days	✓	27-Aug-2024	28 days	18 days	✓
Anions and Nutrients (<63 µm) : Total Nitrogen by Combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E366A	08-Aug-2024	27-Aug-2024	28 days	19 days	✓	27-Aug-2024	28 days	19 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E366	13-Aug-2024	10-Sep-2024	28 days	28 days	✓	10-Sep-2024	28 days	28 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E366	13-Aug-2024	10-Sep-2024	28 days	28 days	✓	10-Sep-2024	28 days	28 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E366	13-Aug-2024	10-Sep-2024	28 days	28 days	✓	10-Sep-2024	28 days	28 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E366	13-Aug-2024	10-Sep-2024	28 days	28 days	✓	10-Sep-2024	28 days	28 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E366	13-Aug-2024	10-Sep-2024	28 days	28 days	✓	10-Sep-2024	28 days	28 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E366	12-Aug-2024	10-Sep-2024	28 days	29 days	× EHT	10-Sep-2024	28 days	29 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E366	11-Aug-2024	10-Sep-2024	28 days	30 days	× EHT	10-Sep-2024	28 days	30 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E366	11-Aug-2024	10-Sep-2024	28 days	30 days	× EHT	10-Sep-2024	28 days	30 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E366	11-Aug-2024	10-Sep-2024	28 days	30 days	× EHT	10-Sep-2024	28 days	30 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E366	11-Aug-2024	10-Sep-2024	28 days	30 days	× EHT	10-Sep-2024	28 days	30 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E366	11-Aug-2024	10-Sep-2024	28 days	30 days	× EHT	10-Sep-2024	28 days	30 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E366	10-Aug-2024	10-Sep-2024	28 days	31 days	× EHT	10-Sep-2024	28 days	31 days	× EHT

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E366	10-Aug-2024	10-Sep-2024	28 days	31 days	× EHT	10-Sep-2024	28 days	31 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E366	09-Aug-2024	10-Sep-2024	28 days	32 days	× EHT	10-Sep-2024	28 days	32 days	× EHT

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E366	08-Aug-2024	10-Sep-2024	28 days	33 days	× EHT	10-Sep-2024	28 days	33 days	× EHT
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E399A	13-Aug-2024	27-Aug-2024	365 days	14 days	✓	27-Aug-2024	365 days	14 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E399A	13-Aug-2024	27-Aug-2024	365 days	14 days	✓	27-Aug-2024	365 days	14 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E399A	13-Aug-2024	27-Aug-2024	365 days	14 days	✓	27-Aug-2024	365 days	14 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E399A	13-Aug-2024	27-Aug-2024	365 days	14 days	✓	27-Aug-2024	365 days	14 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E399A	13-Aug-2024	27-Aug-2024	365 days	14 days	✓	27-Aug-2024	365 days	14 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E399A	12-Aug-2024	27-Aug-2024	365 days	15 days	✓	27-Aug-2024	365 days	15 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E399A	11-Aug-2024	27-Aug-2024	365 days	16 days	✓	27-Aug-2024	365 days	16 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E399A	11-Aug-2024	27-Aug-2024	365 days	16 days	✓	27-Aug-2024	365 days	16 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E399A	11-Aug-2024	27-Aug-2024	365 days	16 days	✓	27-Aug-2024	365 days	16 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E399A	11-Aug-2024	27-Aug-2024	365 days	16 days	✓	27-Aug-2024	365 days	16 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E399A	11-Aug-2024	27-Aug-2024	365 days	16 days	✓	27-Aug-2024	365 days	16 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E399A	10-Aug-2024	27-Aug-2024	365 days	17 days	✓	27-Aug-2024	365 days	17 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E399A	10-Aug-2024	27-Aug-2024	365 days	17 days	✓	27-Aug-2024	365 days	17 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓

Matrix: **Soil/Solid**

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E399A	09-Aug-2024	27-Aug-2024	365 days	18 days	✓	27-Aug-2024	365 days	18 days	✓
Inorganics (<63 µm) : Total Sulfur by high temperature combustion (<63 µm)										
LDPE bag MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E399A	08-Aug-2024	27-Aug-2024	365 days	19 days	✓	27-Aug-2024	365 days	19 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E399	13-Aug-2024	10-Sep-2024	365 days	28 days	✓	10-Sep-2024	365 days	28 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E399	13-Aug-2024	10-Sep-2024	365 days	28 days	✓	10-Sep-2024	365 days	28 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E399	13-Aug-2024	10-Sep-2024	365 days	28 days	✓	10-Sep-2024	365 days	28 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E399	13-Aug-2024	10-Sep-2024	365 days	28 days	✓	10-Sep-2024	365 days	28 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E399	13-Aug-2024	10-Sep-2024	365 days	28 days	✓	10-Sep-2024	365 days	28 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E399	12-Aug-2024	10-Sep-2024	365 days	29 days	✓	10-Sep-2024	365 days	29 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E399	11-Aug-2024	10-Sep-2024	365 days	30 days	✓	10-Sep-2024	365 days	30 days	✓
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LDPE bag MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E399	10-Aug-2024	10-Sep-2024	365 days	31 days	✓	10-Sep-2024	365 days	31 days	✓
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Inorganics : Total Sulfur by high temperature combustion										
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LDPE bag MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E399	09-Aug-2024	10-Sep-2024	365 days	32 days	✓	10-Sep-2024	365 days	32 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E399	09-Aug-2024	10-Sep-2024	365 days	32 days	✓	10-Sep-2024	365 days	32 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E399	09-Aug-2024	10-Sep-2024	365 days	32 days	✓	10-Sep-2024	365 days	32 days	✓
Inorganics : Total Sulfur by high temperature combustion										
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Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E399	08-Aug-2024	10-Sep-2024	365 days	33 days	✓	10-Sep-2024	365 days	33 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E510A	13-Aug-2024	28-Aug-2024	28 days	16 days	✓	29-Aug-2024	28 days	16 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E510A	13-Aug-2024	29-Aug-2024	28 days	16 days	✓	29-Aug-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E510A	13-Aug-2024	29-Aug-2024	28 days	16 days	✓	29-Aug-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E510A	13-Aug-2024	29-Aug-2024	28 days	16 days	✓	29-Aug-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E510A	13-Aug-2024	29-Aug-2024	28 days	16 days	✓	29-Aug-2024	28 days	17 days	✓
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Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E510A	11-Aug-2024	29-Aug-2024	28 days	18 days	✓	29-Aug-2024	28 days	19 days	✓
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Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E510A	09-Aug-2024	29-Aug-2024	28 days	20 days	✓	29-Aug-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E510A	09-Aug-2024	29-Aug-2024	28 days	20 days	✓	29-Aug-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
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Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E440A	13-Aug-2024	29-Aug-2024	180 days	16 days	✓	29-Aug-2024	180 days	17 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E440A	13-Aug-2024	29-Aug-2024	180 days	16 days	✓	29-Aug-2024	180 days	17 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E440A	13-Aug-2024	28-Aug-2024	180 days	16 days	✓	29-Aug-2024	180 days	17 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
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Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E440A	11-Aug-2024	29-Aug-2024	180 days	18 days	✓	29-Aug-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E440A	11-Aug-2024	29-Aug-2024	180 days	18 days	✓	29-Aug-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E440A	11-Aug-2024	29-Aug-2024	180 days	18 days	✓	29-Aug-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E440A	11-Aug-2024	29-Aug-2024	180 days	18 days	✓	29-Aug-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E440A	10-Aug-2024	29-Aug-2024	180 days	19 days	✓	29-Aug-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E440A	10-Aug-2024	29-Aug-2024	180 days	19 days	✓	29-Aug-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	28-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E440A	09-Aug-2024	29-Aug-2024	180 days	20 days	✓	29-Aug-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E440A	08-Aug-2024	29-Aug-2024	180 days	21 days	✓	29-Aug-2024	180 days	22 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E144	13-Aug-2024	----	----	----		26-Aug-2024	----	14 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E144	13-Aug-2024	----	----	----		26-Aug-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E144	13-Aug-2024	----	----	----		26-Aug-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E144	13-Aug-2024	----	----	----		26-Aug-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E144	13-Aug-2024	----	----	----		27-Aug-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E144	12-Aug-2024	----	----	----		26-Aug-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E144	11-Aug-2024	----	----	----		26-Aug-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E144	11-Aug-2024	----	----	----		26-Aug-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E144	11-Aug-2024	----	----	----		26-Aug-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E144	11-Aug-2024	----	----	----		26-Aug-2024	----	16 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E144	11-Aug-2024	----	----	----		26-Aug-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E144	10-Aug-2024	----	----	----		26-Aug-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E144	10-Aug-2024	----	----	----		26-Aug-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		26-Aug-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E144	09-Aug-2024	----	----	----		27-Aug-2024	----	19 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E144	08-Aug-2024	----	----	----		26-Aug-2024	----	19 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-1_2024-08 - (Comp A+B+C)	E108	13-Aug-2024	27-Aug-2024	30 days	15 days	✓	27-Aug-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-2_2024-08 - (Comp A+B+C)	E108	13-Aug-2024	27-Aug-2024	30 days	15 days	✓	27-Aug-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3 X_2024-08 - (Comp A+B+C)	E108	13-Aug-2024	28-Aug-2024	30 days	15 days	✓	28-Aug-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-3_2024-08 - (Comp A+B+C)	E108	13-Aug-2024	27-Aug-2024	30 days	15 days	✓	27-Aug-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-4_2024-08 - (Comp A+B+C)	E108	13-Aug-2024	27-Aug-2024	30 days	15 days	✓	27-Aug-2024	30 days	15 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_SE-5_2024-08 - (Comp A+B+C)	E108	12-Aug-2024	27-Aug-2024	30 days	16 days	✓	27-Aug-2024	30 days	16 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-1_2024-08 - (Comp A+B+C)	E108	11-Aug-2024	27-Aug-2024	30 days	17 days	✓	27-Aug-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-2_2024-08 - (Comp A+B+C)	E108	11-Aug-2024	27-Aug-2024	30 days	17 days	✓	27-Aug-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-3_2024-08 - (Comp A+B+C)	E108	11-Aug-2024	27-Aug-2024	30 days	17 days	✓	27-Aug-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-4_2024-08 - (Comp A+B+C)	E108	11-Aug-2024	27-Aug-2024	30 days	17 days	✓	27-Aug-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_SE-5_2024-08 - (Comp A+B+C)	E108	11-Aug-2024	27-Aug-2024	30 days	17 days	✓	27-Aug-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-4_2024-08 - (Comp A+B+C)	E108	10-Aug-2024	27-Aug-2024	30 days	18 days	✓	27-Aug-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-5_2024-08 - (Comp A+B+C)	E108	10-Aug-2024	27-Aug-2024	30 days	18 days	✓	27-Aug-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-1_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-2_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_SE-3_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-1_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-2_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-3_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4 X_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	28-Aug-2024	30 days	19 days	✓	28-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-4_2024-08 - (Comp A+B+C)	E108	09-Aug-2024	27-Aug-2024	30 days	19 days	✓	27-Aug-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_SE-5_2024-08 - (Comp A+B+C)	E108	08-Aug-2024	27-Aug-2024	30 days	20 days	✓	27-Aug-2024	30 days	20 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1617301	2	24	8.3	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1617300	2	24	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1617302	2	25	8.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1617299	2	34	5.8	5.0	✓
Total Nitrogen by Combustion	E366	1642384	2	36	5.5	5.0	✓
Total Nitrogen by Combustion (<63 µm)	E366A	1618180	2	22	9.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1642383	2	36	5.5	5.0	✓
Total Sulfur by high temperature combustion (<63 µm)	E399A	1618178	2	24	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1617301	4	24	16.6	10.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1617300	4	24	16.6	10.0	✓
Moisture Content by Gravimetry	E144	1617302	2	25	8.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1617299	2	34	5.8	5.0	✓
Total Nitrogen by Combustion	E366	1642384	4	36	11.1	10.0	✓
Total Nitrogen by Combustion (<63 µm)	E366A	1618180	4	22	18.1	10.0	✓
Total Sulfur by high temperature combustion	E399	1642383	4	36	11.1	10.0	✓
Total Sulfur by high temperature combustion (<63 µm)	E399A	1618178	4	24	16.6	10.0	✓
Method Blanks (MB)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1617301	2	24	8.3	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1617300	2	24	8.3	5.0	✓
Moisture Content by Gravimetry	E144	1617302	2	25	8.0	5.0	✓
Total Nitrogen by Combustion	E366	1642384	2	36	5.5	5.0	✓
Total Nitrogen by Combustion (<63 µm)	E366A	1618180	2	22	9.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1642383	2	36	5.5	5.0	✓
Total Sulfur by high temperature combustion (<63 µm)	E399A	1618178	2	24	8.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Total Nitrogen by Combustion (<63 µm)	E366A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4 (mod)	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Total Sulfur by high temperature combustion	E399 ALS Environmental - Saskatoon	Soil/Solid	ISO 15178:2000	Air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO_2 gas is determined using a thermal conductivity detector.
Total Sulfur by high temperature combustion (<63 µm)	E399A ALS Environmental - Saskatoon	Soil/Solid	ISO 15178:2000	Air-dried sample is disaggregated to pass a 63µm sieve. The sample is ignited in a combustion analyzer where sulfur in the reduced SO_2 gas is determined using a thermal conductivity detector.
Metals in Sediment by CRC ICPMS (<63 µm)	E440A ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 63 um sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Sediment by CVAAS (<63 µm)	E510A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO_3 and HCl, followed by CVAAS analysis.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Particle Size Analysis (Pipette) - MMER Classification	EC184E ALS Environmental - Saskatoon	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil (<63 µm)	EC356A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC) analyzed on material passing a 63 µm sieve.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury (63 µm Sieve)	EP440A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C0980**	Page	: 1 of 14
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 16-Aug-2024 10:20
PO	: 5590017616	Date Analysis Commenced	: 26-Aug-2024
C-O-C number	: ----	Issue Date	: 13-Sep-2024 18:17
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 88		
No. of samples analysed	: 22		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1617299)											
VA24C0980-004	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	pH (1:2 soil:water)	----	E108	0.10	pH units	7.44	7.53	1.2%	5%	----
Physical Tests (QC Lot: 1617302)											
VA24C0980-004	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	Moisture	----	E144	0.25	%	87.1	87.1	0.0310%	20%	----
Physical Tests (QC Lot: 1619835)											
FJ2402546-004	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.00	8.04	0.5%	5%	----
Physical Tests (QC Lot: 1619840)											
VA24C0980-084	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	Moisture	----	E144	0.25	%	84.7	84.8	0.152%	20%	----
Anions and Nutrients (QC Lot: 1642384)											
VA24C0980-016	MP_HAC-U_SE-4_2024-08 (Comp A+B+C)	Nitrogen, total	7727-37-9	E366	0.020	%	0.883	0.915	3.56%	20%	----
Anions and Nutrients (QC Lot: 1642386)											
VA24C0980-052	MP_EDC-U_SE-3_2024-08 (Comp A+B+C)	Nitrogen, total	7727-37-9	E366	0.020	%	0.281	0.263	6.62%	20%	----
Anions and Nutrients (<63 µm) (QC Lot: 1618180)											
VA24C0980-020	MP_HAC-U_SE-5_2024-08 (Comp A+B+C)	Nitrogen, total, <63µm	7727-37-9	E366A	0.020	%	0.832	0.807	3.05%	20%	----
Anions and Nutrients (<63 µm) (QC Lot: 1618225)											
VA24C0980-084	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	Nitrogen, total, <63µm	7727-37-9	E366A	0.020	%	0.734	0.736	0.272%	20%	----
Inorganics (QC Lot: 1642383)											
VA24C0980-016	MP_HAC-U_SE-4_2024-08 (Comp A+B+C)	Sulfur, total	7704-34-9	E399	0.050	%	4190 mg/kg	0.364	0.055	Diff <2x LOR	----
Inorganics (QC Lot: 1642385)											
VA24C0980-052	MP_EDC-U_SE-3_2024-08 (Comp A+B+C)	Sulfur, total	7704-34-9	E399	0.050	%	670 mg/kg	0.098	0.031	Diff <2x LOR	----
Inorganics (<63 µm) (QC Lot: 1618178)											
VA24C0980-020	MP_HAC-U_SE-5_2024-08 (Comp A+B+C)	Sulfur, total, <63µm	7704-34-9	E399A	0.050	%	5380 mg/kg	0.534	0.746%	20%	----
Inorganics (<63 µm) (QC Lot: 1618223)											
VA24C0980-084	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	Sulfur, total, <63µm	7704-34-9	E399A	0.050	%	5310 mg/kg	0.525	1.14%	20%	----
Metals (<63 µm) (QC Lot: 1617300)											
VA24C0980-004	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	Aluminum	7429-90-5	E440A	50	mg/kg	19100	20900	8.62%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (<63 µm) (QC Lot: 1617300) - continued											
VA24C0980-004	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	Antimony	7440-36-0	E440A	0.10	mg/kg	0.38	0.41	0.03	Diff <2x LOR	----
		Arsenic	7440-38-2	E440A	0.050	mg/kg	8.22	9.12	10.4%	30%	----
		Barium	7440-39-3	E440A	0.50	mg/kg	277	310	11.0%	40%	----
		Beryllium	7440-41-7	E440A	0.10	mg/kg	0.57	0.61	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440A	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Boron	7440-42-8	E440A	5.0	mg/kg	17.8	19.6	1.8	Diff <2x LOR	----
		Cadmium	7440-43-9	E440A	0.020	mg/kg	0.572	0.665	15.1%	30%	----
		Calcium	7440-70-2	E440A	50	mg/kg	26800	28200	5.14%	30%	----
		Chromium	7440-47-3	E440A	0.50	mg/kg	27.7	29.9	7.49%	30%	----
		Cobalt	7440-48-4	E440A	0.10	mg/kg	17.0	18.4	8.08%	30%	----
		Copper	7440-50-8	E440A	0.50	mg/kg	549	606	9.93%	30%	----
		Iron	7439-89-6	E440A	50	mg/kg	36400	38500	5.52%	30%	----
		Lead	7439-92-1	E440A	0.10	mg/kg	6.34	6.77	6.54%	40%	----
		Lithium	7439-93-2	E440A	2.0	mg/kg	14.1	15.4	9.01%	30%	----
		Magnesium	7439-95-4	E440A	10	mg/kg	10200	11300	9.68%	30%	----
		Manganese	7439-96-5	E440A	0.20	mg/kg	2040	2270	10.5%	30%	----
		Molybdenum	7439-98-7	E440A	0.10	mg/kg	4.96	5.38	8.12%	40%	----
		Nickel	7440-02-0	E440A	0.50	mg/kg	28.4	30.2	6.22%	30%	----
		Phosphorus	7723-14-0	E440A	50	mg/kg	1620	1760	8.45%	30%	----
		Potassium	7440-09-7	E440A	100	mg/kg	1450	1590	8.65%	40%	----
		Selenium	7782-49-2	E440A	0.10	mg/kg	7.91	8.52	7.47%	30%	----
		Silver	7440-22-4	E440A	0.050	mg/kg	0.232	0.246	0.013	Diff <2x LOR	----
		Sodium	7440-23-5	E440A	50	mg/kg	553	599	7.99%	40%	----
		Strontium	7440-24-6	E440A	0.10	mg/kg	154	158	2.40%	40%	----
		Thallium	7440-28-0	E440A	0.050	mg/kg	0.058	0.061	0.003	Diff <2x LOR	----
		Tin	7440-31-5	E440A	0.20	mg/kg	0.81	0.86	0.04	Diff <2x LOR	----
		Titanium	7440-32-6	E440A	1.0	mg/kg	828	900	8.45%	40%	----
		Uranium	7440-61-1	E440A	0.050	mg/kg	0.867	0.916	5.40%	30%	----
		Vanadium	7440-62-2	E440A	0.20	mg/kg	109	116	6.25%	30%	----
		Zinc	7440-66-6	E440A	1.0	mg/kg	113	116	2.46%	30%	----
		Zirconium	7440-67-7	E440A	1.0	mg/kg	2.5	2.6	0.10	Diff <2x LOR	----
Metals (<63 µm) (QC Lot: 1617301)											
VA24C0980-004	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	Mercury	7439-97-6	E510A	0.0050	mg/kg	0.130	0.137	5.70%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (<63 µm) (QC Lot: 1619838)											
VA24C1266-021	Anonymous	Aluminum	7429-90-5	E440A	50	mg/kg	12800	13200	2.82%	40%	----
		Antimony	7440-36-0	E440A	0.10	mg/kg	2.36	2.32	1.31%	30%	----
		Arsenic	7440-38-2	E440A	0.050	mg/kg	949	925	2.56%	30%	----
		Barium	7440-39-3	E440A	0.50	mg/kg	184	186	1.24%	40%	----
		Beryllium	7440-41-7	E440A	0.10	mg/kg	0.29	0.34	0.04	Diff <2x LOR	----
		Bismuth	7440-69-9	E440A	0.10	mg/kg	30.4	29.6	2.61%	30%	----
		Boron	7440-42-8	E440A	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440A	0.020	mg/kg	0.876	0.900	2.76%	30%	----
		Calcium	7440-70-2	E440A	50	mg/kg	8790	9000	2.34%	30%	----
		Chromium	7440-47-3	E440A	0.50	mg/kg	28.4	28.6	0.777%	30%	----
		Cobalt	7440-48-4	E440A	0.10	mg/kg	26.3	26.1	0.827%	30%	----
		Copper	7440-50-8	E440A	0.50	mg/kg	53.9	54.4	0.894%	30%	----
		Iron	7439-89-6	E440A	50	mg/kg	102000	99300	2.41%	30%	----
		Lead	7439-92-1	E440A	0.10	mg/kg	252	245	2.58%	40%	----
		Lithium	7439-93-2	E440A	2.0	mg/kg	11.5	12.6	1.1	Diff <2x LOR	----
		Magnesium	7439-95-4	E440A	10	mg/kg	6630	6700	0.995%	30%	----
		Manganese	7439-96-5	E440A	0.20	mg/kg	2580	2560	0.958%	30%	----
		Molybdenum	7439-98-7	E440A	0.10	mg/kg	4.07	4.05	0.370%	40%	----
		Nickel	7440-02-0	E440A	0.50	mg/kg	63.1	62.7	0.647%	30%	----
		Phosphorus	7723-14-0	E440A	50	mg/kg	756	742	1.80%	30%	----
		Potassium	7440-09-7	E440A	100	mg/kg	1430	1500	4.54%	40%	----
		Selenium	7782-49-2	E440A	0.10	mg/kg	1.44	1.44	0.0732%	30%	----
		Silver	7440-22-4	E440A	0.050	mg/kg	1.26	1.21	4.05%	40%	----
		Sodium	7440-23-5	E440A	50	mg/kg	73	78	5	Diff <2x LOR	----
		Strontium	7440-24-6	E440A	0.10	mg/kg	36.3	34.6	4.71%	40%	----
		Thallium	7440-28-0	E440A	0.050	mg/kg	0.088	0.089	0.001	Diff <2x LOR	----
		Tin	7440-31-5	E440A	0.20	mg/kg	0.52	0.50	0.02	Diff <2x LOR	----
		Titanium	7440-32-6	E440A	1.0	mg/kg	141	134	5.39%	40%	----
		Uranium	7440-61-1	E440A	0.050	mg/kg	3.32	3.31	0.195%	30%	----
		Vanadium	7440-62-2	E440A	0.20	mg/kg	24.3	24.6	1.38%	30%	----
		Zinc	7440-66-6	E440A	1.0	mg/kg	230	230	0.271%	30%	----
		Zirconium	7440-67-7	E440A	1.0	mg/kg	4.6	5.0	0.4	Diff <2x LOR	----
Metals (<63 µm) (QC Lot: 1619839)											
VA24C1266-021	Anonymous	Mercury	7439-97-6	E510A	0.0050	mg/kg	0.0749	0.0752	0.481%	40%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1617302)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1619840)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1642384)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Anions and Nutrients (QCLot: 1642386)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Anions and Nutrients (<63 µm) (QCLot: 1618180)						
Nitrogen, total, <63µm	7727-37-9	E366A	0.02	%	<0.020	----
Anions and Nutrients (<63 µm) (QCLot: 1618225)						
Nitrogen, total, <63µm	7727-37-9	E366A	0.02	%	<0.020	----
Inorganics (QCLot: 1642383)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Inorganics (QCLot: 1642385)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Inorganics (<63 µm) (QCLot: 1618178)						
Sulfur, total, <63µm	7704-34-9	E399A	0.05	%	<0.050	----
Inorganics (<63 µm) (QCLot: 1618223)						
Sulfur, total, <63µm	7704-34-9	E399A	0.05	%	<0.050	----
Metals (<63 µm) (QCLot: 1617300)						
Aluminum	7429-90-5	E440A	50	mg/kg	<50	----
Antimony	7440-36-0	E440A	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E440A	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	<0.10	----
Boron	7440-42-8	E440A	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440A	50	mg/kg	<50	----
Chromium	7440-47-3	E440A	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (<63 µm) (QCLot: 1617300) - continued						
Copper	7440-50-8	E440A	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440A	50	mg/kg	<50	----
Lead	7439-92-1	E440A	0.1	mg/kg	<0.10	----
Lithium	7439-93-2	E440A	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440A	10	mg/kg	<10	----
Manganese	7439-96-5	E440A	0.2	mg/kg	<0.20	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440A	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440A	50	mg/kg	<50	----
Potassium	7440-09-7	E440A	100	mg/kg	<100	----
Selenium	7782-49-2	E440A	0.1	mg/kg	<0.10	----
Silver	7440-22-4	E440A	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440A	50	mg/kg	<50	----
Strontium	7440-24-6	E440A	0.1	mg/kg	<0.10	----
Thallium	7440-28-0	E440A	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440A	0.2	mg/kg	<0.20	----
Titanium	7440-32-6	E440A	1	mg/kg	<1.0	----
Uranium	7440-61-1	E440A	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440A	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E440A	1	mg/kg	<1.0	----
Metals (<63 µm) (QCLot: 1617301)						
Mercury	7439-97-6	E510A	0.005	mg/kg	<0.0050	----
Metals (<63 µm) (QCLot: 1619838)						
Aluminum	7429-90-5	E440A	50	mg/kg	<50	----
Antimony	7440-36-0	E440A	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E440A	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	<0.10	----
Boron	7440-42-8	E440A	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440A	50	mg/kg	<50	----
Chromium	7440-47-3	E440A	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (<63 µm) (QCLot: 1619838) - continued						
Copper	7440-50-8	E440A	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440A	50	mg/kg	<50	----
Lead	7439-92-1	E440A	0.1	mg/kg	<0.10	----
Lithium	7439-93-2	E440A	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440A	10	mg/kg	<10	----
Manganese	7439-96-5	E440A	0.2	mg/kg	<0.20	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440A	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440A	50	mg/kg	<50	----
Potassium	7440-09-7	E440A	100	mg/kg	<100	----
Selenium	7782-49-2	E440A	0.1	mg/kg	<0.10	----
Silver	7440-22-4	E440A	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440A	50	mg/kg	<50	----
Strontium	7440-24-6	E440A	0.1	mg/kg	<0.10	----
Thallium	7440-28-0	E440A	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440A	0.2	mg/kg	<0.20	----
Titanium	7440-32-6	E440A	1	mg/kg	<1.0	----
Uranium	7440-61-1	E440A	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440A	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E440A	1	mg/kg	<1.0	----
Metals (<63 µm) (QCLot: 1619839)						
Mercury	7439-97-6	E510A	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1617299)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1617302)									
Moisture	----	E144	0.25	%	50 %	98.9	90.0	110	----
Physical Tests (QCLot: 1619835)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.8	95.0	105	----
Physical Tests (QCLot: 1619840)									
Moisture	----	E144	0.25	%	50 %	102	90.0	110	----
Anions and Nutrients (QCLot: 1642384)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1642386)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	98.6	90.0	110	----
Anions and Nutrients (<63 µm) (QCLot: 1618180)									
Nitrogen, total, <63µm	7727-37-9	E366A	0.02	%	22.4 %	101	90.0	110	----
Anions and Nutrients (<63 µm) (QCLot: 1618225)									
Nitrogen, total, <63µm	7727-37-9	E366A	0.02	%	22.4 %	99.6	90.0	110	----
Inorganics (QCLot: 1642383)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	101	90.0	110	----
Inorganics (QCLot: 1642385)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	100	90.0	110	----
Inorganics (<63 µm) (QCLot: 1618178)									
Sulfur, total, <63µm	7704-34-9	E399A	0.05	%	12.8 %	99.2	90.0	110	----
Inorganics (<63 µm) (QCLot: 1618223)									
Sulfur, total, <63µm	7704-34-9	E399A	0.05	%	12.8 %	96.7	90.0	110	----
Metals (<63 µm) (QCLot: 1617300)									
Aluminum	7429-90-5	E440A	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440A	0.1	mg/kg	100 mg/kg	101	80.0	120	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	100 mg/kg	110	80.0	120	----
Barium	7440-39-3	E440A	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	10 mg/kg	95.0	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1617300) - continued									
Bismuth	7440-69-9	E440A	0.1	mg/kg	100 mg/kg	96.9	80.0	120	----
Boron	7440-42-8	E440A	5	mg/kg	100 mg/kg	89.6	80.0	120	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	10 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440A	50	mg/kg	5000 mg/kg	95.3	80.0	120	----
Chromium	7440-47-3	E440A	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	25 mg/kg	105	80.0	120	----
Copper	7440-50-8	E440A	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Iron	7439-89-6	E440A	50	mg/kg	100 mg/kg	105	80.0	120	----
Lead	7439-92-1	E440A	0.1	mg/kg	50 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E440A	2	mg/kg	25 mg/kg	95.4	80.0	120	----
Magnesium	7439-95-4	E440A	10	mg/kg	5000 mg/kg	109	80.0	120	----
Manganese	7439-96-5	E440A	0.2	mg/kg	25 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440A	0.5	mg/kg	50 mg/kg	104	80.0	120	----
Phosphorus	7723-14-0	E440A	50	mg/kg	1000 mg/kg	112	80.0	120	----
Potassium	7440-09-7	E440A	100	mg/kg	5000 mg/kg	111	80.0	120	----
Selenium	7782-49-2	E440A	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Silver	7440-22-4	E440A	0.05	mg/kg	10 mg/kg	92.1	80.0	120	----
Sodium	7440-23-5	E440A	50	mg/kg	5000 mg/kg	108	80.0	120	----
Strontium	7440-24-6	E440A	0.1	mg/kg	25 mg/kg	104	80.0	120	----
Thallium	7440-28-0	E440A	0.05	mg/kg	100 mg/kg	100	80.0	120	----
Tin	7440-31-5	E440A	0.2	mg/kg	50 mg/kg	100	80.0	120	----
Titanium	7440-32-6	E440A	1	mg/kg	25 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E440A	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	50 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E440A	1	mg/kg	50 mg/kg	104	80.0	120	----
Zirconium	7440-67-7	E440A	1	mg/kg	10 mg/kg	101	80.0	120	----
Metals (<63 µm) (QCLot: 1617301)									
Mercury	7439-97-6	E510A	0.005	mg/kg	0.1 mg/kg	92.9	80.0	120	----
Metals (<63 µm) (QCLot: 1619838)									
Aluminum	7429-90-5	E440A	50	mg/kg	200 mg/kg	99.8	80.0	120	----
Antimony	7440-36-0	E440A	0.1	mg/kg	100 mg/kg	98.9	80.0	120	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	100 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440A	0.5	mg/kg	25 mg/kg	99.5	80.0	120	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	10 mg/kg	89.4	80.0	120	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	100 mg/kg	93.2	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1619838) - continued									
Boron	7440-42-8	E440A	5	mg/kg	100 mg/kg	88.2	80.0	120	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	10 mg/kg	96.6	80.0	120	----
Calcium	7440-70-2	E440A	50	mg/kg	5000 mg/kg	92.8	80.0	120	----
Chromium	7440-47-3	E440A	0.5	mg/kg	25 mg/kg	95.4	80.0	120	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	25 mg/kg	96.3	80.0	120	----
Copper	7440-50-8	E440A	0.5	mg/kg	25 mg/kg	93.8	80.0	120	----
Iron	7439-89-6	E440A	50	mg/kg	100 mg/kg	96.9	80.0	120	----
Lead	7439-92-1	E440A	0.1	mg/kg	50 mg/kg	96.0	80.0	120	----
Lithium	7439-93-2	E440A	2	mg/kg	25 mg/kg	91.8	80.0	120	----
Magnesium	7439-95-4	E440A	10	mg/kg	5000 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E440A	0.2	mg/kg	25 mg/kg	96.6	80.0	120	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	25 mg/kg	99.6	80.0	120	----
Nickel	7440-02-0	E440A	0.5	mg/kg	50 mg/kg	95.6	80.0	120	----
Phosphorus	7723-14-0	E440A	50	mg/kg	1000 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E440A	100	mg/kg	5000 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440A	0.1	mg/kg	100 mg/kg	99.5	80.0	120	----
Silver	7440-22-4	E440A	0.05	mg/kg	10 mg/kg	85.4	80.0	120	----
Sodium	7440-23-5	E440A	50	mg/kg	5000 mg/kg	100	80.0	120	----
Strontium	7440-24-6	E440A	0.1	mg/kg	25 mg/kg	98.6	80.0	120	----
Thallium	7440-28-0	E440A	0.05	mg/kg	100 mg/kg	93.9	80.0	120	----
Tin	7440-31-5	E440A	0.2	mg/kg	50 mg/kg	95.7	80.0	120	----
Titanium	7440-32-6	E440A	1	mg/kg	25 mg/kg	96.6	80.0	120	----
Uranium	7440-61-1	E440A	0.05	mg/kg	0.5 mg/kg	98.6	80.0	120	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	50 mg/kg	99.4	80.0	120	----
Zinc	7440-66-6	E440A	1	mg/kg	50 mg/kg	93.9	80.0	120	----
Zirconium	7440-67-7	E440A	1	mg/kg	10 mg/kg	97.7	80.0	120	----
Metals (<63 µm) (QCLot: 1619839)									
Mercury	7439-97-6	E510A	0.005	mg/kg	0.1 mg/kg	90.4	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Anions and Nutrients (QCLot: 1642384)									
QC-1642384-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	108	80.0	120	----
Anions and Nutrients (QCLot: 1642386)									
QC-1642386-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	98.2	80.0	120	----
Anions and Nutrients (<63 µm) (QCLot: 1618180)									
QC-1618180-003	RM	Nitrogen, total, <63µm	7727-37-9	E366A	0.11 %	104	80.0	120	----
Anions and Nutrients (<63 µm) (QCLot: 1618225)									
QC-1618225-003	RM	Nitrogen, total, <63µm	7727-37-9	E366A	0.11 %	95.4	80.0	120	----
Inorganics (QCLot: 1642383)									
QC-1642383-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	98.8	70.0	130	----
Inorganics (QCLot: 1642385)									
QC-1642385-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	105	70.0	130	----
Inorganics (<63 µm) (QCLot: 1618178)									
QC-1618178-003	RM	Sulfur, total, <63µm	7704-34-9	E399A	0.333 %	97.9	70.0	130	----
Inorganics (<63 µm) (QCLot: 1618223)									
QC-1618223-003	RM	Sulfur, total, <63µm	7704-34-9	E399A	0.333 %	88.0	70.0	130	----
Metals (<63 µm) (QCLot: 1617300)									
QC-1617300-003	MRCA-21	Aluminum	7429-90-5	E440A	22500 mg/kg	114	70.0	130	----
QC-1617300-003	MRCA-21	Antimony	7440-36-0	E440A	24.8 mg/kg	99.3	70.0	130	----
QC-1617300-003	MRCA-21	Arsenic	7440-38-2	E440A	21.2 mg/kg	106	70.0	130	----
QC-1617300-003	MRCA-21	Barium	7440-39-3	E440A	788 mg/kg	106	70.0	130	----
QC-1617300-003	MRCA-21	Beryllium	7440-41-7	E440A	1.82 mg/kg	104	70.0	130	----
QC-1617300-003	MRCA-21	Bismuth	7440-69-9	E440A	1.78 mg/kg	87.4	70.0	130	----
QC-1617300-003	MRCA-21	Cadmium	7440-43-9	E440A	2.15 mg/kg	108	70.0	130	----
QC-1617300-003	MRCA-21	Calcium	7440-70-2	E440A	4900 mg/kg	101	70.0	130	----
QC-1617300-003	MRCA-21	Chromium	7440-47-3	E440A	56.9 mg/kg	105	70.0	130	----
QC-1617300-003	MRCA-21	Cobalt	7440-48-4	E440A	32 mg/kg	106	70.0	130	----
QC-1617300-003	MRCA-21	Copper	7440-50-8	E440A	969 mg/kg	106	70.0	130	----
QC-1617300-003	MRCA-21	Iron	7439-89-6	E440A	32700 mg/kg	107	70.0	130	----
QC-1617300-003	MRCA-21	Lead	7439-92-1	E440A	919 mg/kg	96.1	70.0	130	----
QC-1617300-003	MRCA-21	Lithium	7439-93-2	E440A	47.3 mg/kg	105	70.0	130	----
QC-1617300-003	MRCA-21	Magnesium	7439-95-4	E440A	7780 mg/kg	109	70.0	130	----
QC-1617300-003	MRCA-21	Manganese	7439-96-5	E440A	8640 mg/kg	104	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (<63 µm) (QCLot: 1617300) - continued									
QC-1617300-003	MRCA-21	Molybdenum	7439-98-7	E440A	25.1 mg/kg	103	70.0	130	----
QC-1617300-003	MRCA-21	Nickel	7440-02-0	E440A	1000 mg/kg	108	70.0	130	----
QC-1617300-003	MRCA-21	Phosphorus	7723-14-0	E440A	660 mg/kg	102	70.0	130	----
QC-1617300-003	MRCA-21	Potassium	7440-09-7	E440A	10800 mg/kg	109	70.0	130	----
QC-1617300-003	MRCA-21	Selenium	7782-49-2	E440A	1.04 mg/kg	99.6	70.0	130	----
QC-1617300-003	MRCA-21	Silver	7440-22-4	E440A	8.98 mg/kg	100	70.0	130	----
QC-1617300-003	MRCA-21	Sodium	7440-23-5	E440A	1770 mg/kg	120	70.0	130	----
QC-1617300-003	MRCA-21	Strontium	7440-24-6	E440A	41 mg/kg	107	70.0	130	----
QC-1617300-003	MRCA-21	Thallium	7440-28-0	E440A	0.907 mg/kg	101	70.0	130	----
QC-1617300-003	MRCA-21	Tin	7440-31-5	E440A	3.79 mg/kg	98.4	70.0	130	----
QC-1617300-003	MRCA-21	Titanium	7440-32-6	E440A	2790 mg/kg	110	70.0	130	----
QC-1617300-003	MRCA-21	Uranium	7440-61-1	E440A	3.97 mg/kg	102	70.0	130	----
QC-1617300-003	MRCA-21	Vanadium	7440-62-2	E440A	66.2 mg/kg	106	70.0	130	----
QC-1617300-003	MRCA-21	Zinc	7440-66-6	E440A	828 mg/kg	105	70.0	130	----
QC-1617300-003	MRCA-21	Zirconium	7440-67-7	E440A	6.91 mg/kg	101	70.0	130	----
Metals (<63 µm) (QCLot: 1617301)									
QC-1617301-003	MRCA-21	Mercury	7439-97-6	E510A	0.068 mg/kg	93.8	70.0	130	----
Metals (<63 µm) (QCLot: 1619838)									
QC-1619838-003	MRCA-21	Aluminum	7429-90-5	E440A	22500 mg/kg	107	70.0	130	----
QC-1619838-003	MRCA-21	Antimony	7440-36-0	E440A	24.8 mg/kg	104	70.0	130	----
QC-1619838-003	MRCA-21	Arsenic	7440-38-2	E440A	21.2 mg/kg	109	70.0	130	----
QC-1619838-003	MRCA-21	Barium	7440-39-3	E440A	788 mg/kg	99.8	70.0	130	----
QC-1619838-003	MRCA-21	Beryllium	7440-41-7	E440A	1.82 mg/kg	98.8	70.0	130	----
QC-1619838-003	MRCA-21	Bismuth	7440-69-9	E440A	1.78 mg/kg	92.9	70.0	130	----
QC-1619838-003	MRCA-21	Cadmium	7440-43-9	E440A	2.15 mg/kg	101	70.0	130	----
QC-1619838-003	MRCA-21	Calcium	7440-70-2	E440A	4900 mg/kg	97.0	70.0	130	----
QC-1619838-003	MRCA-21	Chromium	7440-47-3	E440A	56.9 mg/kg	99.2	70.0	130	----
QC-1619838-003	MRCA-21	Cobalt	7440-48-4	E440A	32 mg/kg	101	70.0	130	----
QC-1619838-003	MRCA-21	Copper	7440-50-8	E440A	969 mg/kg	100	70.0	130	----
QC-1619838-003	MRCA-21	Iron	7439-89-6	E440A	32700 mg/kg	101	70.0	130	----
QC-1619838-003	MRCA-21	Lead	7439-92-1	E440A	919 mg/kg	93.8	70.0	130	----
QC-1619838-003	MRCA-21	Lithium	7439-93-2	E440A	47.3 mg/kg	95.3	70.0	130	----
QC-1619838-003	MRCA-21	Magnesium	7439-95-4	E440A	7780 mg/kg	106	70.0	130	----
QC-1619838-003	MRCA-21	Manganese	7439-96-5	E440A	8640 mg/kg	100	70.0	130	----
QC-1619838-003	MRCA-21	Molybdenum	7439-98-7	E440A	25.1 mg/kg	100	70.0	130	----
QC-1619838-003	MRCA-21	Nickel	7440-02-0	E440A	1000 mg/kg	99.8	70.0	130	----
QC-1619838-003	MRCA-21	Phosphorus	7723-14-0	E440A	660 mg/kg	97.4	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (<63 µm) (QCLot: 1619838) - continued									
QC-1619838-003	MRCA-21	Potassium	7440-09-7	E440A	10800 mg/kg	108	70.0	130	----
QC-1619838-003	MRCA-21	Selenium	7782-49-2	E440A	1.04 mg/kg	91.2	70.0	130	----
QC-1619838-003	MRCA-21	Silver	7440-22-4	E440A	8.98 mg/kg	98.6	70.0	130	----
QC-1619838-003	MRCA-21	Sodium	7440-23-5	E440A	1770 mg/kg	116	70.0	130	----
QC-1619838-003	MRCA-21	Strontium	7440-24-6	E440A	41 mg/kg	105	70.0	130	----
QC-1619838-003	MRCA-21	Thallium	7440-28-0	E440A	0.907 mg/kg	99.5	70.0	130	----
QC-1619838-003	MRCA-21	Tin	7440-31-5	E440A	3.79 mg/kg	96.9	70.0	130	----
QC-1619838-003	MRCA-21	Titanium	7440-32-6	E440A	2790 mg/kg	104	70.0	130	----
QC-1619838-003	MRCA-21	Uranium	7440-61-1	E440A	3.97 mg/kg	94.5	70.0	130	----
QC-1619838-003	MRCA-21	Vanadium	7440-62-2	E440A	66.2 mg/kg	102	70.0	130	----
QC-1619838-003	MRCA-21	Zinc	7440-66-6	E440A	828 mg/kg	98.8	70.0	130	----
QC-1619838-003	MRCA-21	Zirconium	7440-67-7	E440A	6.91 mg/kg	111	70.0	130	----
Metals (<63 µm) (QCLot: 1619839)									
QC-1619839-003	MRCA-21	Mercury	7439-97-6	E510A	0.068 mg/kg	93.5	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

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COC Number: 15 -

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Environmental Division Vancouver

Work Order Reference VA24C0980

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs	
Regular [R]	☑ Standard TAT if rec
PRIORITY (Business Days) 4 day [P4]	☐
3 day [P3]	☐
2 day [P2]	☐ EMERGENCY
Date and Time Required for all E&P TATs:	
For tests that can not be performed according to the ser	
Analys	
Indicate Filtered (F), Preserved (P) or Filter	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)							Number of Contai
	MP_HAC-U_SE-1_2024-08 A	13-Aug-24		Sediment													1
	MP_HAC-U_SE-1_2024-08 B	13-Aug-24		Sediment													1
	MP_HAC-U_SE-1_2024-08 C	13-Aug-24		Sediment													1
	MP_HAC-U_SE-1_2024-08 (Comp A+B+C)	13-Aug-24		Sediment	R	R	R	R	R	R							3
	MP_HAC-U_SE-2_2024-08 A	13-Aug-24		Sediment													1
	MP_HAC-U_SE-2_2024-08 B	13-Aug-24		Sediment													1
	MP_HAC-U_SE-2_2024-08 C	13-Aug-24		Sediment													1
	MP_HAC-U_SE-2_2024-08 (Comp A+B+C)	13-Aug-24		Sediment	R	R	R	R	R	R							3
	MP_HAC-U_SE-3_2024-08 A	13-Aug-24		Sediment													1
	MP_HAC-U_SE-3_2024-08 B	13-Aug-24		Sediment													1
	MP_HAC-U_SE-3_2024-08 C	13-Aug-24		Sediment													1
	MP_HAC-U_SE-3_2024-08 (Comp A+B+C)	13-Aug-24		Sediment	R	R	R	R	R	R							3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐ N/A

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			4	5	(12 °C warming pk)

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 15-Aug-24	Time: 11:30	Received by:	Date:	Time:	Received by: JC	Date: 16-8-24	Time: 1020am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

COC pages 1 to 8

* temp verified

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm	
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		**ALS Contact:** Can Dang	**Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA111)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E359A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_HAC-U_SE-4_2024-08 A	13-Aug-24		Sediment							1
	MP_HAC-U_SE-4_2024-08 B	13-Aug-24		Sediment							1
	MP_HAC-U_SE-4_2024-08 C	13-Aug-24		Sediment							1
	MP_HAC-U_SE-4_2024-08 (Comp A+B+C)	13-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_HAC-U_SE-5_2024-08 A	12-Aug-24		Sediment							1
	MP_HAC-U_SE-5_2024-08 B	12-Aug-24		Sediment							1
	MP_HAC-U_SE-5_2024-08 C	12-Aug-24		Sediment							1
	MP_HAC-U_SE-5_2024-08 (Comp A+B+C)	12-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_HAC-D_SE-1_2024-08 A	9-Aug-24		Sediment							1
	MP_HAC-D_SE-1_2024-08 B	9-Aug-24		Sediment							1
	MP_HAC-D_SE-1_2024-08 C	9-Aug-24		Sediment							1
	MP_HAC-D_SE-1_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 15-Aug-24	Time: 11:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_HAC-D_SE-2_2024-08 A	9-Aug-24		Sediment							1
	MP_HAC-D_SE-2_2024-08 B	9-Aug-24		Sediment							1
	MP_HAC-D_SE-2_2024-08 C	9-Aug-24		Sediment							1
	MP_HAC-D_SE-2_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_HAC-D_SE-3_2024-08 A	9-Aug-24		Sediment							1
	MP_HAC-D_SE-3_2024-08 B	9-Aug-24		Sediment							1
	MP_HAC-D_SE-3_2024-08 C	9-Aug-24		Sediment							1
	MP_HAC-D_SE-3_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_HAC-D_SE-4_2024-08 A	9-Aug-24		Sediment							1
	MP_HAC-D_SE-4_2024-08 B	9-Aug-24		Sediment							1
	MP_HAC-D_SE-4_2024-08 C	9-Aug-24		Sediment							1
	MP_HAC-D_SE-4_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is [redacted]3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
S Labmer	15-Aug-24	11:30						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm	
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_HAC-D_SE-5_2024-08 A	8 -Aug-24		Sediment							1
	MP_HAC-D_SE-5_2024-08 B	8 -Aug-24		Sediment							1
	MP_HAC-D_SE-5_2024-08 C	8 -Aug-24		Sediment							1
	MP_HAC-D_SE-5_2024-08 (Comp A+B+C)	8 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-U_SE-1_2024-08 A	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-1_2024-08 B	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-1_2024-08 C	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-1_2024-08 (Comp A+B+C)	11 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-U_SE-2_2024-08 A	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-2_2024-08 B	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-2_2024-08 C	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-2_2024-08 (Comp A+B+C)	11 -Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 15-Aug-24	Time: 1130	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)			EMERGENCY	
	4 day [P4]	☐	1 Business day [E1]	☐
	3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
	2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 600
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA111)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Suffur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_EDC-U_SE-3_2024-08 A	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-3_2024-08 B	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-3_2024-08 C	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-3_2024-08 (Comp A+B+C)	11 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-U_SE-4_2024-08 A	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-4_2024-08 B	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-4_2024-08 C	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-4_2024-08 (Comp A+B+C)	11 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-U_SE-5_2024-08 A	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-5_2024-08 B	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-5_2024-08 C	11 -Aug-24		Sediment							1
	MP_EDC-U_SE-5_2024-08 (Comp A+B+C)	11 -Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is [redacted] 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 15-Aug-24	Time: 11 30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_EDC-D_SE-1_2024-08 A	9-Aug-24		Sediment							1
	MP_EDC-D_SE-1_2024-08 B	9-Aug-24		Sediment							1
	MP_EDC-D_SE-1_2024-08 C	9-Aug-24		Sediment							1
	MP_EDC-D_SE-1_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-D_SE-2_2024-08 A	9-Aug-24		Sediment							1
	MP_EDC-D_SE-2_2024-08 B	9-Aug-24		Sediment							1
	MP_EDC-D_SE-2_2024-08 C	9-Aug-24		Sediment							1
	MP_EDC-D_SE-2_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-D_SE-3_2024-08 A	9-Aug-24		Sediment							1
	MP_EDC-D_SE-3_2024-08 B	9-Aug-24		Sediment							1
	MP_EDC-D_SE-3_2024-08 C	9-Aug-24		Sediment							1
	MP_EDC-D_SE-3_2024-08 (Comp A+B+C)	9-Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is [redacted] 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Sarah Latimer	Date: 8-Aug-24	Time: 1130	Received by:	Date:	Time:	Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwbc
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_EDC-D_SE-4_2024-08 A	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-4_2024-08 B	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-4_2024-08 C	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-4_2024-08 (Comp A+B+C)	10 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_EDC-D_SE-5_2024-08 A	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-5_2024-08 B	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-5_2024-08 C	10 -Aug-24		Sediment							1
	MP_EDC-D_SE-5_2024-08 (Comp A+B+C)	10 -Aug-24		Sediment	R	R	R	R	R	R	3
	MP_HAC-U_SE-3 X_2024-08 A	13 -Aug-24		Sediment							1
	MP_HAC-U_SE-3 X_2024-08 B	13 -Aug-24		Sediment							1
	MP_HAC-U_SE-3 X_2024-08 C	13 -Aug-24		Sediment							1
	MP_HAC-U_SE-3 X_2024-08 (Comp A+B+C)	13 -Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Each sample is 2 to 3 jars (denoted -A, -B, -C). Please combine & homogenize the jars before running analyses. Analyses are only listed once for each A, B, C pairing

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Lahmer	Date: 15-Aug-24	Time: 1130	Received by:	Date:	Time:	Received by:	Date:	Time:

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COC Number: 15 -

Page 8 of 8

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Company:	Mount Polley Mining Corporation
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Phone:	236-317-4939
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Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com, alalonde@dwbc

Email 2: kbatchelar@minnow.ca, slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

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PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

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ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

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	~~MP_EDC-D_SE-4_2024-08 A~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-4_2024-08 B~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-4_2024-08 C~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-4_2024-08~~ (Comp A+B+C)	~~-Aug-24~~		Sediment	R	R	R	R	R	R	
	~~MP_EDC-D_SE-5_2024-08 A~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-5_2024-08 B~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-5_2024-08 C~~	~~-Aug-24~~		Sediment							
	~~MP_EDC-D_SE-5_2024-08~~ (Comp A+B+C)	~~-Aug-24~~		Sediment	R	R	R	R	R	R	
	MP_ ~~HAC-D~~ SE-4 X_2024-08 A	9 -Aug-24		Sediment							1
	MP_ ~~HAC-D~~ SE-4 X_2024-08 B	9 -Aug-24		Sediment							1
	MP_ ~~HAC-D~~ SE-4 X_2024-08 C	9 -Aug-24		Sediment							1
	MP_ ~~HAC-D~~ SE-4 X_2024-08 (Comp A+B+C)	9 -Aug-24		Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

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SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 15-Aug-24	Time: 1130	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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SEDIMENT QUALITY

ALS Laboratory Report VA24C2399

(Finalized September 17, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C2399**	Page	: 1 of 14
Amendment	: **1**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 29-Aug-2024 10:45
PO	: 24-04-7	Date Analysis Commenced	: 07-Sep-2024
C-O-C number	: 15-03	Issue Date	: 17-Sep-2024 14:50
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 108		
No. of samples analysed	: 27		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	20-Aug-2024 15:35	20-Aug-2024 15:00	20-Aug-2024 14:27	20-Aug-2024 14:05	20-Aug-2024 16:00
						VA24C2399-004	VA24C2399-008	VA24C2399-012	VA24C2399-016	VA24C2399-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		24.8	21.8	26.4	23.6	25.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		8.73	8.56	8.68	8.61	8.68
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		94.7	97.1	97.3	97.0	97.7
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		5.3	2.9	2.7	2.9	2.2
Clay (<0.004mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		<0.020	0.028	<0.020	<0.020	0.023
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		0.293	0.505	0.491	0.401	0.415
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		1070	770	920	940	920
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		13700	17300	17900	16500	17800
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.52	0.56	0.53	0.50	0.58
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		17.5	18.4	16.6	17.8	19.9
Barium	7440-39-3	E440A/VA	0.50	mg/kg		119	157	187	160	156
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.53	0.63	0.63	0.60	0.65
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.15	0.16	0.13	0.14	0.17
Boron	7440-42-8	E440A/VA	5.0	mg/kg		7.5	8.8	8.5	8.9	9.8
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.252	0.318	0.265	0.323	0.369
Calcium	7440-70-2	E440A/VA	50	mg/kg		26900	24200	27100	23900	30200
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		61.8	42.3	31.8	42.7	38.7
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		37.9	24.5	20.6	24.5	23.0
Copper	7440-50-8	E440A/VA	0.50	mg/kg		1370	1640	1710	1640	2180
Iron	7439-89-6	E440A/VA	50	mg/kg		227000	103000	74400	108000	92400
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.93	9.08	7.76	8.64	9.20

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	20-Aug-2024 15:35	20-Aug-2024 15:00	20-Aug-2024 14:27	20-Aug-2024 14:05	20-Aug-2024 16:00
						VA24C2399-004	VA24C2399-008	VA24C2399-012	VA24C2399-016	VA24C2399-020
						Result	Result	Result	Result	Result
Metals										
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		15.2	17.5	17.5	15.4	17.6
Magnesium	7439-95-4	E440A/VA	10	mg/kg		8550	10400	10400	9100	10200
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		968	1080	862	1120	1060
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0928	0.130	0.110	0.138	0.144
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		6.61	5.31	5.62	4.55	6.22
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		24.4	24.4	20.8	22.7	22.7
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1880	1800	1750	1760	1970
Potassium	7440-09-7	E440A/VA	100	mg/kg		810	1140	1210	1080	1190
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		1.83	1.60	1.61	1.56	2.16
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.672	0.763	0.689	0.799	0.977
Sodium	7440-23-5	E440A/VA	50	mg/kg		412	590	703	594	600
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		97.1	126	150	130	140
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		<0.050	0.056	<0.050	0.054	0.055
Tin	7440-31-5	E440A/VA	0.20	mg/kg		1.43	1.04	1.10	1.04	1.34
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1630	1500	1520	1180	1560
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.34	1.28	1.09	1.24	1.30
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		912	400	286	422	363
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		111	96.3	81.3	84.2	91.3
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		5.5	6.6	7.3	4.4	6.9

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00
						VA24C2399-024	VA24C2399-028	VA24C2399-032	VA24C2399-036	VA24C2399-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		28.4	33.4	31.1	31.0	29.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.47	5.89	6.00	6.71	5.60
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		5.0	<1.0	10.6	4.0	4.7
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		76.0	55.3	69.8	78.6	74.8
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		16.6	41.8	17.6	15.4	18.9
Clay (<0.004mm)	----	EC184E/SK	1.0	%		2.4	2.9	2.0	2.0	1.6
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.062	0.056	0.064	0.060	0.069
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		1.32	0.599	1.45	1.39	0.981
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		<500	<500	<500	<500	<500
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		17500	12900	16600	16200	12700
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.35	0.22	0.30	0.29	0.22
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		6.02	2.92	4.64	5.49	3.27
Barium	7440-39-3	E440A/VA	0.50	mg/kg		135	105	128	119	113
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.45	0.32	0.41	0.40	0.32
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.12	<0.10	0.12	0.11	<0.10
Boron	7440-42-8	E440A/VA	5.0	mg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.345	0.232	0.346	0.340	0.272
Calcium	7440-70-2	E440A/VA	50	mg/kg		8840	7780	8740	8700	7420
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		58.5	53.8	59.4	61.5	53.6
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		12.6	9.05	11.1	12.3	8.54
Copper	7440-50-8	E440A/VA	0.50	mg/kg		39.8	23.8	33.2	31.9	25.8
Iron	7439-89-6	E440A/VA	50	mg/kg		28000	21100	26200	26900	21000
Lead	7439-92-1	E440A/VA	0.10	mg/kg		6.68	4.28	6.14	5.87	4.61
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		14.5	9.0	13.2	13.2	9.8

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00
						VA24C2399-024	VA24C2399-028	VA24C2399-032	VA24C2399-036	VA24C2399-040
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		7750	5940	7570	7600	6050
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		332	262	326	402	246
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0483	0.0240	0.0369	0.0367	0.0271
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		1.02	0.49	0.87	0.91	0.66
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		34.4	25.2	32.9	33.4	25.5
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1200	1190	1280	1240	1280
Potassium	7440-09-7	E440A/VA	100	mg/kg		1420	950	1430	1330	960
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		0.81	0.36	0.79	0.72	0.46
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.168	0.095	0.152	0.147	0.105
Sodium	7440-23-5	E440A/VA	50	mg/kg		473	427	538	476	415
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		82.0	65.2	77.5	76.0	61.1
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.136	0.100	0.122	0.118	0.096
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.34	0.23	0.38	0.39	0.24
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1260	1160	1340	1220	1010
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.48	1.12	1.44	1.39	1.09
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		69.9	61.5	70.0	69.8	58.6
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		70.6	51.8	68.2	69.4	54.0
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		4.9	5.2	4.0	3.9	3.7

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	23-Aug-2024 00:00	23-Aug-2024 00:00	24-Aug-2024 00:00	24-Aug-2024 00:00	24-Aug-2024 00:00
						VA24C2399-044	VA24C2399-048	VA24C2399-052	VA24C2399-056	VA24C2399-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		59.3	62.6	52.4	60.0	63.0
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.94	7.98	8.21	8.05	8.05
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		4.5	4.7	5.9	8.4	1.0
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		48.6	51.0	47.9	46.4	49.2
Clay (<0.004mm)	----	EC184E/SK	1.0	%		46.9	44.3	46.2	45.2	49.8
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.080	0.083	0.059	0.091	0.112
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		0.654	0.702	0.351	0.719	0.748
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		880	950	670	560	600
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		30200	31700	29600	31000	32600
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.52	0.50	0.57	0.58	0.51
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		15.3	15.6	15.4	15.7	15.2
Barium	7440-39-3	E440A/VA	0.50	mg/kg		283	288	288	286	303
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		1.01	1.06	0.96	0.98	1.05
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.18	0.18	0.17	0.20	0.20
Boron	7440-42-8	E440A/VA	5.0	mg/kg		10.0	10.5	11.5	10.5	10.8
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.238	0.250	0.226	0.271	0.267
Calcium	7440-70-2	E440A/VA	50	mg/kg		20000	23600	22400	18000	18600
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		31.6	30.7	29.4	36.3	34.5
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		25.1	27.8	24.0	24.5	25.3
Copper	7440-50-8	E440A/VA	0.50	mg/kg		804	927	818	730	789
Iron	7439-89-6	E440A/VA	50	mg/kg		44000	43500	43200	41700	41700
Lead	7439-92-1	E440A/VA	0.10	mg/kg		12.6	13.1	12.7	14.3	14.6
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		31.5	34.8	29.5	31.1	31.8

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)
Client sampling date / time					23-Aug-2024 00:00	23-Aug-2024 00:00	24-Aug-2024 00:00	24-Aug-2024 00:00	24-Aug-2024 00:00
					VA24C2399-044	VA24C2399-048	VA24C2399-052	VA24C2399-056	VA24C2399-060
					Result	Result	Result	Result	Result
Metals									
Magnesium	7439-95-4	E440A/VA	10	mg/kg	17200	19700	16200	16500	17200
Manganese	7439-96-5	E440A/VA	0.20	mg/kg	1300	1340	1300	1510	1620
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg	0.0974	0.106	0.0954	0.106	0.114
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg	3.52	3.59	3.22	3.65	3.53
Nickel	7440-02-0	E440A/VA	0.50	mg/kg	28.8	29.3	26.9	32.9	32.6
Phosphorus	7723-14-0	E440A/VA	50	mg/kg	1190	1220	1250	1160	1130
Potassium	7440-09-7	E440A/VA	100	mg/kg	2680	2860	2870	3100	3240
Selenium	7782-49-2	E440A/VA	0.10	mg/kg	1.12	1.18	0.97	1.07	1.02
Silver	7440-22-4	E440A/VA	0.050	mg/kg	0.353	0.394	0.358	0.359	0.375
Sodium	7440-23-5	E440A/VA	50	mg/kg	1100	1160	1220	1190	1230
Strontium	7440-24-6	E440A/VA	0.10	mg/kg	203	215	221	224	235
Thallium	7440-28-0	E440A/VA	0.050	mg/kg	0.094	0.095	0.084	0.115	0.112
Tin	7440-31-5	E440A/VA	0.20	mg/kg	1.56	1.65	1.64	1.45	1.56
Titanium	7440-32-6	E440A/VA	1.0	mg/kg	1760	1720	1950	1790	1640
Uranium	7440-61-1	E440A/VA	0.050	mg/kg	1.63	1.73	1.52	1.84	1.80
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg	129	125	143	120	116
Zinc	7440-66-6	E440A/VA	1.0	mg/kg	102	112	95.8	102	107
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg	5.4	4.4	6.7	5.8	4.5

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	22-Aug-2024 00:00
						VA24C2399-064	VA24C2399-068	VA24C2399-072	VA24C2399-076	VA24C2399-080
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		59.4	54.8	59.7	59.0	53.8
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.99	8.15	8.09	8.10	8.33
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		55.3	57.6	48.4	42.4	46.4
Clay (<0.004mm)	----	EC184E/SK	1.0	%		44.5	42.0	51.2	57.2	53.6
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.091	0.049	0.069	0.056	0.058
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		0.697	0.340	0.529	0.406	0.151
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		960	650	750	<500	<500
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		28100	25600	27300	29700	28000
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.57	0.51	0.55	0.57	0.55
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		15.4	13.5	14.6	18.1	14.3
Barium	7440-39-3	E440A/VA	0.50	mg/kg		281	262	288	316	299
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		1.00	0.87	0.97	1.05	1.02
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.16	0.12	0.17	0.17	0.14
Boron	7440-42-8	E440A/VA	5.0	mg/kg		11.6	10.4	10.4	11.6	12.4
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.238	0.179	0.219	0.216	0.167
Calcium	7440-70-2	E440A/VA	50	mg/kg		25800	22300	24500	21600	23600
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		25.7	19.8	24.1	24.4	18.4
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		20.9	17.5	20.6	20.5	18.0
Copper	7440-50-8	E440A/VA	0.50	mg/kg		682	586	706	747	709
Iron	7439-89-6	E440A/VA	50	mg/kg		32100	26000	31400	31900	26100
Lead	7439-92-1	E440A/VA	0.10	mg/kg		11.4	8.94	11.8	12.2	10.3
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		27.0	22.6	26.0	26.4	23.3

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)
				Client sampling date / time	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	21-Aug-2024 00:00	22-Aug-2024 00:00
					VA24C2399-064	VA24C2399-068	VA24C2399-072	VA24C2399-076	VA24C2399-080
					Result	Result	Result	Result	Result
Metals									
Magnesium	7439-95-4	E440A/VA	10	mg/kg	14400	12300	14200	14200	13400
Manganese	7439-96-5	E440A/VA	0.20	mg/kg	1230	893	1200	1530	1010
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg	0.0951	0.0730	0.0928	0.0876	0.0748
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg	3.06	2.62	3.06	2.81	2.52
Nickel	7440-02-0	E440A/VA	0.50	mg/kg	24.0	19.0	23.3	23.3	17.4
Phosphorus	7723-14-0	E440A/VA	50	mg/kg	1270	1160	1170	987	1170
Potassium	7440-09-7	E440A/VA	100	mg/kg	2720	2490	2630	3060	2990
Selenium	7782-49-2	E440A/VA	0.10	mg/kg	1.20	0.75	1.01	0.88	0.60
Silver	7440-22-4	E440A/VA	0.050	mg/kg	0.339	0.253	0.319	0.292	0.272
Sodium	7440-23-5	E440A/VA	50	mg/kg	1190	1280	1260	1450	1520
Strontium	7440-24-6	E440A/VA	0.10	mg/kg	243	251	252	268	265
Thallium	7440-28-0	E440A/VA	0.050	mg/kg	0.089	0.070	0.079	0.089	0.064
Tin	7440-31-5	E440A/VA	0.20	mg/kg	1.80	1.63	1.62	1.69	1.92
Titanium	7440-32-6	E440A/VA	1.0	mg/kg	1920	1790	1790	1750	2040
Uranium	7440-61-1	E440A/VA	0.050	mg/kg	1.70	1.45	1.65	1.45	1.45
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg	100	88.0	96.4	90.9	92.7
Zinc	7440-66-6	E440A/VA	1.0	mg/kg	84.4	71.0	83.4	83.0	72.4
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg	6.6	7.0	6.9	5.2	7.0

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	22-Aug-2024 00:00	22-Aug-2024 00:00	22-Aug-2024 00:00	23-Aug-2024 00:00	23-Aug-2024 00:00
						VA24C2399-084	VA24C2399-088	VA24C2399-092	VA24C2399-096	VA24C2399-100
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		53.4	53.5	54.3	56.4	55.4
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.46	6.35	6.44	6.32	6.35
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	<1.0	<1.0	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		21.2	21.6	21.3	14.5	17.1
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		66.8	67.5	67.0	73.9	71.7
Clay (<0.004mm)	----	EC184E/SK	1.0	%		12.0	10.9	11.7	11.6	11.2
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.164	0.163	0.175	0.169	0.177
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		1.73	1.77	1.78	1.78	1.67
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		1320	1150	1130	1210	1040
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		18900	17100	18200	19000	20100
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.45	0.41	0.44	0.40	0.42
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		9.15	8.21	9.83	8.89	9.34
Barium	7440-39-3	E440A/VA	0.50	mg/kg		176	161	171	167	169
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.55	0.48	0.52	0.51	0.54
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.17	0.15	0.16	0.16	0.16
Boron	7440-42-8	E440A/VA	5.0	mg/kg		<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.437	0.416	0.417	0.395	0.414
Calcium	7440-70-2	E440A/VA	50	mg/kg		9480	8470	9120	9150	9480
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		62.5	57.7	59.6	60.1	61.9
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		15.1	14.1	15.0	14.4	14.9
Copper	7440-50-8	E440A/VA	0.50	mg/kg		49.3	45.2	47.9	45.9	47.1
Iron	7439-89-6	E440A/VA	50	mg/kg		34100	32000	33700	33800	34600
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.92	7.43	7.84	7.71	7.85
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		16.4	14.7	16.1	15.4	15.9

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)
					Client sampling date / time	22-Aug-2024 00:00	22-Aug-2024 00:00	22-Aug-2024 00:00	23-Aug-2024 00:00	23-Aug-2024 00:00
						VA24C2399-084	VA24C2399-088	VA24C2399-092	VA24C2399-096	VA24C2399-100
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		9270	8590	9030	8970	8920
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		507	456	515	496	578
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0522	0.0488	0.0519	0.0484	0.0627
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		1.07	0.92	1.10	0.93	1.01
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		42.0	39.1	41.1	39.4	40.4
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1300	1260	1300	1370	1360
Potassium	7440-09-7	E440A/VA	100	mg/kg		1710	1470	1610	1640	1780
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		1.32	1.24	1.34	1.23	1.28
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.210	0.195	0.226	0.199	0.207
Sodium	7440-23-5	E440A/VA	50	mg/kg		541	458	515	520	553
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		88.4	80.4	85.9	87.6	91.9
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.183	0.161	0.184	0.176	0.187
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.36	0.30	0.35	0.33	0.35
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1140	1020	1110	1080	1280
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.60	1.46	1.59	1.56	1.69
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		72.4	67.1	70.3	70.4	74.4
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		83.8	77.4	80.8	79.3	80.7
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		4.6	4.6	4.3	4.6	4.8

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	----	----	----
					Client sampling date / time	23-Aug-2024 00:00	24-Aug-2024 00:00	----	----	----
						VA24C2399-104	VA24C2399-108	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		56.0	53.1	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.36	8.21	----	----	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	<1.0	----	----	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		14.7	5.3	----	----	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		73.4	50.0	----	----	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		11.9	44.7	----	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.191	0.039	----	----	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		1.76	0.383	----	----	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		1220	780	----	----	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		20700	29900	----	----	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.42	0.49	----	----	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		8.96	15.0	----	----	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		178	297	----	----	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.54	0.95	----	----	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.16	0.16	----	----	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		<5.0	10.9	----	----	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.423	0.230	----	----	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		9600	20900	----	----	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		63.0	29.6	----	----	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		15.1	23.6	----	----	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		47.5	799	----	----	----
Iron	7439-89-6	E440A/VA	50	mg/kg		34400	43500	----	----	----
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.92	12.3	----	----	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	----	----	----
					Client sampling date / time	23-Aug-2024 00:00	24-Aug-2024 00:00	----	----	----
						VA24C2399-104	VA24C2399-108	--------	--------	--------
						Result	Result	----	----	----
Metals										
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		16.2	29.5	----	----	----
Magnesium	7439-95-4	E440A/VA	10	mg/kg		9340	16300	----	----	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		524	1310	----	----	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.0549	0.0885	----	----	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		1.00	2.70	----	----	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		41.0	26.5	----	----	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1350	1290	----	----	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		1830	2880	----	----	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		1.33	0.89	----	----	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.207	0.324	----	----	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		567	1240	----	----	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		93.2	204	----	----	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.186	0.089	----	----	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.36	1.56	----	----	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1240	1790	----	----	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.67	1.48	----	----	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		75.0	141	----	----	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		81.8	95.6	----	----	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		4.6	4.4	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2399**	Page	: 1 of 25
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 29-Aug-2024 10:45
PO	: 24-04-7	Issue Date	: 17-Sep-2024 14:50
C-O-C number	: 15-03		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 108		
No. of samples analysed	: 27		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals (<63 µm)	VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	Titanium	7440-32-6	E440A	41.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals (<63 µm)	VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	Zirconium	7440-67-7	E440A	2.0 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Reference Material (RM) Sample								
Metals (<63 µm)	QC-MRG2-1638246 003	----	Bismuth	7440-69-9	E440A	135 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / **Container / Client Sample ID(s)**	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E366	24-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E366	24-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E366	24-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E366	23-Aug-2024	10-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E366	23-Aug-2024	10-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E366	22-Aug-2024	10-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E366	24-Aug-2024	13-Sep-2024	28 days	20 days	✓	13-Sep-2024	28 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E366	21-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E366	23-Aug-2024	13-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	22 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E366	23-Aug-2024	13-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	22 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E366	23-Aug-2024	13-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	22 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E366	22-Aug-2024	13-Sep-2024	28 days	22 days	✓	13-Sep-2024	28 days	23 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E366	22-Aug-2024	13-Sep-2024	28 days	22 days	✓	13-Sep-2024	28 days	23 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
LDPE bag MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E366	22-Aug-2024	13-Sep-2024	28 days	22 days	✓	13-Sep-2024	28 days	23 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E399	24-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E399	24-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E399	24-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E399	23-Aug-2024	10-Sep-2024	365 days	19 days	✓	10-Sep-2024	365 days	19 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E399	23-Aug-2024	10-Sep-2024	365 days	19 days	✓	10-Sep-2024	365 days	19 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E399	22-Aug-2024	10-Sep-2024	365 days	20 days	✓	10-Sep-2024	365 days	20 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E399	24-Aug-2024	13-Sep-2024	365 days	20 days	✓	13-Sep-2024	365 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E399	21-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E399	23-Aug-2024	13-Sep-2024	365 days	21 days	✓	13-Sep-2024	365 days	22 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E399	23-Aug-2024	13-Sep-2024	365 days	21 days	✓	13-Sep-2024	365 days	22 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E399	23-Aug-2024	13-Sep-2024	365 days	21 days	✓	13-Sep-2024	365 days	22 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E399	22-Aug-2024	13-Sep-2024	365 days	22 days	✓	13-Sep-2024	365 days	23 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E399	22-Aug-2024	13-Sep-2024	365 days	22 days	✓	13-Sep-2024	365 days	23 days	✓
Inorganics : Total Sulfur by high temperature combustion										
LDPE bag MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E399	22-Aug-2024	13-Sep-2024	365 days	22 days	✓	13-Sep-2024	365 days	23 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E510A	24-Aug-2024	09-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E510A	24-Aug-2024	09-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E510A	24-Aug-2024	09-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E510A	24-Aug-2024	09-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E510A	23-Aug-2024	09-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E510A	23-Aug-2024	09-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E510A	23-Aug-2024	09-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E510A	23-Aug-2024	09-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E510A	23-Aug-2024	09-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E510A	22-Aug-2024	09-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E510A	22-Aug-2024	09-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E510A	22-Aug-2024	09-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E510A	22-Aug-2024	09-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E510A	21-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E510A	20-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E510A	20-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E510A	20-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E510A	20-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E510A	20-Aug-2024	09-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E440A	24-Aug-2024	09-Sep-2024	180 days	17 days	✓	11-Sep-2024	180 days	18 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E440A	24-Aug-2024	09-Sep-2024	180 days	17 days	✓	11-Sep-2024	180 days	18 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E440A	24-Aug-2024	09-Sep-2024	180 days	17 days	✓	11-Sep-2024	180 days	18 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E440A	24-Aug-2024	09-Sep-2024	180 days	17 days	✓	11-Sep-2024	180 days	18 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E440A	23-Aug-2024	09-Sep-2024	180 days	18 days	✓	11-Sep-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E440A	23-Aug-2024	09-Sep-2024	180 days	18 days	✓	11-Sep-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E440A	23-Aug-2024	09-Sep-2024	180 days	18 days	✓	11-Sep-2024	180 days	19 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E440A	23-Aug-2024	09-Sep-2024	180 days	18 days	✓	11-Sep-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E440A	23-Aug-2024	09-Sep-2024	180 days	18 days	✓	11-Sep-2024	180 days	19 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E440A	22-Aug-2024	09-Sep-2024	180 days	19 days	✓	11-Sep-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E440A	22-Aug-2024	09-Sep-2024	180 days	19 days	✓	11-Sep-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E440A	22-Aug-2024	09-Sep-2024	180 days	19 days	✓	11-Sep-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E440A	22-Aug-2024	09-Sep-2024	180 days	19 days	✓	11-Sep-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E440A	21-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E440A	20-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E440A	20-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E440A	20-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	22 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E440A	20-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E440A	20-Aug-2024	09-Sep-2024	180 days	20 days	✓	11-Sep-2024	180 days	22 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E144	24-Aug-2024	----	----	----		07-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E144	24-Aug-2024	----	----	----		07-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E144	24-Aug-2024	----	----	----		07-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E144	24-Aug-2024	----	----	----		07-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E144	23-Aug-2024	----	----	----		07-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E144	23-Aug-2024	----	----	----		07-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E144	23-Aug-2024	----	----	----		07-Sep-2024	----	15 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E144	23-Aug-2024	----	----	----		07-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E144	23-Aug-2024	----	----	----		07-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E144	22-Aug-2024	----	----	----		07-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E144	22-Aug-2024	----	----	----		07-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E144	22-Aug-2024	----	----	----		07-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E144	22-Aug-2024	----	----	----		07-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E144	21-Aug-2024	----	----	----		07-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E144	20-Aug-2024	----	----	----		07-Sep-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E144	20-Aug-2024	----	----	----		07-Sep-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E144	20-Aug-2024	----	----	----		07-Sep-2024	----	18 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E144	20-Aug-2024	----	----	----		07-Sep-2024	----	18 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E144	20-Aug-2024	----	----	----		07-Sep-2024	----	18 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	E108	24-Aug-2024	09-Sep-2024	30 days	17 days	✓	09-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-3X_2024-08 (Comp A+B+C)	E108	24-Aug-2024	09-Sep-2024	30 days	17 days	✓	10-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	E108	24-Aug-2024	09-Sep-2024	30 days	17 days	✓	09-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	E108	24-Aug-2024	09-Sep-2024	30 days	17 days	✓	09-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	E108	23-Aug-2024	09-Sep-2024	30 days	18 days	✓	09-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	E108	23-Aug-2024	09-Sep-2024	30 days	18 days	✓	09-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	E108	23-Aug-2024	09-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-4X_2024-08 (Comp A+B+C)	E108	23-Aug-2024	09-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	E108	23-Aug-2024	09-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	E108	22-Aug-2024	09-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	E108	22-Aug-2024	09-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	E108	22-Aug-2024	09-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	E108	22-Aug-2024	09-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	E108	20-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	E108	20-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	E108	20-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	E108	20-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	E108	20-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	09-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	E108	21-Aug-2024	09-Sep-2024	30 days	20 days	✓	10-Sep-2024	30 days	20 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1638598	2	37	5.4	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1638599	2	37	5.4	5.0	✓
Moisture Content by Gravimetry	E144	1638600	2	37	5.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1638245	2	37	5.4	5.0	✓
Total Nitrogen by Combustion	E366	1650126	2	40	5.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1650128	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1638598	4	37	10.8	10.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1638599	4	37	10.8	10.0	✓
Moisture Content by Gravimetry	E144	1638600	2	37	5.4	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1638597	2	37	5.4	5.0	✓
Total Nitrogen by Combustion	E366	1650126	4	40	10.0	10.0	✓
Total Sulfur by high temperature combustion	E399	1650128	4	40	10.0	10.0	✓
Method Blanks (MB)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1638598	2	37	5.4	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1638599	2	37	5.4	5.0	✓
Moisture Content by Gravimetry	E144	1638600	2	37	5.4	5.0	✓
Total Nitrogen by Combustion	E366	1650126	2	40	5.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1650128	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Total Sulfur by high temperature combustion	E399 ALS Environmental - Saskatoon	Soil/Solid	ISO 15178:2000	Air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO_2 gas is determined using a thermal conductivity detector.
Metals in Sediment by CRC ICPMS (<63 µm)	E440A ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 63 um sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Sediment by CVAAS (<63 µm)	E510A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO_3 and HCl, followed by CVAAS analysis.
Particle Size Analysis (Pipette) - MMER Classification	EC184E ALS Environmental - Saskatoon	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil (<63 µm)	EC356A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC) analyzed on material passing a 63 µm sieve.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury (63 µm Sieve)	EP440A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C2399**	Page	: 1 of 14
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 29-Aug-2024 10:45
PO	: 24-04-7	Date Analysis Commenced	: 07-Sep-2024
C-O-C number	: 15-03	Issue Date	: 17-Sep-2024 14:50
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 108		
No. of samples analysed	: 27		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Hedy Lai	Team Leader - Inorganics	Saskatoon Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1638245)											
VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	pH (1:2 soil:water)	----	E108	0.10	pH units	6.47	6.50	0.5%	5%	----
Physical Tests (QC Lot: 1638248)											
VA24C2333-041	Anonymous	Moisture	----	E144	0.25	%	44.5	44.2	0.826%	20%	----
Physical Tests (QC Lot: 1638597)											
VA24C2399-076	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	pH (1:2 soil:water)	----	E108	0.10	pH units	8.10	8.11	0.1%	5%	----
Physical Tests (QC Lot: 1638600)											
VA24C2399-076	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	Moisture	----	E144	0.25	%	59.0	59.0	0.0368%	20%	----
Anions and Nutrients (QC Lot: 1643529)											
VA24C2399-008	MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	Nitrogen, total	7727-37-9	E366	0.020	%	0.028	0.020	0.008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1650126)											
CG2412919-004	Anonymous	Nitrogen, total	7727-37-9	E366	0.020	%	0.259	0.260	0.385%	20%	----
Inorganics (QC Lot: 1643528)											
VA24C2399-008	MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	Sulfur, total	7704-34-9	E399	0.050	%	770 mg/kg	0.066	0.011	Diff <2x LOR	----
Inorganics (QC Lot: 1650128)											
CG2412919-004	Anonymous	Sulfur, total	7704-34-9	E399	0.050	%	1430 mg/kg	0.124	0.019	Diff <2x LOR	----
Metals (<63 µm) (QC Lot: 1638246)											
VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	Mercury	7439-97-6	E510A	0.0050	mg/kg	0.0483	0.0417	14.7%	40%	----
Metals (<63 µm) (QC Lot: 1638247)											
VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	Aluminum	7429-90-5	E440A	50	mg/kg	17500	16800	3.81%	40%	----
		Antimony	7440-36-0	E440A	0.10	mg/kg	0.35	0.28	0.07	Diff <2x LOR	----
		Arsenic	7440-38-2	E440A	0.050	mg/kg	6.02	5.84	3.06%	30%	----
		Barium	7440-39-3	E440A	0.50	mg/kg	135	131	2.94%	40%	----
		Beryllium	7440-41-7	E440A	0.10	mg/kg	0.45	0.43	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440A	0.10	mg/kg	0.12	0.12	0.004	Diff <2x LOR	----
		Boron	7440-42-8	E440A	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440A	0.020	mg/kg	0.345	0.344	0.190%	30%	----
		Calcium	7440-70-2	E440A	50	mg/kg	8840	8430	4.76%	30%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (<63 µm) (QC Lot: 1638247) - continued											
VA24C2399-024	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	Chromium	7440-47-3	E440A	0.50	mg/kg	58.5	57.9	1.06%	30%	----
		Cobalt	7440-48-4	E440A	0.10	mg/kg	12.6	12.6	0.335%	30%	----
		Copper	7440-50-8	E440A	0.50	mg/kg	39.8	39.2	1.65%	30%	----
		Iron	7439-89-6	E440A	50	mg/kg	28000	27300	2.86%	30%	----
		Lead	7439-92-1	E440A	0.10	mg/kg	6.68	6.50	2.73%	40%	----
		Lithium	7439-93-2	E440A	2.0	mg/kg	14.5	14.4	0.314%	30%	----
		Magnesium	7439-95-4	E440A	10	mg/kg	7750	7920	2.20%	30%	----
		Manganese	7439-96-5	E440A	0.20	mg/kg	332	332	0.183%	30%	----
		Molybdenum	7439-98-7	E440A	0.10	mg/kg	1.02	1.01	1.21%	40%	----
		Nickel	7440-02-0	E440A	0.50	mg/kg	34.4	34.4	0.110%	30%	----
		Phosphorus	7723-14-0	E440A	50	mg/kg	1200	1060	12.6%	30%	----
		Potassium	7440-09-7	E440A	100	mg/kg	1420	1300	9.23%	40%	----
		Selenium	7782-49-2	E440A	0.10	mg/kg	0.81	0.66	20.0%	30%	----
		Silver	7440-22-4	E440A	0.050	mg/kg	0.168	0.164	0.004	Diff <2x LOR	----
		Sodium	7440-23-5	E440A	50	mg/kg	473	432	9.15%	40%	----
		Strontium	7440-24-6	E440A	0.10	mg/kg	82.0	73.7	10.6%	40%	----
		Thallium	7440-28-0	E440A	0.050	mg/kg	0.136	0.128	0.007	Diff <2x LOR	----
		Tin	7440-31-5	E440A	0.20	mg/kg	0.34	0.26	0.08	Diff <2x LOR	----
		Titanium	7440-32-6	E440A	1.0	mg/kg	1260	825	41.9%	40%	DUP-H
		Uranium	7440-61-1	E440A	0.050	mg/kg	1.48	1.36	8.43%	30%	----
		Vanadium	7440-62-2	E440A	0.20	mg/kg	69.9	67.9	2.95%	30%	----
		Zinc	7440-66-6	E440A	1.0	mg/kg	70.6	74.8	5.72%	30%	----
		Zirconium	7440-67-7	E440A	1.0	mg/kg	4.9	# 2.9	2.0	Diff <2x LOR	DUP-H,J
Metals (<63 µm) (QC Lot: 1638598)											
VA24C2399-076	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	Mercury	7439-97-6	E510A	0.0050	mg/kg	0.0876	0.0932	6.16%	40%	----
Metals (<63 µm) (QC Lot: 1638599)											
VA24C2399-076	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	Aluminum	7429-90-5	E440A	50	mg/kg	29700	30000	1.14%	40%	----
		Antimony	7440-36-0	E440A	0.10	mg/kg	0.57	0.60	0.03	Diff <2x LOR	----
		Arsenic	7440-38-2	E440A	0.050	mg/kg	18.1	15.5	15.5%	30%	----
		Barium	7440-39-3	E440A	0.50	mg/kg	316	326	3.04%	40%	----
		Beryllium	7440-41-7	E440A	0.10	mg/kg	1.05	1.07	1.68%	30%	----
		Bismuth	7440-69-9	E440A	0.10	mg/kg	0.17	0.17	0.004	Diff <2x LOR	----
		Boron	7440-42-8	E440A	5.0	mg/kg	11.6	12.0	0.4	Diff <2x LOR	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (<63 µm) (QC Lot: 1638599) - continued											
VA24C2399-076	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	Cadmium	7440-43-9	E440A	0.020	mg/kg	0.216	0.211	1.99%	30%	----
		Calcium	7440-70-2	E440A	50	mg/kg	21600	20700	4.18%	30%	----
		Chromium	7440-47-3	E440A	0.50	mg/kg	24.4	24.3	0.488%	30%	----
		Cobalt	7440-48-4	E440A	0.10	mg/kg	20.5	20.7	1.15%	30%	----
		Copper	7440-50-8	E440A	0.50	mg/kg	747	767	2.72%	30%	----
		Iron	7439-89-6	E440A	50	mg/kg	31900	30500	4.58%	30%	----
		Lead	7439-92-1	E440A	0.10	mg/kg	12.2	12.4	2.28%	40%	----
		Lithium	7439-93-2	E440A	2.0	mg/kg	26.4	27.6	4.50%	30%	----
		Magnesium	7439-95-4	E440A	10	mg/kg	14200	14600	3.23%	30%	----
		Manganese	7439-96-5	E440A	0.20	mg/kg	1530	1500	1.96%	30%	----
		Molybdenum	7439-98-7	E440A	0.10	mg/kg	2.81	2.89	2.77%	40%	----
		Nickel	7440-02-0	E440A	0.50	mg/kg	23.3	22.8	2.43%	30%	----
		Phosphorus	7723-14-0	E440A	50	mg/kg	987	957	3.10%	30%	----
		Potassium	7440-09-7	E440A	100	mg/kg	3060	3230	5.34%	40%	----
		Selenium	7782-49-2	E440A	0.10	mg/kg	0.88	0.88	0.466%	30%	----
		Silver	7440-22-4	E440A	0.050	mg/kg	0.292	0.304	4.13%	40%	----
		Sodium	7440-23-5	E440A	50	mg/kg	1450	1520	4.63%	40%	----
		Strontium	7440-24-6	E440A	0.10	mg/kg	268	276	3.15%	40%	----
		Thallium	7440-28-0	E440A	0.050	mg/kg	0.089	0.085	0.003	Diff <2x LOR	----
		Tin	7440-31-5	E440A	0.20	mg/kg	1.69	1.78	5.58%	40%	----
		Titanium	7440-32-6	E440A	1.0	mg/kg	1750	1890	7.78%	40%	----
		Uranium	7440-61-1	E440A	0.050	mg/kg	1.45	1.47	1.66%	30%	----
		Vanadium	7440-62-2	E440A	0.20	mg/kg	90.9	94.3	3.67%	30%	----
		Zinc	7440-66-6	E440A	1.0	mg/kg	83.0	83.3	0.333%	30%	----
		Zirconium	7440-67-7	E440A	1.0	mg/kg	5.2	6.3	1.1	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1638248)						
Moisture	----	E144	0.25	%	<0.25	----
Physical Tests (QCLot: 1638600)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1643529)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Anions and Nutrients (QCLot: 1650126)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Inorganics (QCLot: 1643528)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Inorganics (QCLot: 1650128)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Metals (<63 µm) (QCLot: 1638246)						
Mercury	7439-97-6	E510A	0.005	mg/kg	<0.0050	----
Metals (<63 µm) (QCLot: 1638247)						
Aluminum	7429-90-5	E440A	50	mg/kg	<50	----
Antimony	7440-36-0	E440A	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E440A	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	<0.10	----
Boron	7440-42-8	E440A	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440A	50	mg/kg	<50	----
Chromium	7440-47-3	E440A	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440A	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440A	50	mg/kg	<50	----
Lead	7439-92-1	E440A	0.1	mg/kg	<0.10	----
Lithium	7439-93-2	E440A	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440A	10	mg/kg	<10	----
Manganese	7439-96-5	E440A	0.2	mg/kg	<0.20	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (<63 µm) (QCLot: 1638247) - continued						
Nickel	7440-02-0	E440A	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440A	50	mg/kg	<50	----
Potassium	7440-09-7	E440A	100	mg/kg	<100	----
Selenium	7782-49-2	E440A	0.1	mg/kg	<0.10	----
Silver	7440-22-4	E440A	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440A	50	mg/kg	<50	----
Strontium	7440-24-6	E440A	0.1	mg/kg	<0.10	----
Thallium	7440-28-0	E440A	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440A	0.2	mg/kg	<0.20	----
Titanium	7440-32-6	E440A	1	mg/kg	<1.0	----
Uranium	7440-61-1	E440A	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440A	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E440A	1	mg/kg	<1.0	----
Metals (<63 µm) (QCLot: 1638598)						
Mercury	7439-97-6	E510A	0.005	mg/kg	<0.0050	----
Metals (<63 µm) (QCLot: 1638599)						
Aluminum	7429-90-5	E440A	50	mg/kg	<50	----
Antimony	7440-36-0	E440A	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E440A	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	<0.10	----
Boron	7440-42-8	E440A	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440A	50	mg/kg	<50	----
Chromium	7440-47-3	E440A	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440A	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440A	50	mg/kg	<50	----
Lead	7439-92-1	E440A	0.1	mg/kg	<0.10	----
Lithium	7439-93-2	E440A	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440A	10	mg/kg	<10	----
Manganese	7439-96-5	E440A	0.2	mg/kg	<0.20	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (<63 µm) (QCLot: 1638599) - continued						
Nickel	7440-02-0	E440A	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440A	50	mg/kg	<50	----
Potassium	7440-09-7	E440A	100	mg/kg	<100	----
Selenium	7782-49-2	E440A	0.1	mg/kg	<0.10	----
Silver	7440-22-4	E440A	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440A	50	mg/kg	<50	----
Strontium	7440-24-6	E440A	0.1	mg/kg	<0.10	----
Thallium	7440-28-0	E440A	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440A	0.2	mg/kg	<0.20	----
Titanium	7440-32-6	E440A	1	mg/kg	<1.0	----
Uranium	7440-61-1	E440A	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440A	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E440A	1	mg/kg	<1.0	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1638245)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.5	95.0	105	----
Physical Tests (QCLot: 1638248)									
Moisture	----	E144	0.25	%	50 %	99.5	90.0	110	----
Physical Tests (QCLot: 1638597)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	99.2	95.0	105	----
Physical Tests (QCLot: 1638600)									
Moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Anions and Nutrients (QCLot: 1643529)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	98.5	90.0	110	----
Anions and Nutrients (QCLot: 1650126)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	100	90.0	110	----
Inorganics (QCLot: 1643528)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	98.8	90.0	110	----
Inorganics (QCLot: 1650128)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	95.0	90.0	110	----
Metals (<63 µm) (QCLot: 1638246)									
Mercury	7439-97-6	E510A	0.005	mg/kg	0.1 mg/kg	90.8	80.0	120	----
Metals (<63 µm) (QCLot: 1638247)									
Aluminum	7429-90-5	E440A	50	mg/kg	200 mg/kg	96.0	80.0	120	----
Antimony	7440-36-0	E440A	0.1	mg/kg	100 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	100 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440A	0.5	mg/kg	25 mg/kg	98.4	80.0	120	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	10 mg/kg	96.7	80.0	120	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	100 mg/kg	95.4	80.0	120	----
Boron	7440-42-8	E440A	5	mg/kg	100 mg/kg	96.6	80.0	120	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	10 mg/kg	96.0	80.0	120	----
Calcium	7440-70-2	E440A	50	mg/kg	5000 mg/kg	96.4	80.0	120	----
Chromium	7440-47-3	E440A	0.5	mg/kg	25 mg/kg	94.7	80.0	120	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	25 mg/kg	95.5	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1638247) - continued									
Copper	7440-50-8	E440A	0.5	mg/kg	25 mg/kg	95.0	80.0	120	----
Iron	7439-89-6	E440A	50	mg/kg	100 mg/kg	98.4	80.0	120	----
Lead	7439-92-1	E440A	0.1	mg/kg	50 mg/kg	99.1	80.0	120	----
Lithium	7439-93-2	E440A	2	mg/kg	25 mg/kg	97.2	80.0	120	----
Magnesium	7439-95-4	E440A	10	mg/kg	5000 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440A	0.2	mg/kg	25 mg/kg	96.7	80.0	120	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440A	0.5	mg/kg	50 mg/kg	94.3	80.0	120	----
Phosphorus	7723-14-0	E440A	50	mg/kg	1000 mg/kg	112	80.0	120	----
Potassium	7440-09-7	E440A	100	mg/kg	5000 mg/kg	98.4	80.0	120	----
Selenium	7782-49-2	E440A	0.1	mg/kg	100 mg/kg	102	80.0	120	----
Silver	7440-22-4	E440A	0.05	mg/kg	10 mg/kg	89.0	80.0	120	----
Sodium	7440-23-5	E440A	50	mg/kg	5000 mg/kg	94.0	80.0	120	----
Strontium	7440-24-6	E440A	0.1	mg/kg	25 mg/kg	97.2	80.0	120	----
Thallium	7440-28-0	E440A	0.05	mg/kg	100 mg/kg	95.4	80.0	120	----
Tin	7440-31-5	E440A	0.2	mg/kg	50 mg/kg	99.7	80.0	120	----
Titanium	7440-32-6	E440A	1	mg/kg	25 mg/kg	97.3	80.0	120	----
Uranium	7440-61-1	E440A	0.05	mg/kg	0.5 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	50 mg/kg	97.5	80.0	120	----
Zinc	7440-66-6	E440A	1	mg/kg	50 mg/kg	95.6	80.0	120	----
Zirconium	7440-67-7	E440A	1	mg/kg	10 mg/kg	102	80.0	120	----
Metals (<63 µm) (QCLot: 1638598)									
Mercury	7439-97-6	E510A	0.005	mg/kg	0.1 mg/kg	95.4	80.0	120	----
Metals (<63 µm) (QCLot: 1638599)									
Aluminum	7429-90-5	E440A	50	mg/kg	200 mg/kg	98.6	80.0	120	----
Antimony	7440-36-0	E440A	0.1	mg/kg	100 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	100 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440A	0.5	mg/kg	25 mg/kg	99.5	80.0	120	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	10 mg/kg	99.1	80.0	120	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	100 mg/kg	101	80.0	120	----
Boron	7440-42-8	E440A	5	mg/kg	100 mg/kg	98.8	80.0	120	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	10 mg/kg	97.5	80.0	120	----
Calcium	7440-70-2	E440A	50	mg/kg	5000 mg/kg	98.3	80.0	120	----
Chromium	7440-47-3	E440A	0.5	mg/kg	25 mg/kg	96.7	80.0	120	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	25 mg/kg	96.6	80.0	120	----
Copper	7440-50-8	E440A	0.5	mg/kg	25 mg/kg	96.0	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1638599) - continued									
Iron	7439-89-6	E440A	50	mg/kg	100 mg/kg	101	80.0	120	----
Lead	7439-92-1	E440A	0.1	mg/kg	50 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E440A	2	mg/kg	25 mg/kg	103	80.0	120	----
Magnesium	7439-95-4	E440A	10	mg/kg	5000 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E440A	0.2	mg/kg	25 mg/kg	98.6	80.0	120	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	25 mg/kg	104	80.0	120	----
Nickel	7440-02-0	E440A	0.5	mg/kg	50 mg/kg	97.3	80.0	120	----
Phosphorus	7723-14-0	E440A	50	mg/kg	1000 mg/kg	107	80.0	120	----
Potassium	7440-09-7	E440A	100	mg/kg	5000 mg/kg	100.0	80.0	120	----
Selenium	7782-49-2	E440A	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Silver	7440-22-4	E440A	0.05	mg/kg	10 mg/kg	89.3	80.0	120	----
Sodium	7440-23-5	E440A	50	mg/kg	5000 mg/kg	97.1	80.0	120	----
Strontium	7440-24-6	E440A	0.1	mg/kg	25 mg/kg	99.9	80.0	120	----
Thallium	7440-28-0	E440A	0.05	mg/kg	100 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440A	0.2	mg/kg	50 mg/kg	100	80.0	120	----
Titanium	7440-32-6	E440A	1	mg/kg	25 mg/kg	99.7	80.0	120	----
Uranium	7440-61-1	E440A	0.05	mg/kg	0.5 mg/kg	109	80.0	120	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	50 mg/kg	97.8	80.0	120	----
Zinc	7440-66-6	E440A	1	mg/kg	50 mg/kg	94.3	80.0	120	----
Zirconium	7440-67-7	E440A	1	mg/kg	10 mg/kg	101	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Anions and Nutrients (QCLot: 1643529)									
QC-1643529-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	106	80.0	120	----
Anions and Nutrients (QCLot: 1650126)									
QC-1650126-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	109	80.0	120	----
Inorganics (QCLot: 1643528)									
QC-1643528-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	85.9	70.0	130	----
Inorganics (QCLot: 1650128)									
QC-1650128-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	101	70.0	130	----
Metals (<63 µm) (QCLot: 1638246)									
QC-1638246-003	MRCA-21	Mercury	7439-97-6	E510A	0.068 mg/kg	101	70.0	130	----
Metals (<63 µm) (QCLot: 1638247)									
QC-1638247-003	MRCA-21	Aluminum	7429-90-5	E440A	22500 mg/kg	115	70.0	130	----
QC-1638247-003	MRCA-21	Antimony	7440-36-0	E440A	24.8 mg/kg	103	70.0	130	----
QC-1638247-003	MRCA-21	Arsenic	7440-38-2	E440A	21.2 mg/kg	105	70.0	130	----
QC-1638247-003	MRCA-21	Barium	7440-39-3	E440A	788 mg/kg	105	70.0	130	----
QC-1638247-003	MRCA-21	Beryllium	7440-41-7	E440A	1.82 mg/kg	109	70.0	130	----
QC-1638247-003	MRCA-21	Bismuth	7440-69-9	E440A	1.78 mg/kg	# 135	70.0	130	MES
QC-1638247-003	MRCA-21	Cadmium	7440-43-9	E440A	2.15 mg/kg	110	70.0	130	----
QC-1638247-003	MRCA-21	Calcium	7440-70-2	E440A	4900 mg/kg	106	70.0	130	----
QC-1638247-003	MRCA-21	Chromium	7440-47-3	E440A	56.9 mg/kg	108	70.0	130	----
QC-1638247-003	MRCA-21	Cobalt	7440-48-4	E440A	32 mg/kg	106	70.0	130	----
QC-1638247-003	MRCA-21	Copper	7440-50-8	E440A	969 mg/kg	108	70.0	130	----
QC-1638247-003	MRCA-21	Iron	7439-89-6	E440A	32700 mg/kg	106	70.0	130	----
QC-1638247-003	MRCA-21	Lead	7439-92-1	E440A	919 mg/kg	102	70.0	130	----
QC-1638247-003	MRCA-21	Lithium	7439-93-2	E440A	47.3 mg/kg	114	70.0	130	----
QC-1638247-003	MRCA-21	Magnesium	7439-95-4	E440A	7780 mg/kg	113	70.0	130	----
QC-1638247-003	MRCA-21	Manganese	7439-96-5	E440A	8640 mg/kg	108	70.0	130	----
QC-1638247-003	MRCA-21	Molybdenum	7439-98-7	E440A	25.1 mg/kg	104	70.0	130	----
QC-1638247-003	MRCA-21	Nickel	7440-02-0	E440A	1000 mg/kg	107	70.0	130	----
QC-1638247-003	MRCA-21	Phosphorus	7723-14-0	E440A	660 mg/kg	116	70.0	130	----
QC-1638247-003	MRCA-21	Potassium	7440-09-7	E440A	10800 mg/kg	111	70.0	130	----
QC-1638247-003	MRCA-21	Selenium	7782-49-2	E440A	1.04 mg/kg	97.9	70.0	130	----
QC-1638247-003	MRCA-21	Silver	7440-22-4	E440A	8.98 mg/kg	101	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1638247) - continued									
QC-1638247-003	MRCA-21	Sodium	7440-23-5	E440A	1770 mg/kg	116	70.0	130	----
QC-1638247-003	MRCA-21	Strontium	7440-24-6	E440A	41 mg/kg	105	70.0	130	----
QC-1638247-003	MRCA-21	Thallium	7440-28-0	E440A	0.907 mg/kg	106	70.0	130	----
QC-1638247-003	MRCA-21	Tin	7440-31-5	E440A	3.79 mg/kg	100	70.0	130	----
QC-1638247-003	MRCA-21	Titanium	7440-32-6	E440A	2790 mg/kg	108	70.0	130	----
QC-1638247-003	MRCA-21	Uranium	7440-61-1	E440A	3.97 mg/kg	110	70.0	130	----
QC-1638247-003	MRCA-21	Vanadium	7440-62-2	E440A	66.2 mg/kg	106	70.0	130	----
QC-1638247-003	MRCA-21	Zinc	7440-66-6	E440A	828 mg/kg	108	70.0	130	----
QC-1638247-003	MRCA-21	Zirconium	7440-67-7	E440A	6.91 mg/kg	111	70.0	130	----
Metals (<63 µm) (QCLot: 1638598)									
QC-1638598-003	MRCA-21	Mercury	7439-97-6	E510A	0.068 mg/kg	99.4	70.0	130	----
Metals (<63 µm) (QCLot: 1638599)									
QC-1638599-003	MRCA-21	Aluminum	7429-90-5	E440A	22500 mg/kg	110	70.0	130	----
QC-1638599-003	MRCA-21	Antimony	7440-36-0	E440A	24.8 mg/kg	107	70.0	130	----
QC-1638599-003	MRCA-21	Arsenic	7440-38-2	E440A	21.2 mg/kg	101	70.0	130	----
QC-1638599-003	MRCA-21	Barium	7440-39-3	E440A	788 mg/kg	102	70.0	130	----
QC-1638599-003	MRCA-21	Beryllium	7440-41-7	E440A	1.82 mg/kg	111	70.0	130	----
QC-1638599-003	MRCA-21	Bismuth	7440-69-9	E440A	1.78 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Cadmium	7440-43-9	E440A	2.15 mg/kg	101	70.0	130	----
QC-1638599-003	MRCA-21	Calcium	7440-70-2	E440A	4900 mg/kg	111	70.0	130	----
QC-1638599-003	MRCA-21	Chromium	7440-47-3	E440A	56.9 mg/kg	102	70.0	130	----
QC-1638599-003	MRCA-21	Cobalt	7440-48-4	E440A	32 mg/kg	102	70.0	130	----
QC-1638599-003	MRCA-21	Copper	7440-50-8	E440A	969 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Iron	7439-89-6	E440A	32700 mg/kg	107	70.0	130	----
QC-1638599-003	MRCA-21	Lead	7439-92-1	E440A	919 mg/kg	104	70.0	130	----
QC-1638599-003	MRCA-21	Lithium	7439-93-2	E440A	47.3 mg/kg	122	70.0	130	----
QC-1638599-003	MRCA-21	Magnesium	7439-95-4	E440A	7780 mg/kg	105	70.0	130	----
QC-1638599-003	MRCA-21	Manganese	7439-96-5	E440A	8640 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Molybdenum	7439-98-7	E440A	25.1 mg/kg	103	70.0	130	----
QC-1638599-003	MRCA-21	Nickel	7440-02-0	E440A	1000 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Phosphorus	7723-14-0	E440A	660 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Potassium	7440-09-7	E440A	10800 mg/kg	106	70.0	130	----
QC-1638599-003	MRCA-21	Selenium	7782-49-2	E440A	1.04 mg/kg	113	70.0	130	----
QC-1638599-003	MRCA-21	Silver	7440-22-4	E440A	8.98 mg/kg	101	70.0	130	----
QC-1638599-003	MRCA-21	Sodium	7440-23-5	E440A	1770 mg/kg	110	70.0	130	----
QC-1638599-003	MRCA-21	Strontium	7440-24-6	E440A	41 mg/kg	104	70.0	130	----
QC-1638599-003	MRCA-21	Thallium	7440-28-0	E440A	0.907 mg/kg	108	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (<63 µm) (QCLot: 1638599) - continued									
QC-1638599-003	MRCA-21	Tin	7440-31-5	E440A	3.79 mg/kg	98.1	70.0	130	----
QC-1638599-003	MRCA-21	Titanium	7440-32-6	E440A	2790 mg/kg	105	70.0	130	----
QC-1638599-003	MRCA-21	Uranium	7440-61-1	E440A	3.97 mg/kg	120	70.0	130	----
QC-1638599-003	MRCA-21	Vanadium	7440-62-2	E440A	66.2 mg/kg	102	70.0	130	----
QC-1638599-003	MRCA-21	Zinc	7440-66-6	E440A	828 mg/kg	101	70.0	130	----
QC-1638599-003	MRCA-21	Zirconium	7440-67-7	E440A	6.91 mg/kg	111	70.0	130	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04-7	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Environmental Division Vancouver

Work Order Reference

VA24C2399

Telephone : +1 604 253 4188

Analysis Request

Indicate Filtered (F), Preserved (P) or F

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	
	MP_QUL-LNF1_SE-1_2024-08 A	20-Aug-24	15:35	Sediment							1
	MP_QUL-LNF1_SE-1_2024-08 B	20-Aug-24	15:35	Sediment							1
	MP_QUL-LNF1_SE-1_2024-08 C	20-Aug-24	15:35	Sediment							1
	MP_QUL-LNF1_SE-1_2024-08 (Comp A+B+C)	20-Aug-24	15:35	Sediment	R	R	R	R	R	R	3
	MP_QUL-LNF1_SE-2_2024-08 A	20-Aug-24	15:00	Sediment							1
	MP_QUL-LNF1_SE-2_2024-08 B	20-Aug-24	15:00	Sediment							1
	MP_QUL-LNF1_SE-2_2024-08 C	20-Aug-24	15:00	Sediment							1
	MP_QUL-LNF1_SE-2_2024-08 (Comp A+B+C)	20-Aug-24	15:00	Sediment	R	R	R	R	R	R	3
	MP_QUL-LNF1_SE-3_2024-08 A	20-Aug-24	14:27	Sediment							1
	MP_QUL-LNF1_SE-3_2024-08 B	20-Aug-24	14:27	Sediment							1
	MP_QUL-LNF1_SE-3_2024-08 C	20-Aug-24	14:27	Sediment							1
	MP_QUL-LNF1_SE-3_2024-08 (Comp A+B+C)	20-Aug-24	14:27	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.3	12.1	13.3, 13

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by: M.C	Date: 29 Aug	Time: 10:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 63

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)							Number of Containers
	MP_QUL-LNF1_SE-4_2024-08 A	20-Aug-24	14:05	Sediment													1
	MP_QUL-LNF1_SE-4_2024-08 B	20-Aug-24	14:05	Sediment													1
	MP_QUL-LNF1_SE-4_2024-08 C	20-Aug-24	14:05	Sediment													1
	MP_QUL-LNF1_SE-4_2024-08 (Comp A+B+C)	20-Aug-24	14:05	Sediment	R	R	R	R	R	R							3
	MP_QUL-LNF1_SE-5_2024-08 A	20-Aug-24	16:00	Sediment													1
	MP_QUL-LNF1_SE-5_2024-08 B	20-Aug-24	16:00	Sediment													1
	MP_QUL-LNF1_SE-5_2024-08 C	20-Aug-24	16:00	Sediment													1
	MP_QUL-LNF1_SE-5_2024-08 (Comp A+B+C)	20-Aug-24	16:00	Sediment	R	R	R	R	R	R							3
	MP_QUL-LREF1_SE-1_2024-08 A	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-1_2024-08 B	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-1_2024-08 C	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-1_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R							3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?

☐ YES ☐ NO

Are samples for human drinking water use?

☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.3	12.1	13.3, 13

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: KC	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by: MC	Date: 29 Aug	Time: 10:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca,

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
~~—~~	~~MP_QUL-LREF1_SE-2_2024-08 A~~	~~21-Aug-24~~	~~—~~	~~Sediment~~							~~1~~
~~—~~	~~MP_QUL-LREF1_SE-2_2024-08 B~~	~~21-Aug-24~~	~~—~~	~~Sediment~~							~~1~~
~~—~~	~~MP_QUL-LREF1_SE-2_2024-08 C~~	~~21-Aug-24~~	~~—~~	~~Sediment~~							~~1~~
~~—~~	~~MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)~~	~~21-Aug-24~~	~~—~~	~~Sediment~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~3~~
	MP_QUL-LREF1_SE-2_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-2_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-2_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-2_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-LREF1_SE-3_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-3_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-3_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-LREF1_SE-3_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)	ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)							Number of Containers
	MP_QUL-LREF1_SE-4_2024-08 A	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-4_2024-08 B	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-4_2024-08 C	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-4_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R							3
	MP_QUL-LREF1_SE-5_2024-08 A	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-5_2024-08 B	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-5_2024-08 C	21-Aug-24	—	Sediment													1
	MP_QUL-LREF1_SE-5_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R							3
	MP_QUL-PNF_SE-1_2024-08 A	23-Aug-24	—	Sediment													1
	MP_QUL-PNF_SE-1_2024-08 B	23-Aug-24	—	Sediment													1
	MP_QUL-PNF_SE-1_2024-08 C	23-Aug-24	—	Sediment													1
	MP_QUL-PNF_SE-1_2024-08 (Comp A+B+C)	23-Aug-24	—	Sediment	R	R	R	R	R	R							3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?

☐ YES ☐ NO

Are samples for human drinking water use?

☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwb

Email 2: kbatchelar@minnow.ca, slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2: alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: [illegible]

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_QUL-PNF_SE-2_2024-08 A	23-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-2_2024-08 B	23-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-2_2024-08 C	23-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-2_2024-08 (Comp A+B+C)	23-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PNF_SE-3_2024-08 A	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-3_2024-08 B	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-3_2024-08 C	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-3_2024-08 (Comp A+B+C)	24-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PNF_SE-4_2024-08 A	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-4_2024-08 B	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-4_2024-08 C	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-4_2024-08 (Comp A+B+C)	24-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: KO	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette-gravel) (S184EA)	Number of Containers
	MP_QUL-PNF_SE-5_2024-08 A	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-5_2024-08 B	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-5_2024-08 C	24-Aug-24	—	Sediment							1
	MP_QUL-PNF_SE-5_2024-08 (Comp A+B+C)	24-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PFF1_SE-1_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-1_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-1_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-1_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PFF1_SE-2_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-2_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-2_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-2_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwb

Email 2: kbatchelar@minnow.ca, slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2: alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_QUL-PFF1_SE-3_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-3_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-3_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-3_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PFF1_SE-4_2024-08 A	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-4_2024-08 B	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-4_2024-08 C	21-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-4_2024-08 (Comp A+B+C)	21-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PFF1_SE-5_2024-08 A	22-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-5_2024-08 B	22-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-5_2024-08 C	22-Aug-24	—	Sediment							1
	MP_QUL-PFF1_SE-5_2024-08 (Comp A+B+C)	22-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date: —	Time:	Received by:	Date: —	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 - 03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_QUL-PREF1_SE-1_2024-08 A	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-1_2024-08 B	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-1_2024-08 C	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-1_2024-08 (Comp A+B+C)	22-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PREF1_SE-2_2024-08 A	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-2_2024-08 B	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-2_2024-08 C	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-2_2024-08 (Comp A+B+C)	22-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PREF1_SE-3_2024-08 A	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-3_2024-08 B	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-3_2024-08 C	22-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-3_2024-08 (Comp A+B+C)	22-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	26-Aug-24	16:00		—				

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OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -03

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2: kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2: alalonde@dwbconsulting.ca

Project Information

ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd mmm yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

ALS Lab Work Order # (lab use only): | **ALS Contact:** Can Dang | **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_QUL-PREF1_SE-4_2024-08 A	23-Aug-24	—	Sediment							1
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	MP_QUL-PREF1_SE-4_2024-08 C	23-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-4_2024-08 (Comp A+B+C)	23-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PREF1_SE-5_2024-08 A	23-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-5_2024-08 B	23-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-5_2024-08 C	23-Aug-24	—	Sediment							1
	MP_QUL-PREF1_SE-5_2024-08 (Comp A+B+C)	23-Aug-24	—	Sediment	R	R	R	R	R	R	3
	MP_QUL-PREF1_SE-4 X_2024-08 A	23-Aug-24	—	Sediment							1
	MP_QULPREF1_SE-4 X_2024-08 B	23-Aug-24	—	Sediment							1
	MP_QULPREF1_SE-4 X_2024-08 C	23-Aug-24	—	Sediment							1
	MP_QULPREF1_SE-4 X_2024-08 (Comp A+B+C)	23-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

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Contact:	Gabriel Holmes
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City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_QUL PNF_SE- 3 X_2024-08 A	24-Aug-24	—	Sediment							1
	MP_QULPNF_SE- 3 X_2024-08 B	24-Aug-24	—	Sediment							1
	MP_QULPNF_SE- 3 X_2024-08 C	24-Aug-24	—	Sediment							1
	MP_QULPNF_SE- 3 X_2024-08 (Comp A+B+C)	24-Aug-24	—	Sediment	R	R	R	R	R	R	3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Some samples consist of 2 to 3 jars (ending in A, B, and C). Combine and homogenize jars before analyses (Comp A+B+C).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 26-Aug-24	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SEDIMENT QUALITY

ALS Laboratory Report VA24C2503

(Finalized September 16, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C2503**	Page	: 1 of 16
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 29-Aug-2024 10:45
PO	:	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 16-Sep-2024 16:05
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 68		
No. of samples analysed	: 34		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Colby Bingham	Laboratory Supervisor	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Inorganics, Saskatoon, Saskatchewan
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kinny Wu	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

PSAL:Sample 003,007,011,015,019,023,027,031,035,039,043,047,051,055,059,063 067: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.

Qualifiers

Qualifier	*Description*
FR4	*As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:4 due to high soil organic content.*
FR5	*As per applicable reference method(s), soil:water ratio for Fixed Ratio Leach was modified to 1:5 due to high soil organic content*

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE -1_2024-08 P (COMP A+B)	MP_BOL-B2_SE -1_2024-08 C	MP_BOL-B2_SE -2_2024-08 P (COMP A+B)	MP_BOL-B2_SE -2_2024-08 C	MP_BOL-B2_SE -3_2024-08 P (COMP A+B)
					Client sampling date / time	19-Aug-2024 13:35	19-Aug-2024 12:30	20-Aug-2024 08:01	19-Aug-2024 14:25	20-Aug-2024 09:54
						VA24C2503-003	VA24C2503-004	VA24C2503-007	VA24C2503-008	VA24C2503-011
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		----	94.6	----	94.6	----
pH (1:2 soil:water)	----	E108/SK	0.10	pH units		----	5.85 FR5	----	----	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		----	----	----	6.02 FR4	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	1.1
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		80.7	----	81.4	----	79.9
Clay (<0.004mm)	----	EC184E/SK	1.0	%		18.7	----	17.9	----	19.0
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		----	1.64	----	1.69	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		----	13.6	----	15.6	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		----	8650	----	9830	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		----	22100	----	22200	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		----	0.87	----	1.07	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		----	8.22	----	9.80	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		----	252	----	306	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		----	0.79	----	0.77	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		----	0.14	----	0.13	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		----	16.0	----	17.7	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		----	0.535	----	0.445	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		----	9020	----	9400	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		----	41.3	----	38.7	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		----	13.4	----	13.3	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		----	408	----	375	----
Iron	7439-89-6	E440A/VA	50	mg/kg		----	28700	----	32900	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE-1_2024-08 P (COMP A+B)	MP_BOL-B2_SE-1_2024-08 C	MP_BOL-B2_SE-2_2024-08 P (COMP A+B)	MP_BOL-B2_SE-2_2024-08 C	MP_BOL-B2_SE-3_2024-08 P (COMP A+B)
					Client sampling date / time	19-Aug-2024 13:35	19-Aug-2024 12:30	20-Aug-2024 08:01	19-Aug-2024 14:25	20-Aug-2024 09:54
						VA24C2503-003	VA24C2503-004	VA24C2503-007	VA24C2503-008	VA24C2503-011
						Result	Result	Result	Result	Result
Metals										
Lead	7439-92-1	E440A/VA	0.10	mg/kg		----	10.4	----	10.4	----
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		----	13.3	----	13.0	----
Magnesium	7439-95-4	E440A/VA	10	mg/kg		----	6180	----	5920	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		----	1360	----	1360	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		----	0.278	----	0.265	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		----	3.78	----	4.23	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		----	31.3	----	29.4	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		----	1550	----	1540	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		----	1570	----	1640	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		----	2.93	----	2.88	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		----	0.383	----	0.360	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		----	298	----	292	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		----	96.2	----	105	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		----	0.132	----	0.136	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		----	0.99	----	0.62	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		----	515	----	672	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		----	2.36	----	2.36	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		----	80.7	----	78.2	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		----	90.6	----	78.4	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		----	4.6	----	4.0	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE-3_2024-08 C	MP_BOL-B2_SE-4_2024-08 P (COMP A+B)	MP_BOL-B2_SE-4_2024-08 C	MP_BOL-B2_SE-5_2024-08 P (COMP A+B)	MP_BOL-B2_SE-5_2024-08 C
					Client sampling date / time	20-Aug-2024 09:29	20-Aug-2024 11:32	20-Aug-2024 11:09	20-Aug-2024 13:35	20-Aug-2024 12:46
						VA24C2503-012	VA24C2503-015	VA24C2503-016	VA24C2503-019	VA24C2503-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		94.4	----	94.4	----	94.1
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		5.87 FR4	----	5.80 FR4	----	5.75 FR4
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		----	<1.0	----	<1.0	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		----	<1.0	----	<1.0	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		----	80.0	----	80.7	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		----	19.6	----	18.8	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		1.60	----	1.59	----	1.56
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		14.9	----	14.8	----	14.2
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		8170	----	8100	----	7170
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		21000	----	20400	----	19900
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.82	----	0.90	----	0.81
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		7.94	----	7.90	----	7.66
Barium	7440-39-3	E440A/VA	0.50	mg/kg		314	----	312	----	300
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.74	----	0.72	----	0.71
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.12	----	0.13	----	0.12
Boron	7440-42-8	E440A/VA	5.0	mg/kg		14.3	----	14.3	----	13.7
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.395	----	0.404	----	0.380
Calcium	7440-70-2	E440A/VA	50	mg/kg		8080	----	8310	----	7750
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		36.1	----	35.2	----	33.6
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		12.0	----	12.3	----	11.6
Copper	7440-50-8	E440A/VA	0.50	mg/kg		350	----	342	----	334
Iron	7439-89-6	E440A/VA	50	mg/kg		28800	----	28200	----	28000
Lead	7439-92-1	E440A/VA	0.10	mg/kg		8.73	----	9.59	----	9.03
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		11.9	----	11.8	----	11.7

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE-3_2024-08 C	MP_BOL-B2_SE-4_2024-08 P (COMP A+B)	MP_BOL-B2_SE-4_2024-08 C	MP_BOL-B2_SE-5_2024-08 P (COMP A+B)	MP_BOL-B2_SE-5_2024-08 C
					Client sampling date / time	20-Aug-2024 09:29	20-Aug-2024 11:32	20-Aug-2024 11:09	20-Aug-2024 13:35	20-Aug-2024 12:46
						VA24C2503-012	VA24C2503-015	VA24C2503-016	VA24C2503-019	VA24C2503-020
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		5730	----	5810	----	5490
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		1280	----	1240	----	1440
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.218	----	0.212	----	0.224
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		3.15	----	3.35	----	3.05
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		27.4	----	27.8	----	26.6
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1510	----	1520	----	1890
Potassium	7440-09-7	E440A/VA	100	mg/kg		1510	----	1470	----	1420
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		2.70	----	2.56	----	2.36
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.342	----	0.347	----	0.342
Sodium	7440-23-5	E440A/VA	50	mg/kg		282	----	271	----	268
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		89.3	----	95.6	----	89.2
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.110	----	0.121	----	0.119
Tin	7440-31-5	E440A/VA	0.20	mg/kg		0.39	----	0.51	----	0.50
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		566	----	558	----	514
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		2.07	----	2.19	----	2.10
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		74.9	----	73.3	----	70.3
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		72.5	----	73.6	----	72.5
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		4.0	----	4.1	----	3.9

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_SE-1_2024-08 P (COMP A+B)	MP_POL-P2_SE-1_2024-08 C	MP_POL-P2_SE-2_2024-08 P (COMP A+B)	MP_POL-P2_SE-2_2024-08 C	MP_POL-P2_SE-3_2024-08 P (COMP A+B)
					Client sampling date / time	21-Aug-2024 10:04	21-Aug-2024 09:22	21-Aug-2024 12:20	21-Aug-2024 11:40	22-Aug-2024 08:49
						VA24C2503-023	VA24C2503-024	VA24C2503-027	VA24C2503-028	VA24C2503-031
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		----	86.7	----	89.8	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		----	7.23	----	7.04	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	<1.0
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		71.3	----	77.5	----	73.1
Clay (<0.004mm)	----	EC184E/SK	1.0	%		27.9	----	22.0	----	26.5
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		----	0.808	----	1.16	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		----	6.36	----	10.2	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		----	5240	----	8070	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		----	27400	----	26700	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		----	0.48	----	0.41	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		----	11.6	----	10.4	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		----	292	----	250	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		----	0.86	----	0.76	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		----	0.10	----	0.11	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		----	12.2	----	13.4	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		----	0.281	----	0.350	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		----	17400	----	16600	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		----	28.1	----	36.3	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		----	20.8	----	18.6	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		----	624	----	524	----
Iron	7439-89-6	E440A/VA	50	mg/kg		----	32400	----	31900	----
Lead	7439-92-1	E440A/VA	0.10	mg/kg		----	7.56	----	7.41	----
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		----	23.3	----	21.0	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_SE-1_2024-08 P (COMP A+B)	MP_POL-P2_SE-1_2024-08 C	MP_POL-P2_SE-2_2024-08 P (COMP A+B)	MP_POL-P2_SE-2_2024-08 C	MP_POL-P2_SE-3_2024-08 P (COMP A+B)
					Client sampling date / time	21-Aug-2024 10:04	21-Aug-2024 09:22	21-Aug-2024 12:20	21-Aug-2024 11:40	22-Aug-2024 08:49
						VA24C2503-023	VA24C2503-024	VA24C2503-027	VA24C2503-028	VA24C2503-031
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		----	14600	----	12300	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		----	2090	----	1820	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		----	0.106	----	0.132	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		----	5.22	----	6.73	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		----	23.4	----	30.4	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		----	1320	----	1240	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		----	2020	----	1970	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		----	2.75	----	3.47	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		----	0.320	----	0.340	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		----	1060	----	842	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		----	209	----	182	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		----	0.063	----	0.083	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		----	1.29	----	0.94	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		----	1110	----	892	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		----	1.31	----	1.56	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		----	112	----	102	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		----	87.5	----	86.3	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		----	5.0	----	6.6	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_SE-3_2024-08 C	MP_POL-P2_SE-4_2024-08 P (COMP A+B)	MP_POL-P2_SE-4_2024-08 C	MP_POL-P2_SE-5_2024-08 P (COMP A+B)	MP_POL-P2_SE-5_2024-08 C
					Client sampling date / time	21-Aug-2024 14:23	24-Aug-2024 08:56	24-Aug-2024 08:30	24-Aug-2024 10:56	24-Aug-2024 10:06
						VA24C2503-032	VA24C2503-035	VA24C2503-036	VA24C2503-039	VA24C2503-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		84.2	----	89.9	----	88.8
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		7.03	----	7.13	----	7.16
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		----	<1.0	----	<1.0	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		----	<1.0	----	1.2	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		----	70.9	----	80.5	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		----	28.3	----	18.3	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		0.845	----	1.04	----	0.974
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		6.75	----	9.13	----	8.34
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		4790	----	6110	----	5200
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		28600	----	28200	----	30900
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.46	----	0.63	----	0.60
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		11.2	----	11.7	----	13.0
Barium	7440-39-3	E440A/VA	0.50	mg/kg		299	----	260	----	313
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.87	----	0.82	----	0.86
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.11	----	0.11	----	0.12
Boron	7440-42-8	E440A/VA	5.0	mg/kg		13.0	----	17.2	----	17.5
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.286	----	0.351	----	0.373
Calcium	7440-70-2	E440A/VA	50	mg/kg		16500	----	16100	----	17400
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		28.9	----	38.0	----	38.2
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		20.8	----	19.2	----	21.0
Copper	7440-50-8	E440A/VA	0.50	mg/kg		598	----	559	----	595
Iron	7439-89-6	E440A/VA	50	mg/kg		31900	----	31800	----	35200
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.72	----	7.49	----	7.72
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		23.3	----	21.8	----	22.6

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_SE-3_2024-08 C	MP_POL-P2_SE-4_2024-08 P (COMP A+B)	MP_POL-P2_SE-4_2024-08 C	MP_POL-P2_SE-5_2024-08 P (COMP A+B)	MP_POL-P2_SE-5_2024-08 C
					Client sampling date / time	21-Aug-2024 14:23	24-Aug-2024 08:56	24-Aug-2024 08:30	24-Aug-2024 10:56	24-Aug-2024 10:06
						VA24C2503-032	VA24C2503-035	VA24C2503-036	VA24C2503-039	VA24C2503-040
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		14800	----	12900	----	14600
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		2010	----	1940	----	2880
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.113	----	0.134	----	0.131
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		3.98	----	5.66	----	3.51
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		24.1	----	28.8	----	29.8
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1260	----	1400	----	1970
Potassium	7440-09-7	E440A/VA	100	mg/kg		2090	----	2250	----	2510
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		2.86	----	3.98	----	3.88
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.323	----	0.336	----	0.345
Sodium	7440-23-5	E440A/VA	50	mg/kg		1090	----	984	----	1100
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		214	----	194	----	210
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.067	----	0.086	----	0.084
Tin	7440-31-5	E440A/VA	0.20	mg/kg		1.25	----	1.40	----	1.53
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1160	----	1550	----	1710
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.25	----	1.49	----	1.33
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		114	----	119	----	132
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		88.3	----	87.8	----	96.5
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		5.8	----	8.5	----	8.0

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE -5X_2024-08 P (COMP A+B)	MP_BOL-B2_SE -5X_2024-08 C	MP_POL-P1_SE -2X_2024-08 P (COMP A+B)	MP_POL-P1_SE -2X_2024-08 C	MP_POL-P1_SE -1_2024-08 P (COMP A+B)
					Client sampling date / time	20-Aug-2024 13:35	20-Aug-2024 12:46	22-Aug-2024 14:27	22-Aug-2024 12:57	22-Aug-2024 11:02
						VA24C2503-043	VA24C2503-044	VA24C2503-047	VA24C2503-048	VA24C2503-051
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		----	90.5	----	93.1	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		----	5.80 FR4	----	6.96	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	<1.0
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		<1.0	----	1.6	----	<1.0
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		81.8	----	77.5	----	73.6
Clay (<0.004mm)	----	EC184E/SK	1.0	%		17.7	----	20.9	----	26.0
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		----	1.55	----	1.17	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		----	14.0	----	10.5	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		----	6640	----	6540	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		----	21300	----	24900	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		----	0.91	----	0.52	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		----	8.15	----	10.8	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		----	316	----	238	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		----	0.74	----	0.76	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		----	0.12	----	0.10	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		----	15.5	----	13.8	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		----	0.395	----	0.401	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		----	8140	----	16100	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		----	36.5	----	36.8	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		----	12.1	----	16.7	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		----	346	----	480	----
Iron	7439-89-6	E440A/VA	50	mg/kg		----	29000	----	31300	----
Lead	7439-92-1	E440A/VA	0.10	mg/kg		----	9.37	----	6.77	----
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		----	12.5	----	18.9	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_SE-5X_2024-08 P (COMP A+B)	MP_BOL-B2_SE-5X_2024-08 C	MP_POL-P1_SE-2X_2024-08 P (COMP A+B)	MP_POL-P1_SE-2X_2024-08 C	MP_POL-P1_SE-1_2024-08 P (COMP A+B)
					Client sampling date / time	20-Aug-2024 13:35	20-Aug-2024 12:46	22-Aug-2024 14:27	22-Aug-2024 12:57	22-Aug-2024 11:02
						VA24C2503-043	VA24C2503-044	VA24C2503-047	VA24C2503-048	VA24C2503-051
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		----	5900	----	10500	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		----	1500	----	1190	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		----	0.228	----	0.129	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		----	3.18	----	5.12	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		----	27.5	----	28.2	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		----	1990	----	1660	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		----	1560	----	1780	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		----	2.72	----	3.13	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		----	0.340	----	0.340	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		----	294	----	806	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		----	95.3	----	167	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		----	0.117	----	0.085	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		----	0.72	----	1.43	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		----	626	----	1170	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		----	2.16	----	1.41	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		----	75.7	----	116	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		----	73.9	----	80.5	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		----	3.8	----	7.3	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P1_SE-1_2024-08 C	MP_POL-P1_SE-2_2024-08 P (COMP A+B)	MP_POL-P1_SE-2_2024-08 C	MP_POL-P1_SE-3_2024-08 P (COMP A+B)	MP_POL-P1_SE-3_2024-08 C
					Client sampling date / time	22-Aug-2024 10:40	22-Aug-2024 14:27	22-Aug-2024 12:57	23-Aug-2024 08:58	23-Aug-2024 08:22
						VA24C2503-052	VA24C2503-055	VA24C2503-056	VA24C2503-059	VA24C2503-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.25	%		90.0	----	90.7	----	90.6
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		6.85	----	6.88	----	6.99
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		----	<1.0	----	<1.0	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		----	<1.0	----	1.6	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		----	79.4	----	77.2	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		----	20.0	----	21.2	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		1.21	----	1.19	----	1.06
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		10.8	----	10.5	----	9.34
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		8520	----	6870	----	7560
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		26800	----	24200	----	26400
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		0.64	----	0.48	----	0.43
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		10.8	----	10.5	----	10.2
Barium	7440-39-3	E440A/VA	0.50	mg/kg		254	----	226	----	271
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		0.76	----	0.74	----	0.79
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		0.12	----	0.10	----	0.11
Boron	7440-42-8	E440A/VA	5.0	mg/kg		17.5	----	13.2	----	13.9
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		0.423	----	0.390	----	0.398
Calcium	7440-70-2	E440A/VA	50	mg/kg		14800	----	15200	----	15600
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		42.0	----	37.4	----	35.2
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		18.3	----	16.5	----	18.4
Copper	7440-50-8	E440A/VA	0.50	mg/kg		497	----	470	----	501
Iron	7439-89-6	E440A/VA	50	mg/kg		33700	----	30600	----	31800
Lead	7439-92-1	E440A/VA	0.10	mg/kg		7.90	----	6.68	----	7.56
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		19.8	----	19.0	----	21.0

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P1_SE-1_2024-08 C	MP_POL-P1_SE-2_2024-08 P (COMP A+B)	MP_POL-P1_SE-2_2024-08 C	MP_POL-P1_SE-3_2024-08 P (COMP A+B)	MP_POL-P1_SE-3_2024-08 C
					Client sampling date / time	22-Aug-2024 10:40	22-Aug-2024 14:27	22-Aug-2024 12:57	23-Aug-2024 08:58	23-Aug-2024 08:22
						VA24C2503-052	VA24C2503-055	VA24C2503-056	VA24C2503-059	VA24C2503-060
						Result	Result	Result	Result	Result
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		11700	----	10400	----	12400
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		1690	----	1200	----	1710
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		0.136	----	0.130	----	0.121
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		5.56	----	4.90	----	4.76
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		31.9	----	27.9	----	28.3
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		1650	----	1590	----	1380
Potassium	7440-09-7	E440A/VA	100	mg/kg		2030	----	1780	----	2000
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		4.17	----	3.10	----	3.30
Silver	7440-22-4	E440A/VA	0.050	mg/kg		0.353	----	0.338	----	0.320
Sodium	7440-23-5	E440A/VA	50	mg/kg		841	----	799	----	899
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		179	----	168	----	181
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		0.097	----	0.084	----	0.079
Tin	7440-31-5	E440A/VA	0.20	mg/kg		1.07	----	1.26	----	1.16
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		1250	----	1120	----	886
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		1.44	----	1.39	----	1.32
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		115	----	112	----	108
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		89.2	----	80.2	----	87.5
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		8.5	----	6.4	----	5.9

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P1_SE-4_2024-08 P (COMP A+B)	MP_POL-P1_SE-4_2024-08 C	MP_POL-P1_SE-5_2024-08 P (COMP A+B)	MP_POL-P1_SE-5_2024-08 C	----
					Client sampling date / time	23-Aug-2024 11:05	23-Aug-2024 10:20	23-Aug-2024 13:20	23-Aug-2024 12:45	----
						VA24C2503-063	VA24C2503-064	VA24C2503-067	VA24C2503-068	--------
						Result	Result	Result	Result	----
Physical Tests										
Moisture	----	E144/VA	0.25	%		----	89.1	----	87.3	----
pH (1:2 soil:water)	----	E108/VA	0.10	pH units		----	7.01	----	6.90	----
Particle Size										
Gravel (>2mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	----
Sand (2.0mm - 0.063mm)	----	EC184E/SK	1.0	%		<1.0	----	<1.0	----	----
Silt (0.063mm - 0.004mm)	----	EC184E/SK	1.0	%		78.8	----	63.4	----	----
Clay (<0.004mm)	----	EC184E/SK	1.0	%		20.4	----	36.4	----	----
Anions and Nutrients										
Nitrogen, total	7727-37-9	E366/SK	0.020	%		----	0.851	----	0.977	----
Organic / Inorganic Carbon										
Carbon, total organic [TOC], <63µm	----	EC356A/SK	0.050	%		----	9.04	----	9.04	----
Inorganics										
Sulfur, total	7704-34-9	E399/SK	500	mg/kg		----	5950	----	7150	----
Metals										
Aluminum	7429-90-5	E440A/VA	50	mg/kg		----	27200	----	26300	----
Antimony	7440-36-0	E440A/VA	0.10	mg/kg		----	0.52	----	0.54	----
Arsenic	7440-38-2	E440A/VA	0.050	mg/kg		----	11.0	----	10.6	----
Barium	7440-39-3	E440A/VA	0.50	mg/kg		----	273	----	268	----
Beryllium	7440-41-7	E440A/VA	0.10	mg/kg		----	0.79	----	0.74	----
Bismuth	7440-69-9	E440A/VA	0.10	mg/kg		----	0.12	----	0.12	----
Boron	7440-42-8	E440A/VA	5.0	mg/kg		----	14.5	----	13.9	----
Cadmium	7440-43-9	E440A/VA	0.020	mg/kg		----	0.373	----	0.391	----
Calcium	7440-70-2	E440A/VA	50	mg/kg		----	15700	----	14600	----
Chromium	7440-47-3	E440A/VA	0.50	mg/kg		----	37.4	----	36.2	----
Cobalt	7440-48-4	E440A/VA	0.10	mg/kg		----	19.0	----	18.2	----
Copper	7440-50-8	E440A/VA	0.50	mg/kg		----	538	----	498	----
Iron	7439-89-6	E440A/VA	50	mg/kg		----	33400	----	32700	----
Lead	7439-92-1	E440A/VA	0.10	mg/kg		----	7.97	----	7.65	----
Lithium	7439-93-2	E440A/VA	2.0	mg/kg		----	21.2	----	19.9	----

Analytical Results

Sub-Matrix: **Sediment**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P1_SE-4_2024-08 P (COMP A+B)	MP_POL-P1_SE-4_2024-08 C	MP_POL-P1_SE-5_2024-08 P (COMP A+B)	MP_POL-P1_SE-5_2024-08 C	----
					Client sampling date / time	23-Aug-2024 11:05	23-Aug-2024 10:20	23-Aug-2024 13:20	23-Aug-2024 12:45	----
						VA24C2503-063	VA24C2503-064	VA24C2503-067	VA24C2503-068	--------
						Result	Result	Result	Result	----
Metals										
Magnesium	7439-95-4	E440A/VA	10	mg/kg		----	12600	----	11900	----
Manganese	7439-96-5	E440A/VA	0.20	mg/kg		----	1590	----	2010	----
Mercury	7439-97-6	E510A/VA	0.0050	mg/kg		----	0.134	----	0.120	----
Molybdenum	7439-98-7	E440A/VA	0.10	mg/kg		----	5.01	----	4.89	----
Nickel	7440-02-0	E440A/VA	0.50	mg/kg		----	28.7	----	28.7	----
Phosphorus	7723-14-0	E440A/VA	50	mg/kg		----	1550	----	1380	----
Potassium	7440-09-7	E440A/VA	100	mg/kg		----	2080	----	1990	----
Selenium	7782-49-2	E440A/VA	0.10	mg/kg		----	3.58	----	3.59	----
Silver	7440-22-4	E440A/VA	0.050	mg/kg		----	0.326	----	0.326	----
Sodium	7440-23-5	E440A/VA	50	mg/kg		----	940	----	879	----
Strontium	7440-24-6	E440A/VA	0.10	mg/kg		----	185	----	179	----
Thallium	7440-28-0	E440A/VA	0.050	mg/kg		----	0.086	----	0.083	----
Tin	7440-31-5	E440A/VA	0.20	mg/kg		----	1.32	----	1.29	----
Titanium	7440-32-6	E440A/VA	1.0	mg/kg		----	1210	----	1050	----
Uranium	7440-61-1	E440A/VA	0.050	mg/kg		----	1.34	----	1.41	----
Vanadium	7440-62-2	E440A/VA	0.20	mg/kg		----	118	----	113	----
Zinc	7440-66-6	E440A/VA	1.0	mg/kg		----	89.3	----	89.0	----
Zirconium	7440-67-7	E440A/VA	1.0	mg/kg		----	7.3	----	7.2	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2503**	Page	: 1 of 18
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 29-Aug-2024 10:45
PO	:	Issue Date	: 16-Sep-2024 16:02
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 68		
No. of samples analysed	: 34		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals (<63 µm)	VA24C2503-004	MP_BOL-B2_SE-1_2024-08 C	Antimony	7440-36-0	E440A	31.4 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-4_2024-08 C	E366	24-Aug-2024	10-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-5_2024-08 C	E366	24-Aug-2024	10-Sep-2024	28 days	17 days	✓	10-Sep-2024	28 days	17 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-3_2024-08 C	E366	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-4_2024-08 C	E366	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-5_2024-08 C	E366	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	10-Sep-2024	28 days	18 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-1_2024-08 C	E366	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2_2024-08 C	E366	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-2X_2024-08 C	E366	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	10-Sep-2024	28 days	19 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-1_2024-08 C	E366	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-2_2024-08 C	E366	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-3_2024-08 C	E366	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	10-Sep-2024	28 days	20 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-3_2024-08 C	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-4_2024-08 C	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5_2024-08 C	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5X_2024-08 C	E366	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	10-Sep-2024	28 days	21 days	✓
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-1_2024-08 C	E366	19-Aug-2024	10-Sep-2024	28 days	22 days	✓	10-Sep-2024	28 days	22 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Anions and Nutrients : Total Nitrogen by Combustion										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-2_2024-08 C	E366	19-Aug-2024	10-Sep-2024	28 days	22 days	✓	10-Sep-2024	28 days	22 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-4_2024-08 C	E399	24-Aug-2024	10-Sep-2024	365 days	17 days	✓	10-Sep-2024	365 days	17 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-5_2024-08 C	E399	24-Aug-2024	10-Sep-2024	365 days	17 days	✓	10-Sep-2024	365 days	17 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-3_2024-08 C	E399	23-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-4_2024-08 C	E399	23-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-5_2024-08 C	E399	23-Aug-2024	10-Sep-2024	365 days	18 days	✓	10-Sep-2024	365 days	18 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-1_2024-08 C	E399	22-Aug-2024	10-Sep-2024	365 days	19 days	✓	10-Sep-2024	365 days	19 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2_2024-08 C	E399	22-Aug-2024	10-Sep-2024	365 days	19 days	✓	10-Sep-2024	365 days	19 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2X_2024-08 C	E399	22-Aug-2024	10-Sep-2024	365 days	19 days	✓	10-Sep-2024	365 days	19 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-1_2024-08 C	E399	21-Aug-2024	10-Sep-2024	365 days	20 days	✓	10-Sep-2024	365 days	20 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-2_2024-08 C	E399	21-Aug-2024	10-Sep-2024	365 days	20 days	✓	10-Sep-2024	365 days	20 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-3_2024-08 C	E399	21-Aug-2024	10-Sep-2024	365 days	20 days	✓	10-Sep-2024	365 days	20 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-3_2024-08 C	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-4_2024-08 C	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5_2024-08 C	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5X_2024-08 C	E399	20-Aug-2024	10-Sep-2024	365 days	21 days	✓	10-Sep-2024	365 days	21 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-1_2024-08 C	E399	19-Aug-2024	10-Sep-2024	365 days	22 days	✓	10-Sep-2024	365 days	22 days	✓
Inorganics : Total Sulfur by high temperature combustion										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-2_2024-08 C	E399	19-Aug-2024	10-Sep-2024	365 days	22 days	✓	10-Sep-2024	365 days	22 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-4_2024-08 C	E510A	24-Aug-2024	10-Sep-2024	28 days	17 days	✓	13-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-5_2024-08 C	E510A	24-Aug-2024	10-Sep-2024	28 days	17 days	✓	13-Sep-2024	28 days	20 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-3_2024-08 C	E510A	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	13-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-4_2024-08 C	E510A	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	13-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-5_2024-08 C	E510A	23-Aug-2024	10-Sep-2024	28 days	18 days	✓	13-Sep-2024	28 days	21 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-1_2024-08 C	E510A	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	13-Sep-2024	28 days	22 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2_2024-08 C	E510A	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	13-Sep-2024	28 days	22 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2X_2024-08 C	E510A	22-Aug-2024	10-Sep-2024	28 days	19 days	✓	13-Sep-2024	28 days	22 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-3_2024-08 C	E510A	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	13-Sep-2024	28 days	22 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-1_2024-08 C	E510A	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	13-Sep-2024	28 days	23 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-2_2024-08 C	E510A	21-Aug-2024	10-Sep-2024	28 days	20 days	✓	13-Sep-2024	28 days	23 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-3_2024-08 C	E510A	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	24 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-4_2024-08 C	E510A	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	24 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5_2024-08 C	E510A	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	24 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5X_2024-08 C	E510A	20-Aug-2024	10-Sep-2024	28 days	21 days	✓	13-Sep-2024	28 days	24 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-2_2024-08 C	E510A	19-Aug-2024	10-Sep-2024	28 days	22 days	✓	13-Sep-2024	28 days	24 days	✓
Metals (<63 µm) : Mercury in Sediment by CVAAS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-1_2024-08 C	E510A	19-Aug-2024	10-Sep-2024	28 days	22 days	✓	13-Sep-2024	28 days	25 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-4_2024-08 C	E440A	24-Aug-2024	10-Sep-2024	180 days	17 days	✓	13-Sep-2024	180 days	20 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-5_2024-08 C	E440A	24-Aug-2024	10-Sep-2024	180 days	17 days	✓	13-Sep-2024	180 days	20 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-3_2024-08 C	E440A	23-Aug-2024	10-Sep-2024	180 days	18 days	✓	13-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-4_2024-08 C	E440A	23-Aug-2024	10-Sep-2024	180 days	18 days	✓	13-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-5_2024-08 C	E440A	23-Aug-2024	10-Sep-2024	180 days	18 days	✓	13-Sep-2024	180 days	21 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-1_2024-08 C	E440A	22-Aug-2024	10-Sep-2024	180 days	19 days	✓	13-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2_2024-08 C	E440A	22-Aug-2024	10-Sep-2024	180 days	19 days	✓	13-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2X_2024-08 C	E440A	22-Aug-2024	10-Sep-2024	180 days	19 days	✓	13-Sep-2024	180 days	22 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-1_2024-08 C	E440A	21-Aug-2024	10-Sep-2024	180 days	20 days	✓	13-Sep-2024	180 days	23 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-2_2024-08 C	E440A	21-Aug-2024	10-Sep-2024	180 days	20 days	✓	13-Sep-2024	180 days	23 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-3_2024-08 C	E440A	21-Aug-2024	10-Sep-2024	180 days	20 days	✓	13-Sep-2024	180 days	23 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-3_2024-08 C	E440A	20-Aug-2024	10-Sep-2024	180 days	21 days	✓	13-Sep-2024	180 days	24 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-4_2024-08 C	E440A	20-Aug-2024	10-Sep-2024	180 days	21 days	✓	13-Sep-2024	180 days	24 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5_2024-08 C	E440A	20-Aug-2024	10-Sep-2024	180 days	21 days	✓	13-Sep-2024	180 days	24 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5X_2024-08 C	E440A	20-Aug-2024	10-Sep-2024	180 days	21 days	✓	13-Sep-2024	180 days	24 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-1_2024-08 C	E440A	19-Aug-2024	10-Sep-2024	180 days	22 days	✓	13-Sep-2024	180 days	25 days	✓
Metals (<63 µm) : Metals in Sediment by CRC ICPMS (<63 µm)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-2_2024-08 C	E440A	19-Aug-2024	10-Sep-2024	180 days	22 days	✓	13-Sep-2024	180 days	25 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-4_2024-08 C	E144	24-Aug-2024	----	----	----		05-Sep-2024	----	12 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-5_2024-08 C	E144	24-Aug-2024	----	----	----		05-Sep-2024	----	12 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-3_2024-08 C	E144	23-Aug-2024	----	----	----		05-Sep-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-4_2024-08 C	E144	23-Aug-2024	----	----	----		05-Sep-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-5_2024-08 C	E144	23-Aug-2024	----	----	----		05-Sep-2024	----	13 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-1_2024-08 C	E144	22-Aug-2024	----	----	----		05-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2_2024-08 C	E144	22-Aug-2024	----	----	----		05-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P1_SE-2X_2024-08 C	E144	22-Aug-2024	----	----	----		05-Sep-2024	----	14 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-1_2024-08 C	E144	21-Aug-2024	----	----	----		05-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-2_2024-08 C	E144	21-Aug-2024	----	----	----		05-Sep-2024	----	15 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_POL-P2_SE-3_2024-08 C	E144	21-Aug-2024	----	----	----		05-Sep-2024	----	15 days	

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-3_2024-08 C	E144	20-Aug-2024	----	----	----		05-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-4_2024-08 C	E144	20-Aug-2024	----	----	----		05-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5_2024-08 C	E144	20-Aug-2024	----	----	----		05-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-5X_2024-08 C	E144	20-Aug-2024	----	----	----		05-Sep-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-1_2024-08 C	E144	19-Aug-2024	----	----	----		05-Sep-2024	----	17 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-2_2024-08 C	E144	19-Aug-2024	----	----	----		05-Sep-2024	----	17 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-4_2024-08 C	E108	24-Aug-2024	10-Sep-2024	30 days	17 days	✓	10-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-5_2024-08 C	E108	24-Aug-2024	10-Sep-2024	30 days	17 days	✓	10-Sep-2024	30 days	17 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-3_2024-08 C	E108	23-Aug-2024	10-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-4_2024-08 C	E108	23-Aug-2024	10-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-5_2024-08 C	E108	23-Aug-2024	10-Sep-2024	30 days	18 days	✓	10-Sep-2024	30 days	18 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-1_2024-08 C	E108	22-Aug-2024	10-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-2_2024-08 C	E108	22-Aug-2024	10-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P1_SE-2X_2024-08 C	E108	22-Aug-2024	10-Sep-2024	30 days	19 days	✓	10-Sep-2024	30 days	19 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-1_2024-08 C	E108	21-Aug-2024	10-Sep-2024	30 days	20 days	✓	10-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-2_2024-08 C	E108	21-Aug-2024	10-Sep-2024	30 days	20 days	✓	10-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_POL-P2_SE-3_2024-08 C	E108	21-Aug-2024	10-Sep-2024	30 days	20 days	✓	10-Sep-2024	30 days	20 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap MP_BOL-B2_SE-3_2024-08 C	E108	20-Aug-2024	10-Sep-2024	30 days	21 days	✓	10-Sep-2024	30 days	21 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-4_2024-08 C	E108	20-Aug-2024	10-Sep-2024	30 days	21 days	✓	10-Sep-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5_2024-08 C	E108	20-Aug-2024	10-Sep-2024	30 days	21 days	✓	10-Sep-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-5X_2024-08 C	E108	20-Aug-2024	10-Sep-2024	30 days	21 days	✓	10-Sep-2024	30 days	21 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-2_2024-08 C	E108	19-Aug-2024	10-Sep-2024	30 days	22 days	✓	10-Sep-2024	30 days	22 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap										
MP_BOL-B2_SE-1_2024-08 C	E108	19-Aug-2024	13-Sep-2024	30 days	25 days	✓	13-Sep-2024	30 days	25 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: ✗ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1635658	1	17	5.8	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1635657	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1635659	1	17	5.8	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1635656	0	16	0.0	5.0	✗
Total Nitrogen by Combustion	E366	1642384	2	40	5.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1642383	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1635658	2	17	11.7	10.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1635657	2	17	11.7	10.0	✓
Moisture Content by Gravimetry	E144	1635659	1	17	5.8	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1648557	2	17	11.7	10.0	✓
Total Nitrogen by Combustion	E366	1642384	4	40	10.0	10.0	✓
Total Sulfur by high temperature combustion	E399	1642383	4	40	10.0	10.0	✓
Method Blanks (MB)							
Mercury in Sediment by CVAAS (<63 µm)	E510A	1635658	1	17	5.8	5.0	✓
Metals in Sediment by CRC ICPMS (<63 µm)	E440A	1635657	1	17	5.8	5.0	✓
Moisture Content by Gravimetry	E144	1635659	1	17	5.8	5.0	✓
Total Nitrogen by Combustion	E366	1642384	2	40	5.0	5.0	✓
Total Sulfur by high temperature combustion	E399	1642383	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Vancouver	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Total Nitrogen by Combustion	E366 ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 22.4	The sample is ignited in a combustion analyzer where nitrogen in the reduced nitrous oxide gas is determined using a thermal conductivity detector.
Total Sulfur by high temperature combustion	E399 ALS Environmental - Saskatoon	Soil/Solid	ISO 15178:2000	Air-dried sample is ignited in a combustion analyzer where sulfur in the reduced SO_2 gas is determined using a thermal conductivity detector.
Metals in Sediment by CRC ICPMS (<63 µm)	E440A ALS Environmental - Vancouver	Soil/Solid	EPA 6020B (mod)	Samples are sieved through a 63 um sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Elemental Sulfur may be poorly recovered by this method. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Sediment by CVAAS (<63 µm)	E510A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO_3 and HCl, followed by CVAAS analysis.
Particle Size Analysis (Pipette) - MMER Classification	EC184E ALS Environmental - Saskatoon	Soil/Solid	Metal Mining Technical Guidance for Environmental Effects Monitoring (2012)	The particle size determination is performed by various methods to generate a Grain Size curve. The data from the curve is then used to produce particle size ranges based on the Metal Mining Effluent Regulations (MMER) classification system for Environmental Effects Monitoring.
Total Organic Carbon (Calculated) in soil (<63 µm)	EC356A ALS Environmental - Saskatoon	Soil/Solid	CSSS (2008) 21.2	Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon (TIC) analyzed on material passing a 63 µm sieve.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Vancouver	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury (63 µm Sieve)	EP440A ALS Environmental - Vancouver	Soil/Solid	EPA 200.2 (mod)	Samples are sieved through a 63 µm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Dry and Grind in Soil/Solid <60°C	EPP442 ALS Environmental - Saskatoon	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C2503**	Page	: 1 of 10
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 7	Date Samples Received	: 29-Aug-2024 10:45
PO	:	Date Analysis Commenced	: 05-Sep-2024
C-O-C number	: ----	Issue Date	: 16-Sep-2024 15:59
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-006 (Minnow/Mt. Polley)		
No. of samples received	: 68		
No. of samples analysed	: 34		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
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General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1635659)											
VA24C2503-004	MP_BOL-B2_SE-1_2024-08 C	Moisture	----	E144	0.25	%	94.6	94.5	0.0886%	20%	----
Physical Tests (QC Lot: 1648557)											
CG2412883-005	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	8.01	8.00	0.125%	10%	----
Anions and Nutrients (QC Lot: 1642379)											
VA24C2474-012	Anonymous	Nitrogen, total	7727-37-9	E366	0.020	%	0.051	0.033	0.018	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1642384)											
VA24C0980-016	Anonymous	Nitrogen, total	7727-37-9	E366	0.020	%	0.883	0.915	3.56%	20%	----
Inorganics (QC Lot: 1642378)											
VA24C2474-012	Anonymous	Sulfur, total	7704-34-9	E399	0.050	%	620 mg/kg	0.055	0.007	Diff <2x LOR	----
Inorganics (QC Lot: 1642383)											
VA24C0980-016	Anonymous	Sulfur, total	7704-34-9	E399	0.050	%	4190 mg/kg	0.364	0.055	Diff <2x LOR	----
Metals (<63 µm) (QC Lot: 1635657)											
VA24C2503-004	MP_BOL-B2_SE-1_2024-08 C	Aluminum	7429-90-5	E440A	50	mg/kg	22100	22200	0.304%	40%	----
		Antimony	7440-36-0	E440A	0.10	mg/kg	0.87	0.63	31.4%	30%	DUP-H
		Arsenic	7440-38-2	E440A	0.050	mg/kg	8.22	7.98	2.96%	30%	----
		Barium	7440-39-3	E440A	0.50	mg/kg	252	282	11.3%	40%	----
		Beryllium	7440-41-7	E440A	0.10	mg/kg	0.79	0.79	0.339%	30%	----
		Bismuth	7440-69-9	E440A	0.10	mg/kg	0.14	0.13	0.006	Diff <2x LOR	----
		Boron	7440-42-8	E440A	5.0	mg/kg	16.0	13.5	2.5	Diff <2x LOR	----
		Cadmium	7440-43-9	E440A	0.020	mg/kg	0.535	0.503	6.17%	30%	----
		Calcium	7440-70-2	E440A	50	mg/kg	9020	8920	1.04%	30%	----
		Chromium	7440-47-3	E440A	0.50	mg/kg	41.3	36.9	11.2%	30%	----
		Cobalt	7440-48-4	E440A	0.10	mg/kg	13.4	13.4	0.490%	30%	----
		Copper	7440-50-8	E440A	0.50	mg/kg	408	404	1.18%	30%	----
		Iron	7439-89-6	E440A	50	mg/kg	28700	28500	0.884%	30%	----
		Lead	7439-92-1	E440A	0.10	mg/kg	10.4	10.7	2.48%	40%	----
		Lithium	7439-93-2	E440A	2.0	mg/kg	13.3	12.8	0.5	Diff <2x LOR	----
		Magnesium	7439-95-4	E440A	10	mg/kg	6180	6130	0.857%	30%	----
		Manganese	7439-96-5	E440A	0.20	mg/kg	1360	1340	1.11%	30%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (<63 µm) (QC Lot: 1635657) - continued											
VA24C2503-004	MP_BOL-B2_SE-1_2024-08 C	Molybdenum	7439-98-7	E440A	0.10	mg/kg	3.78	3.66	3.13%	40%	----
		Nickel	7440-02-0	E440A	0.50	mg/kg	31.3	31.3	0.135%	30%	----
		Phosphorus	7723-14-0	E440A	50	mg/kg	1550	1510	2.85%	30%	----
		Potassium	7440-09-7	E440A	100	mg/kg	1570	1450	7.74%	40%	----
		Selenium	7782-49-2	E440A	0.10	mg/kg	2.93	2.84	3.26%	30%	----
		Silver	7440-22-4	E440A	0.050	mg/kg	0.383	0.384	0.373%	40%	----
		Sodium	7440-23-5	E440A	50	mg/kg	298	279	6.56%	40%	----
		Strontium	7440-24-6	E440A	0.10	mg/kg	96.2	97.3	1.18%	40%	----
		Thallium	7440-28-0	E440A	0.050	mg/kg	0.132	0.135	0.003	Diff <2x LOR	----
		Tin	7440-31-5	E440A	0.20	mg/kg	0.99	1.08	8.47%	40%	----
		Titanium	7440-32-6	E440A	1.0	mg/kg	515	439	15.8%	40%	----
		Uranium	7440-61-1	E440A	0.050	mg/kg	2.36	2.43	2.90%	30%	----
		Vanadium	7440-62-2	E440A	0.20	mg/kg	80.7	77.2	4.50%	30%	----
		Zinc	7440-66-6	E440A	1.0	mg/kg	90.6	87.0	4.11%	30%	----
		Zirconium	7440-67-7	E440A	1.0	mg/kg	4.6	5.0	0.4	Diff <2x LOR	----
Metals (<63 µm) (QC Lot: 1635658)											
VA24C2503-004	MP_BOL-B2_SE-1_2024-08 C	Mercury	7439-97-6	E510A	0.0050	mg/kg	0.278	0.254	9.14%	40%	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1635659)						
Moisture	----	E144	0.25	%	<0.25	----
Anions and Nutrients (QCLot: 1642379)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Anions and Nutrients (QCLot: 1642384)						
Nitrogen, total	7727-37-9	E366	0.02	%	<0.020	----
Inorganics (QCLot: 1642378)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Inorganics (QCLot: 1642383)						
Sulfur, total	7704-34-9	E399	0.05	%	<0.050	----
Metals (<63 µm) (QCLot: 1635657)						
Aluminum	7429-90-5	E440A	50	mg/kg	<50	----
Antimony	7440-36-0	E440A	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E440A	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	<0.10	----
Boron	7440-42-8	E440A	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440A	50	mg/kg	<50	----
Chromium	7440-47-3	E440A	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440A	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440A	50	mg/kg	<50	----
Lead	7439-92-1	E440A	0.1	mg/kg	<0.10	----
Lithium	7439-93-2	E440A	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440A	10	mg/kg	<10	----
Manganese	7439-96-5	E440A	0.2	mg/kg	<0.20	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440A	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440A	50	mg/kg	<50	----
Potassium	7440-09-7	E440A	100	mg/kg	<100	----
Selenium	7782-49-2	E440A	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (<63 µm) (QCLot: 1635657) - continued						
Silver	7440-22-4	E440A	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440A	50	mg/kg	<50	----
Strontium	7440-24-6	E440A	0.1	mg/kg	<0.10	----
Thallium	7440-28-0	E440A	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440A	0.2	mg/kg	<0.20	----
Titanium	7440-32-6	E440A	1	mg/kg	<1.0	----
Uranium	7440-61-1	E440A	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440A	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E440A	1	mg/kg	<1.0	----
Metals (<63 µm) (QCLot: 1635658)						
Mercury	7439-97-6	E510A	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1635656)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Physical Tests (QCLot: 1635659)									
Moisture	----	E144	0.25	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1648557)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	100	97.0	103	----
Anions and Nutrients (QCLot: 1642379)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	97.5	90.0	110	----
Anions and Nutrients (QCLot: 1642384)									
Nitrogen, total	7727-37-9	E366	0.02	%	22.4 %	99.4	90.0	110	----
Inorganics (QCLot: 1642378)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	99.5	90.0	110	----
Inorganics (QCLot: 1642383)									
Sulfur, total	7704-34-9	E399	0.05	%	12.8 %	101	90.0	110	----
Metals (<63 µm) (QCLot: 1635657)									
Aluminum	7429-90-5	E440A	50	mg/kg	200 mg/kg	116	80.0	120	----
Antimony	7440-36-0	E440A	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440A	0.05	mg/kg	100 mg/kg	118	80.0	120	----
Barium	7440-39-3	E440A	0.5	mg/kg	25 mg/kg	115	80.0	120	----
Beryllium	7440-41-7	E440A	0.1	mg/kg	10 mg/kg	104	80.0	120	----
Bismuth	7440-69-9	E440A	0.1	mg/kg	100 mg/kg	100	80.0	120	----
Boron	7440-42-8	E440A	5	mg/kg	100 mg/kg	99.2	80.0	120	----
Cadmium	7440-43-9	E440A	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440A	50	mg/kg	5000 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E440A	0.5	mg/kg	25 mg/kg	112	80.0	120	----
Cobalt	7440-48-4	E440A	0.1	mg/kg	25 mg/kg	109	80.0	120	----
Copper	7440-50-8	E440A	0.5	mg/kg	25 mg/kg	108	80.0	120	----
Iron	7439-89-6	E440A	50	mg/kg	100 mg/kg	107	80.0	120	----
Lead	7439-92-1	E440A	0.1	mg/kg	50 mg/kg	105	80.0	120	----
Lithium	7439-93-2	E440A	2	mg/kg	25 mg/kg	105	80.0	120	----
Magnesium	7439-95-4	E440A	10	mg/kg	5000 mg/kg	116	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1635657) - continued									
Manganese	7439-96-5	E440A	0.2	mg/kg	25 mg/kg	111	80.0	120	----
Molybdenum	7439-98-7	E440A	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Nickel	7440-02-0	E440A	0.5	mg/kg	50 mg/kg	108	80.0	120	----
Phosphorus	7723-14-0	E440A	50	mg/kg	1000 mg/kg	118	80.0	120	----
Potassium	7440-09-7	E440A	100	mg/kg	5000 mg/kg	113	80.0	120	----
Selenium	7782-49-2	E440A	0.1	mg/kg	100 mg/kg	104	80.0	120	----
Silver	7440-22-4	E440A	0.05	mg/kg	10 mg/kg	93.8	80.0	120	----
Sodium	7440-23-5	E440A	50	mg/kg	5000 mg/kg	110	80.0	120	----
Strontium	7440-24-6	E440A	0.1	mg/kg	25 mg/kg	106	80.0	120	----
Thallium	7440-28-0	E440A	0.05	mg/kg	100 mg/kg	104	80.0	120	----
Tin	7440-31-5	E440A	0.2	mg/kg	50 mg/kg	105	80.0	120	----
Titanium	7440-32-6	E440A	1	mg/kg	25 mg/kg	111	80.0	120	----
Uranium	7440-61-1	E440A	0.05	mg/kg	0.5 mg/kg	111	80.0	120	----
Vanadium	7440-62-2	E440A	0.2	mg/kg	50 mg/kg	114	80.0	120	----
Zinc	7440-66-6	E440A	1	mg/kg	50 mg/kg	111	80.0	120	----
Zirconium	7440-67-7	E440A	1	mg/kg	10 mg/kg	109	80.0	120	----
Metals (<63 µm) (QCLot: 1635658)									
Mercury	7439-97-6	E510A	0.005	mg/kg	0.1 mg/kg	96.0	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 1648557)									
QC-1648557-002	RM	pH (1:2 soil:water)	----	E108	7.78 pH units	99.7	96.0	104	----
Anions and Nutrients (QCLot: 1642379)									
QC-1642379-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	104	80.0	120	----
Anions and Nutrients (QCLot: 1642384)									
QC-1642384-003	RM	Nitrogen, total	7727-37-9	E366	0.11 %	108	80.0	120	----
Inorganics (QCLot: 1642378)									
QC-1642378-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	92.2	70.0	130	----
Inorganics (QCLot: 1642383)									
QC-1642383-003	RM	Sulfur, total	7704-34-9	E399	0.333 %	98.8	70.0	130	----
Metals (<63 µm) (QCLot: 1635657)									
QC-1635657-003	MRCA-21	Aluminum	7429-90-5	E440A	22500 mg/kg	116	70.0	130	----
QC-1635657-003	MRCA-21	Antimony	7440-36-0	E440A	24.8 mg/kg	100	70.0	130	----
QC-1635657-003	MRCA-21	Arsenic	7440-38-2	E440A	21.2 mg/kg	103	70.0	130	----
QC-1635657-003	MRCA-21	Barium	7440-39-3	E440A	788 mg/kg	104	70.0	130	----
QC-1635657-003	MRCA-21	Beryllium	7440-41-7	E440A	1.82 mg/kg	108	70.0	130	----
QC-1635657-003	MRCA-21	Bismuth	7440-69-9	E440A	1.78 mg/kg	92.9	70.0	130	----
QC-1635657-003	MRCA-21	Cadmium	7440-43-9	E440A	2.15 mg/kg	108	70.0	130	----
QC-1635657-003	MRCA-21	Calcium	7440-70-2	E440A	4900 mg/kg	102	70.0	130	----
QC-1635657-003	MRCA-21	Chromium	7440-47-3	E440A	56.9 mg/kg	108	70.0	130	----
QC-1635657-003	MRCA-21	Cobalt	7440-48-4	E440A	32 mg/kg	105	70.0	130	----
QC-1635657-003	MRCA-21	Copper	7440-50-8	E440A	969 mg/kg	104	70.0	130	----
QC-1635657-003	MRCA-21	Iron	7439-89-6	E440A	32700 mg/kg	104	70.0	130	----
QC-1635657-003	MRCA-21	Lead	7439-92-1	E440A	919 mg/kg	97.2	70.0	130	----
QC-1635657-003	MRCA-21	Lithium	7439-93-2	E440A	47.3 mg/kg	111	70.0	130	----
QC-1635657-003	MRCA-21	Magnesium	7439-95-4	E440A	7780 mg/kg	108	70.0	130	----
QC-1635657-003	MRCA-21	Manganese	7439-96-5	E440A	8640 mg/kg	105	70.0	130	----
QC-1635657-003	MRCA-21	Molybdenum	7439-98-7	E440A	25.1 mg/kg	95.2	70.0	130	----
QC-1635657-003	MRCA-21	Nickel	7440-02-0	E440A	1000 mg/kg	107	70.0	130	----
QC-1635657-003	MRCA-21	Phosphorus	7723-14-0	E440A	660 mg/kg	106	70.0	130	----
QC-1635657-003	MRCA-21	Potassium	7440-09-7	E440A	10800 mg/kg	106	70.0	130	----
QC-1635657-003	MRCA-21	Selenium	7782-49-2	E440A	1.04 mg/kg	101	70.0	130	----
QC-1635657-003	MRCA-21	Silver	7440-22-4	E440A	8.98 mg/kg	95.4	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (<63 µm) (QCLot: 1635657) - continued									
QC-1635657-003	MRCA-21	Sodium	7440-23-5	E440A	1770 mg/kg	110	70.0	130	----
QC-1635657-003	MRCA-21	Strontium	7440-24-6	E440A	41 mg/kg	100	70.0	130	----
QC-1635657-003	MRCA-21	Thallium	7440-28-0	E440A	0.907 mg/kg	98.1	70.0	130	----
QC-1635657-003	MRCA-21	Tin	7440-31-5	E440A	3.79 mg/kg	97.1	70.0	130	----
QC-1635657-003	MRCA-21	Titanium	7440-32-6	E440A	2790 mg/kg	111	70.0	130	----
QC-1635657-003	MRCA-21	Uranium	7440-61-1	E440A	3.97 mg/kg	94.6	70.0	130	----
QC-1635657-003	MRCA-21	Vanadium	7440-62-2	E440A	66.2 mg/kg	105	70.0	130	----
QC-1635657-003	MRCA-21	Zinc	7440-66-6	E440A	828 mg/kg	105	70.0	130	----
QC-1635657-003	MRCA-21	Zirconium	7440-67-7	E440A	6.91 mg/kg	107	70.0	130	----
Metals (<63 µm) (QCLot: 1635658)									
QC-1635658-003	MRCA-21	Mercury	7439-97-6	E510A	0.068 mg/kg	95.8	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

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Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): VA24C2503 **ALS Contact:** Can Dang **Sampler:**

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the servi

Analys

Indicate Filtered (F), Preserved (P) or Filte

Environmental Division Vancouver
Work Order Reference
VA24C2503

Telephone : +1 604 253 4188

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	
	MP_BOL-B2_SE-1_2024-08 P (A)	19 -Aug-24	13:35	Sediment							1
	MP_BOL-B2_SE-1_2024-08 P (B)	19 -Aug-24	13:35	Sediment							1
3	MP_BOL-B2_SE-1_2024-08 P (Comp A+B) (particle size)	19 -Aug-24	13:35	Sediment						R	2
4	MP_BOL-B2_SE-1_2024-08 C (metals)	19 -Aug-24	12:30	Sediment	R	R	R	R	R		1
	MP_BOL-B2_SE-2_2024-08 P (A)	20 -Aug-24	8:01	Sediment							1
	MP_BOL-B2_SE-2_2024-08 P (B)	20 -Aug-24	8:01	Sediment							1
7	MP_BOL-B2_SE-2_2024-08 P (Comp A+B) (particle size)	20 -Aug-24	8:01	Sediment						R	2
8	MP_BOL-B2_SE-2_2024-08 C (metals)	19 -Aug-24	14:25	Sediment	R	R	R	R	R		1
	MP_BOL-B2_SE-3_2024-08 P (A)	20 -Aug-24	9:54	Sediment							1
	MP_BOL-B2_SE-3_2024-08 P (B)	20 -Aug-24	9:54	Sediment							1
11	MP_BOL-B2_SE-3_2024-08 P (Comp A+B) (particle size)	20 -Aug-24	9:54	Sediment						R	2
12	MP_BOL-B2_SE-3_2024-08 C (metals)	20 -Aug-24	9:09	Sediment	R	R	R	R	R		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human drinking water use? ☒ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples ending in P are particle size, and consist of 2 jars (denoted -A and -B). Please combine and homogenize the 2 jars before running analyses. Samples ending in C are for metals.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13	16	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Braden Fregeau	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by: M.C	Date: 29 Aug	Time: 10:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2: kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2: alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-006	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04-7	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_BOL-B2_SE-4_2024-08 P (A)		20-Aug-24	11:32	Sediment							1
	MP_BOL-B2_SE-4_2024-08 P (B)		20-Aug-24	11:32	Sediment							1
15	MP_BOL-B2_SE-4_2024-08 P	(Comp A+B) (particle size)	20-Aug-24	11:32	Sediment						R	2
16	MP_BOL-B2_SE-4_2024-08 C	(metals)	20-Aug-24	11:09	Sediment	R	R	R	R	R		1
	MP_BOL-B2_SE-5_2024-08 P (A)		20-Aug-24	13:35	Sediment							1
	MP_BOL-B2_SE-5_2024-08 P (B)		20-Aug-24	13:35	Sediment							1
19	MP_BOL-B2_SE-5_2024-08 P	(Comp A+B) (particle size)	20-Aug-24	13:35	Sediment						R	2
20	MP_BOL-B2_SE-5_2024-08 C	(metals)	20-Aug-24	12:46	Sediment	R	R	R	R	R		1
	MP_POL-P2_SE-1_2024-08 P (A)		21-Aug-24	10:04	Sediment							1
	MP_POL-P2_SE-1_2024-08 P (B)		21-Aug-24	10:04	Sediment							1
23	MP_POL-P2_SE-1_2024-08 P	(Comp A+B) (particle size)	21-Aug-24	10:04	Sediment						R	2
24	MP_POL-P2_SE-1_2024-08 C	(metals)	21-Aug-24	9:22	Sediment	R	R	R	R	R		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples ending in P are particle size, and consist of 2 jars (denoted -A and -B). Please combine and homogenize the 2 jars before running analyses. Samples ending in C are for metals.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13	16	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Braden Gregory	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by: MC	Date: 29 Aug	Time: 1045

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)		Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_POL-P2_SE-2_2024-08 P (A)		21-Aug-24	12:20	Sediment							1
	MP_POL-P2_SE-2_2024-08 P (B)		21-Aug-24	12:20	Sediment							1
27	MP_POL-P2_SE-2_2024-08 P	(Comp A+B) (particle size)	21-Aug-24	12:20	Sediment						R	2
28	MP_POL-P2_SE-2_2024-08 C	(metals)	21-Aug-24	11:40	Sediment	R	R	R	R	R		1
	MP_POL-P2_SE-3_2024-08 P (A)		22-Aug-24	8:49	Sediment							1
	MP_POL-P2_SE-3_2024-08 P (B)		22-Aug-24	8:49	Sediment							1
31	MP_POL-P2_SE-3_2024-08 P	(Comp A+B) (particle size)	22-Aug-24	8:49	Sediment						R	2
32	MP_POL-P2_SE-3_2024-08 C	(metals)	21-Aug-24	14:23	Sediment	R	R	R	R	R		1
	MP_POL-P2_SE-4_2024-08 P (A)		24-Aug-24	8:56	Sediment							1
	MP_POL-P2_SE-4_2024-08 P (B)		24-Aug-24	8:56	Sediment							1
35	MP_POL-P2_SE-4_2024-08 P	(Comp A+B) (particle size)	24-Aug-24	8:56	Sediment						R	2
36	MP_POL-P2_SE-4_2024-08 C	(metals)	24-Aug-24	8:30	Sediment	R	R	R	R	R		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?

☐ YES ☒ NO

Are samples for human drinking water use?

☒ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples ending in P are particle size, and consist of 2 jars (denoted -A and -B). Please combine and homogenize the 2 jars before running analyses. Samples ending in C are for metals.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Braden Gregory	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-006
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_POL-P2_SE-5_2024-08 P (A)	24-Aug-24	10:56	Sediment							1
	MP_POL-P2_SE-5_2024-08 P (B)	24-Aug-24	10:56	Sediment							1
39	MP_POL-P2_SE-5_2024-08 P (Comp A+B) (particle size)	24-Aug-24	10:56	Sediment						R	2
40	MP_POL-P2_SE-5_2024-08 C (metals)	24-Aug-24	10:06	Sediment	R	R	R	R	R		1
	MP_BOL-B2_SE-5X_2024-08 P (A)	20-Aug-24	13:35	Sediment							1
	MP_BOL-B2_SE-5X_2024-08 P (B)	20-Aug-24	13:35	Sediment							1
43	MP_BOL-B2_SE-5X_2024-08 P (Comp A+B) (particle size)	20-Aug-24	13:35	Sediment						R	2
44	MP_BOL-B2_SE-5X_2024-08 C (metals)	20-Aug-24	12:46	Sediment	R	R	R	R	R		1
	MP_POL-P1_SE-2X_2024-08 P (A)	22-Aug-24	14:27	Sediment							1
	MP_POL-P1_SE-2X_2024-08 P (B)	22-Aug-24	14:27	Sediment							1
47	MP_POL-P1_SE-2X_2024-08 P (Comp A+B) (particle size)	22-Aug-24	14:27	Sediment						R	2
48	MP_POL-P1_SE-2X_2024-08 C (metals)	22-Aug-24	12:57	Sediment	R	R	R	R	R		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples ending in P are particle size, and consist of 2 jars (denoted -A and -B). Please combine and homogenize the 2 jars before running analyses. Samples ending in C are for metals.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Braden Gregory	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2019 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 - 02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 7	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP-POL-PI_SE-1_2024-08 P (A)	22-Aug-24	11:02	Sediment							
	MP_POL-PI-SE-1_2024-08 P (B)	22-Aug-24	11:02	Sediment							
51	MP_POL-PI_SE-1_2024-08P (Comp A+B)	22-Aug-24	11:02	Sediment						R	
52	MP-POL-PI_SE-1_2024-08 C (metals)	22-Aug-24	10:40	Sediment	R	R	R	R	R		
	MP_POL-PI_SE-2_2024-08 (P)(A)	22-Aug-24	14:27	Sediment							
	MP_POL-PI_SE-2_2024-08-P (B)	22-Aug-24	14:27	Sediment							
55	MP-POL-PI_SE-2_2024-08 P (Comp A+B)	22-Aug-24	14:27	Sediment						R	
56	MP-POL-PI_SE-2_2024-08 C (metals)	22-Aug-24	12:57	Sediment	R	R	R	R	R		
	MP_POL-PI_SE-3_2024-08 P (A)	23-Aug-24	8:58	Sediment							
	MP_POL-PI_SE-3_2024-08 P (B)	23-Aug-24	8:58	Sediment							
59	MP-POL-PI_SE-3_2024-08 P (Comp A+B)	23-Aug-24	8:58	Sediment						R	
60	MP_POL-PI_SE-3_2024-08 C (metals)	23-Aug-24	8:22	Sediment	R	R	R	R	R		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human drinking water use? ☒ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Samples ending in P are for particle size, and consist of 2 jars (denoted -A and -B). Please combine and homogenize the 2 jars before running analyses. Samples ending in C are for metals

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kyaden Gregory	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

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ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15-02

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwb
Email 2	kbatchelar@minnow.ca, slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	alalonde@dwbconsulting.ca

Project Information	
ALS Account # / Quote #:	
Job #:	
PO / AFE:	24-04 Task 7
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals package(<63µm) (CA11)	TC, TOC, TIC (<63 µm) (S351A)	Total Nitrogen (<63um) (E366A)	Total Sulfur (<63um)(E399A)	Moisture (E144)	Particle Size Analysis (Pipette+gravel) (S184EA)	Number of Containers
	MP_POL-P1_SE-4_2024-08 P (A)	27-Aug-24	11:05	Sediment							
	MP_POL-P1_SE-4_2024-08 P (B)	23-Aug-24	11:05	Sediment							
63	MP_POL-P1_SE-4_2024-08 P (comp A+B)	23-Aug-24	11:05	Sediment						R	
64	MP_POL-P1_SE-4_2024-08 C (metals)	23-Aug-24	10:20	Sediment	R	R	R	R	R		
	MP_POL-P1_SE-5_2024-08 P (A)	23-Aug-24	13:20	Sediment							
	MP_POL-P1_SE-5_2024-08 P (B)	23-Aug-24	13:20	Sediment							
67	MP_POL-P1_SE-5_2024-08 P (comp A+B)	23-Aug-24	13:20	Sediment						R	
68	MP_POL-P1_SE-5_2024-08 C (metals)	23-Aug-24	12:45	Sediment	R	R	R	R	R		
				Sediment							
				Sediment							
				Sediment							
				Sediment							

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human drinking water use? ☒ NO

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SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Braden Gregory	Date: 26-Aug-2024	Time: 16:00	Received by:	Date:	Time:	Received by:	Date:	Time:

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SEDIMENT TOXICITY

Nautilus Environmental Laboratory Report

1510-0022405-11

(Finalized January 30, 2025)

Freshwater sediment toxicity testing using *H. azteca* and *C. dilutus*

August 2024 Sediment Samples

Final Report – Revision 2

December 16, 2024
Revised January 30, 2025

Submitted to: **Minnow Environmental Inc.**
Victoria, BC

10823 27 Street SE, Calgary, AB T2Z 3V9

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SIGNATURE PAGE

Report By:
Daisy Meyer, BSc, BIT
Project Coordinator

Reviewed By:
Stephanie Schiffer, MSc
Project Biologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Sample and Test Type Information

Sample ID (Internal ID)	MP-QUL-LNF1 (1510-0022405)
	MP-QUL-LREF1 (1510-0022406)
	MP-QUL-PNF (1510-0022407)
	MP-QUL-PREF1 (1510-0022408)
	MP-BOL-B2 (1510-0022409)
	MP-POL-P1 (1510-0022410)
	MP-POL-P2 (1510-0022411)
Sample collection date	August 21, 2024
	August 21, 2024
	August 23 and 24, 2024
	August 22 and 23, 2024
	August 19 and 20, 2024
	August 22 and 23, 2024
	August 21, 22 and 24, 2024
Sample receipt date	August 29, 2024
Sample receipt temperature	10.1-11.9°C
Test types	14-d *Hyalella azteca* survival and growth
	10-d *Chironomus dilutus* survival and growth

Results

Endpoint [1] (mean ± SD)	Sample ID		
	Control Sediment	MP-QUL-LNF1	MP-QUL-LREF1
H. azteca survival (%)	100.0 ± 0.0	62.0 ± 20.5*$^{\alpha}$	90.0 ± 12.3
H. azteca growth (mg/org)	0.23 ± 0.05	0.12 ± 0.02*$^{\alpha}$	0.32 ± 0.04

[1] According to information provided by Nautilus Environmental (Point Edward, ON).
SD = Standard Deviation
(*) Indicates result is significantly lower than the control sediment
($^{\alpha}$) Indicates result is significantly lower than the reference sediment MP_QUL_LREF1

Endpoint [1] (mean ± SD)	Sample ID			
	Control Sediment A	MP-QUL-PNF	MP-QUL-PREF1	MP-BOL-B2
C. dilutus survival (%)	100.0 ± 0.0	54.0 ± 30.5*	70.0 ± 18.7*	98.0 ± 4.5
C. dilutus growth (mg/org)	1.66 ± 0.12	2.44 ± 1.11	3.25 ± 0.29	2.05 ± 0.22

[1] According to information provided by Nautilus Environmental (Point Edward, ON).
SD = Standard Deviation
(*) Indicates result is significantly lower than the control sediment

Endpoint [1] (mean ± SD)	Sample ID		
	Control Sediment B	MP-POL-P1	MP-POL-P2
C. dilutus survival (%)	88.0 ± 11.0	96.0 ± 5.5	90.0 ± 17.3
C. dilutus growth (mg/ org)	1.77 ± 0.19	2.34 ± 0.20	2.32 ± 0.23

[1] According to information provided by Nautilus Environmental (Point Edward, ON).
SD = Standard Deviation

Endpoint [1, 2] (mean ± SD)	Sample ID			
	Control Sediment B	MP-BOL-B2	MP-POL-P1	MP-POL-P2
C. dilutus survival (%)	88.8 ± 11.0	98.0 ± 4.5	96.0 ± 5.5	90.0 ± 17.3
C. dilutus growth (mg/org)	1.77 ± 0.19	2.05 ± 0.22	2.34 ± 0.20$^{\beta}$	2.32 ± 0.23$^{\beta}$

[1] According to information provided by Nautilus Environmental (Point Edward, ON).

[2] Samples statistically compared using the Tukey-Kramer test.

SD = Standard Deviation

($^{\beta}$) Indicates result is significantly higher than the control sediment

1.0 INTRODUCTION

Nautilus Environmental Company Inc. (Nautilus) conducted freshwater sediment toxicity tests for Minnow Environmental Inc. on samples MP-QUL-LNF1, MP-QUL-LREF1, MP-QUL-PNF, MP-QUL-PREF1, MP-BOL-B2, MP-POL-P1, and MP-POL-P2. The samples were collected between August 19 and 24, 2024 and delivered to the Nautilus laboratory in Point Edwards, ON, on August 29, 2024. The samples were each transported in five 500-mL glass containers and were received at temperatures between 10.1 to 11.9°C. The 14-d *Hyalella azteca* survival and growth sediment toxicity test was performed on samples MP-QUL-LNF1 and MP-QUL-LREF1. The 10-d *Chironomus dilutus* survival and growth sediment toxicity test was performed on samples MP-QUL-PNF, MP-QUL-PREF1, MP-BOL-B2, MP-POL-P1, and MP-POL-P2. Testing was initiated September 17, 2024, for all species. Samples were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of these toxicity tests. Copies of raw laboratory data sheets and printouts of statistical analyses for the tests are provided in Appendices A and B, analytical chemistry is provided in Appendix C, and the chain-of-custody forms are provided in Appendix D.

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 1 and 2. Testing was conducted according to procedures described by Environment Canada (1997 and 2017). Statistical analyses for all tests were performed using CETIS (Tidepool Scientific Software, version 2.1.5.5).

Ammonia concentrations were measured in-house three times per week on the reference sediment sample MP-QUL-LREF in the *H. azteca* test to ensure that un-ionized ammonia was below 0.2 mg/L N (Environment Canada, 2017). Total ammonia concentrations were also measured in-house at test initiation and completion in the overlying water for all samples. Subsamples for dissolved copper, dissolved organic carbon, hardness and alkalinity were collected at test termination in the overlying water as requested by the client, and sent to ALS Environmental (Waterloo, ON) for analysis. Analytical results are provided in Appendix C.

Table 1. Summary of test conditions: *Hyalella azteca* survival and growth test (sediment).

Test species	*Hyalella azteca*
Organism source	In-house culture
Organism age	6 to 8 days old
Test type	Static
Test duration	14 days
Test vessel	500-mL glass container
Test volume	100 mL sediment; 175 mL overlying water
Test replicates	5 per sample
Number of organisms	10 per replicate
Control water	Dechlorinated municipal tap water
Test solution renewal	None
Test temperature	23 ± 1°C
Feeding	2.7 mg/L TSS of YCT per replicate daily
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH, conductivity and total ammonia of overlying water measured 3x per week; hardness and alkalinity of overlying water measured at test initiation and termination; unionized ammonia measured three times weekly in overlying water of reference sample
Test protocol	Environment Canada (2017), EPS 1/RM/33
Statistical software	CETIS Version 2.1.5.5
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	≥80% survival and ≥0.1 mg/amphipod dry weight
Reference toxicant	Potassium chloride (KCl)

Table 2. Summary of test conditions: *Chironomus dilutus* survival and growth test.

Test species	*Chironomus dilutus*
Organism source	In-house culture
Organism age	Third instar (9-13 days post hatch)
Test type	Static
Test duration	10 days
Test vessel	500-mL glass container
Test volume	100 mL sediment; 175 mL overlying water
Test replicates	5 per sample
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated municipal tap water
Test solution renewal	None
Test temperature	23 ± 1°C
Feeding	6 mg of Tetramin per replicate daily
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH, conductivity and total ammonia of overlying water measured 3x per week; hardness and alkalinity of overlying water measured at test initiation and termination.
Test protocol	Environment Canada (1997), EPS 1/RM/32
Statistical software	CETIS Version 2.1.5.5
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	≥70% survival and ≥0.6 mg/worm dry weight
Reference toxicant	Potassium chloride (KCl)

3.0 RESULTS

Results of the toxicity tests are summarized in Tables 3, 4 and 5. Adverse effects were observed on the survival and dry weight of *H. azteca* in sample MP-QUL-LNF1 compared to the control sediment and the reference sediment MP-QUL-LREF1. No adverse effects were observed on the survival and dry weight of *H. azteca* in the reference sediment MP-QUL-LREF1 when compared to the control sediment (Table 3).

Adverse effects on the survival of *C. dilutus* were observed in samples MP-QUL-PNF and MP-QUL-PREF1 when compared to the control sediment. However, no adverse effects were observed on the dry weight of *C. dilutus* in these samples when compared to the control sediment. Additionally, no adverse effects were observed on the survival and dry weight of *C. dilutus* in sample MP-QUL-PNF when compared to the reference sediment, MP-QUL-PREF1 (Table 4). There were no adverse effects observed on the survival and dry weight of *C. dilutus* in the reference sediment MP-BOL-B2 relative to the control sediment (Table 4).

There were no adverse effects observed on the survival and dry weight of *C. dilutus* for samples MP-POL-P1 and MP-POL-P2 when compared to the control sediment (Table 5). However, sediment samples MP-POL-P1 and MP-POL-P2 could not be directly compared to their associated reference sediment MP-BOL-B2, as they were initiated with different batches of *C. dilutus* organisms. Additional details on the use of different organism batches are provided in Section 4.0. These organism batches are distinguished by the different control sediments shown in Tables 4 and 5 (i.e., control sediment A and associated samples were initiated with a different batch than control sediment B and associated samples). Therefore, to evaluate whether sediment samples MP-POL-P1 and MP-POL-P2 were negatively impacted relative to the reference sediment MP-BOL-B2, a weight-of-evidence approach was used to assess both endpoints. Additional statistical comparisons were also conducted to confirm the presence or absence of effects, with results summarized in Table 6.

A visual assessment of the data suggests that sediment samples MP-POL-P1 and MP-POL-P2 were not negatively impacted in terms of *C. dilutus* survival and dry weight relative to the reference sample MP-BOL-B2. This observation is supported by the absence of negative effects on survival and dry weight of *C. dilutus* in sediment samples MP-POL-P1 and MP-POL-P2 when compared to control sediment B, which used the same organism batch (Table 5). Additionally, the survival of both sediment samples exceeded the 70% control acceptance criteria for sediment toxicity tests with *C. dilutus* (Environment Canada, 1997), further supporting an absence of adverse effects. The mean dry weights of MP-POL-P1 and MP-POL-P2 were also greater than the reference sediment MP-BOL-B2 and both control sediments (A and B) (Table 4 and 5).

Statistical comparisons using the two-tailed, Tukey-Kramer test, which compared data across control sediment B, reference sediment MP-BOL-B2, and the two sediment samples (MP-POL-P1 and MP-POL-P2), showed no significant adverse effects on survival or dry weight between the control sediment B and reference sediment MP-BOL-B2, despite using different organism batches. Additionally, no significant adverse effects on survival and dry weight were observed when the reference sediment MP-BOL-B2 was compared to sediment samples MP-POL-P1 and MP-POL-P2. Sediment samples MP-POL-P1 and MP-POL-P2 had significantly greater dry weight when compared to the control sediment B (Table 6). It should be noted that the test assumption for normality was not met for survival rate in this statistical analysis.

Measured total ammonia concentrations in the *H. azteca and C. dilutus* tests are summarized in Tables 7 and 8, respectively. Un-ionized ammonia measurements on the reference sediment of the *H. azteca* test did not exceed 0.2 mg/L throughout the test; therefore, renewal of the overlying water was not required (Environment Canada, 2017).

Dissolved copper and dissolved organic carbon measurements collected at test termination in the *H. azteca and C. dilutus* tests are summarized in Tables 9 to 12.

Table 3. Results: *Hyalella azteca* survival and growth test.

Sample ID	Mean ± SD	
	Survival (%)	Average Dry Weight (mg/org)
Control Sediment	100.0 ± 0.0	0.23 ± 0.05
MP-QUL-LNF1	62.0 ± 20.5*$^{\alpha}$	0.12 ± 0.02*$^{\alpha}$
MP-QUL-LREF1	90.0 ± 12.3	0.32 ± 0.04

SD = Standard Deviation

(*) Indicates result is significantly lower than the control sediment

($^{\alpha}$) Indicates result is significantly lower than the reference sediment MP_QUL_LREF1

Table 4. Results: *Chironomus dilutus* survival and growth test.

Sample ID	Survival (%)		Average Dry Weight (mg/org)	
	Mean ± SD	CV (%)	Mean ± SD	CV (%)
Control Sediment A	100.0 ± 0.0	0.0	1.66 ± 0.12	7.1
MP-QUL-PNF	54.0 ± 30.5*	56.5	2.44 ± 1.11	45.6
MP-QUL-PREF1	70.0 ± 18.7*	26.7	3.25 ± 0.29	9.0
MP-BOL-B2	98.0 ± 4.5	4.6	2.05 ± 0.22	10.7

SD = Standard Deviation, CV = Coefficient of Variation

(*) Indicates result is significantly lower than the control sediment

Table 5. Results: *Chironomus dilutus* survival and growth test.

Sample ID	Survival (%)		Average Dry Weight (mg/org)	
	Mean ± SD	CV (%)	Mean ± SD	CV (%)
Control Sediment B	88.8 ± 11.0	12.5	1.77 ± 0.19	10.8
MP-POL-P1	96.0 ± 5.5	5.7	2.34 ± 0.20	8.7
MP-POL-P2	90.0 ± 17.3	19.3	2.32 ± 0.23	10.0

SD = Standard Deviation, CV = Coefficient of Variation

Table 6. Results: *Chironomus dilutus* survival and growth test statistically compared using Tukey-Kramer test.

Sample ID	Survival (%)		Average Dry Weight (mg/org)	
	Mean ± SD	CV (%)	Mean ± SD	CV (%)
Control Sediment B	88.8 ± 11.0	12.5	1.77 ± 0.19	10.8
MP-BOL-B2	98.0 ± 4.5	4.6	2.05 ± 0.22	10.7
MP-POL-P1	96.0 ± 5.5	5.7	2.34 ± 0.20$^{\beta}$	8.7
MP-POL-P2	90.0 ± 17.3	19.3	2.32 ± 0.23$^{\beta}$	10.0

SD = Standard Deviation, CV = Coefficient of Variation

($^{\beta}$) Indicates result is significantly higher than the control sediment

Table 7. Summary of total overlying ammonia concentrations (mg/L N) measured in the *Hyalella azteca* toxicity tests.

Sample ID	Day 0	Day 3	Day 6	Day 8	Day 10	Day 13	Day 14
Control Sediment	1.20	0.00	0.00	0.00	0.02	0.00	0.07
MP-QUL-LNF1	0.11	0.00	0.00	0.00	0.13	0.00	0.06
MP-QUL-LREF1	0.28	0.00	1.00	0.00	0.08	0.00	0.11

Table 8. Summary of total overlying ammonia concentrations (mg/L N) measured in the *Chironomus dilutus* toxicity tests.

Sample ID	Day 0	Day 10
Control Sediment A	0.14	0.09
Control Sediment B	0.14	0.09
MP-QUL-PNF	0.64	0.49
MP-QUL-PREF1	0.94	0.05
MP-BOL-B2	1.66	0.27
MP-POL-P1	0.99	0.07
MP-POL-P2	0.99	0.07

Table 9. Summary of dissolved copper (mg/L Cu) measured in the *Hyalella azteca* toxicity tests on Day 14.

Replicate	Control Sediment	MP-QUL-LNF1	MP-QUL-LREF1
	0.00330	--	--
1	--	0.0870	0.00411
2	--	0.0820	0.00386
3	--	0.0930	0.00202
4	--	0.0935	0.00385
5	--	0.0657	0.00251

Table 10. Summary of dissolved copper (mg/L Cu) measured in the *Chironomus dilutus* toxicity tests on Day 10.

Replicate	Control Sediment	MP-QUL-PNF	MP-QUL-PREF1	MP-BOL-B2	MP-POL-P1	MP-POL-P2
	0.00232	--	--	--	--	--
1	--	0.00923	0.00258	0.00300	0.00889	0.0527
2	--	0.00787	0.00380	0.00336	0.00881	0.0518
3	--	0.0107	0.00291	0.00341	0.00814	0.0525
4	--	0.00925	0.00372	0.00356	0.00866	0.0507
5	--	0.00935	0.00264	0.00303	0.00859	0.0479

Table 11. Summary of dissolved organic carbon (mg/L C) measured in the *Hyalella azteca* toxicity tests on Day 14.

Replicate	Control Sediment	MP-QUL-LNF1	MP-QUL-LREF1
	7.08	--	--
1	--	6.32	6.86
2	--	5.59	5.57
3	--	6.02	6.19
4	--	6.02	9.85
5	--	6.11	5.98

Table 12. Summary of dissolved organic carbon (mg/L C) measured in the *Chironomus dilutus* toxicity tests on Day 10.

Replicate	Control Sediment	MP-QUL-PNF	MP-QUL-PREF1	MP-BOL-B2	MP-POL-P1	MP-POL-P2
	5.13	--	--	--	--	--
1	--	12.2	6.52	8.17	10.4	6.80
2	--	10.8	6.92	8.26	11.4	6.26
3	--	14.1	6.49	8.12	12.1	9.11
4	--	13.9	7.34	9.18	12.2	7.19
5	--	16.8	6.06	9.20	11.6	5.90

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests, except for pH in a reference sediment of the *H. azteca* test. The pH in reference sediment, MP-QUL-REF1, exceeded 8.0 by a small margin; however, the test remained static as unionized ammonia concentrations did not exceed 0.2 mg/L N. It should also be noted that the sediment test methods require that particle size, total organic carbon, and ammonia be measured in each field replicate. These measurements were not performed as part of the laboratory toxicity testing as the client measured these as part of the analytical chemistry program associated with the project. There were no other deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviations around the means.

As described in Section 3.0, in the *C. dilutus* test, the reference sediment MP-BOL-B2 could not be directly compared to its associated sediment samples MP-POL-P1 and MP-POL-P2 because they were initiated with different batches of organisms due to a limited number of organisms in the first batch. This error occurred after initiating samples MP-QUL-PNF, MP-QUL-PREF1, and MP-BOL-B2, when it was noted there were not enough organisms remaining to initiate samples MP-POL-P1 and MP-POL-P2. Consequently, these two remaining samples were initiated using organisms from the same culture but one day younger. As reference sediments are not required for *C. dilutus* tests, this did not result in a protocol deviation.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 13. Results for these tests fell within the acceptable range for organism performance of two standard deviations of the mean, based on historical results obtained by the laboratory with these tests Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 13. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
H. azteca	Survival (LC50): 0.65 (0.53-0.80) g/L KCl	0.45 (0.29-0.70)	NA	September 20, 2024
C. dilutus	Survival (LC50): 4.06 (3.41-4.84) g/L KCl	5.30 (2.75-10.22)	NA	September 17, 2024

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, NA = Not Available

REVISION 2 UPDATES

- Page vi – Added the results of the Tukey-Kramer statistical analysis of Control Sediment B, and samples MP-BOL-B2, MP-POL-P1, and MP-POL-P2 to the summary of results section
- Page 4 – Corrected 'Control/dilution water' section in table 2 to be dechlorinated municipal tap water
- Page 6 – Corrected sample ID typo from BP-BOL-B2 to MP-BOL-B2
- Pages 9 and 10 – Corrected the sample IDs in tables 10 and 12 from MP-QUL-LNF1 and MP-QUL-LREF1 to MP-QUL-PNF1 and MP-QUL-PREF1
- Page 11 – Corrected the sample IDs in QA/QC section from MP-QUL-LNF1 and MP-QUL-LREF1 to MP-QUL-PNF1 and MP-QUL-PREF1

5.0 REFERENCES

Borgmann, U. 1996. Systematic Analysis of Aqueous Ion Requirements of Hyalella azteca: A Standard Artificial Medium Including the Essential Bromide Ion, Arch. Environ. Contam. Toxicol. 30: 356- 363 pp.

Environment Canada. 1997. Biological test method: test for survival and growth in sediment using the larvae of freshwater midges (Chironomus tentans and Chironomus riparius). Environmental Protection Series EPS 1/RM/32. December 1997. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 131 pp.

Environment Canada. 2017. Biological test method: test for survival and growth in sediment and water using the freshwater amphipod, Hyalella azteca. EPS 1/RM/33, Second Edition, September 2017.

Tidepool Scientific Software. 2022. CETIS comprehensive environmental toxicity information system, version 2.1.5.5 Tidepool Scientific Software, McKinleyville, CA. 275 pp.

APPENDIX A – *Hyalella azteca* Toxicity Test Data

TEST CONDITIONS

BENCHSHEET COPY

Work Order : 1510-0022405

TEST ORGANISM			
Test Organism:	*Hyalella azteca*	Organism Source:	In-house culture
Organism Batch :	03,04,05 broods and HT	Location of Source :	Point Edward, ON
Age (Test Day 0) :	6-8 days	Mortality Rate :	0 % (prev. 48 h)

TEST CONDITIONS			
Test Type:	Static (no renewal)	Sediment Depth:	3 cm
Renewal Frequency :	Not applicable	Sediment Volume :	100 mL per replicate
Initiation Date :	2024-09-17	Overlying Water Volume :	175 mL per replicate
Randomized at Start of Test?:	Yes	Control Sediment:	Long Point, Lake Erie
Test Vessel:	500ml glass sample jar	Control Sediment Collection Date :	2021-06-30
Sample Type :	Field-collected sediment	Test Aeration :	Yes (all replicates)
Field Replicates per Treatment :	5	Aeration Rate :	2-3 bubbles per second
Test Replicates :	1 per field replicate	Photoperiod (light/dark) :	16 h / 8 h
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	10	Minimum Light Intensity :	500 lux
Feed Type:	YCT	Test Duration :	14 days
YCT Batch :	YCT2421	Date Exposures Prepared :	2024-09-16
Feeding Rate (per replicate):	~2.7 mg dry solids daily	Time Exposures Prepared :	15:00
Feeding Frequency :	Once daily		

NOTES:

CONTROL/TEST WATER :	
Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Renewal Date	Temp. (°C)	DO Sat. (%)*	DO (mg/L)	pH	Cond. (µmhos/cm)
2024-09-16	23.0	100	8.6	8.1	240

*% saturation (adjusted for actual temperature and barometric pressure)

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Hyalella azteca

EPS 1/RM/33

Work Order : 1510-0022405

Sample Number : **Control**

Sample Description : Fine organic silt

Time Start: 15:00

TEST DATA

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)		Conductivity (µmhos/cm)		pH		Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
				Initial	Final	Initial	Final	Initial	Final				
0	2024-09-17	23	Composite	8.4		334		8.3		132	1.20		kf/cs
1	2024-09-18	24	6	8.4		379		8.3			NA		kf
2	2024-09-19	22											KF
3	2024-09-20	23	3	7.2		442		7.9			0.00		kf
4	2024-09-21	22											KF
5	2024-09-22	22											KF
6	2024-09-23	23	8	8.0		465		8.2			0.00		cs
7	2024-09-24	22											KF
8	2024-09-25	23	4	8.0		482		8.3			0.00		KF
9	2024-09-26	22											KF
10	2024-09-27	22	10	7.2		532		8.0			0.02		KF
11	2024-09-28	22											KF
12	2024-09-29	22											KF
13	2024-09-30	22	6	7.6		508		7.7			0.00		KF
14	2024-10-01	23	Composite	8.0		541		8.3			0.07		KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/12

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Hyalella azteca

EPS 1/RM/33

Work Order : 1510-0022405
Sample Number : **MP_QUL-LNF1-TOX-(1-5)_2024-08**
Description : Fine brown sand
Time Start: 15:00

TEST DATA

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)		Conductivity (µmhos/cm)		pH		Hardness (mg/L as $CaCO_3$)	TAN (mg/L)[7]	NH3 (mg/L)[8]	Analyst(s)
				Initial	Final	Initial	Final	Initial	Final				
0	2024-09-17	23	Composite	8.4		257		8.0		108	0.11		kf
1	2024-09-18	24	5	8.3		280		8.2			NA		kf
2	2024-09-19	22											KF
3	2024-09-20	23	4	7.4		301		7.9			0.00		kf
4	2024-09-21	22											KF
5	2024-09-22	22											KF
6	2024-09-23	23	3	8.2		333		8.1			0.00		cs
7	2024-09-24	22											KF
8	2024-09-25	24	2	7.8		345		8.3			0.00		KF
9	2024-09-26	22											KF
10	2024-09-27	22	1	7.4		341		8.0			0.13		KF
11	2024-09-28	22											KF
12	2024-09-29	22											KF
13	2024-09-30	23	5	7.8		363		8.0			0.00		KF
14	2024-10-01										0.06		KF

"–" = not measured/not required

[7] TAN = Total ammonia (as N)

[8] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF
Date : 24/12/12

NOTES : day 0, 1, 3, 6 data entry NL 24/10/22. Day 14 individual chamber measurements: 1-23, 7.9mg/L, 386us, 8.3units. 2-23, 8.0mg/L, 362us, 8.3units. 3-23, 8.0mg/L, 363us, 8.3units. 4-23, 8.1mg/L, 352us, 8.3units. 5-23, 8.0mg/L, 366us, 8.3units.

TEST CONDITIONS

BENCHSHEET COPY

Work Order : 1510-0022406

TEST ORGANISM			
Test Organism:	*Hyalella azteca*	Organism Source:	In-house culture
Organism Batch :	03,04,05 brood and HT	Location of Source :	Point Edward, ON
Age (Test Day 0) :	6-8 days	Mortality Rate :	0 % (prev. 48 h)

TEST CONDITIONS			
Test Type:	Static (no renewal)	Sediment Depth:	3 cm
Renewal Frequency :	Not applicable	Sediment Volume :	100 mL per replicate
Initiation Date :	2024-09-17	Overlying Water Volume :	175 mL per replicate
Randomized at Start of Test?:	Yes	Control Sediment:	Long Point, Lake Erie
Test Vessel:	500ml glass sample jar	Control Sediment Collection Date :	2021-06-30
Sample Type :	Field-collected sediment	Test Aeration :	Yes (all replicates)
Field Replicates per Treatment :	5	Aeration Rate :	2-3 bubbles per second
Test Replicates :	1 per field replicate	Photoperiod (light/dark) :	16 h / 8 h
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	10	Minimum Light Intensity :	500 lux
Feed Type:	YCT	Test Duration :	14 days
YCT Batch :	YCT2421	Date Exposures Prepared :	2024-09-16
Feeding Rate (per replicate):	~2.7 mg dry solids daily	Time Exposures Prepared :	15:00
Feeding Frequency :	Once daily		

NOTES:

CONTROL/TEST WATER :	
Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Renewal Date	Temp. (°C)	DO Sat. (%)*	DO (mg/L)	pH	Cond. (µmhos/cm)
2024-09-16	23.0	100	8.6	8.1	240

*% saturation (adjusted for actual temperature and barometric pressure)

TOXICITY TEST REPORT

Hyalella azteca

EPS 1/RM/33

Work Order : 1510-0022406
Sample Number : **Control**
Sample Description : Fine organic silt
Time Start: 15:00

TEST DATA

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)		Conductivity (µmhos/cm)		pH		Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
				Initial	Final	Initial	Final	Initial	Final				
0	2024-09-17	23	Composite	8.4		334		8.3		132	1.20		kf/cs
1	2024-09-18	24	6	8.4		379		8.3			NA		kf
2	2024-09-19	22											KF
3	2024-09-20	23	3	7.2		442		7.9			0.00		kf
4	2024-09-21	22											KF
5	2024-09-22	22											KF
6	2024-09-23	23	8	8.0		465		8.2			0.00		cs
7	2024-09-24	22											KF
8	2024-09-25	23	4	8.0		482		8.3			0.00		KF
9	2024-09-26	22											KF
10	2024-09-27	22	10	7.2		532		8.0			0.02		KF
11	2024-09-28	22											KF
12	2024-09-29	22											KF
13	2024-09-30	22	6	7.6		508		7.7			0.00		KF
14	2024-10-01	23	Composite	8.0		541		8.3			0.07		KF

"–" = not measured/not required
1 TAN = Total ammonia (as N)
2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF
Date : 24/12/12

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Hyalella azteca

EPS 1/RM/33

Work Order : 1510-0022406
Sample Number : **MP_QUL-LREF1-TOX-(1-5)_2024-08**
Description : Dense dark grey silt
Time Start: 15:00

TEST DATA

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)		Conductivity (µmhos/cm)		pH		Hardness (mg/L as $CaCO_3$)	TAN (mg/L)[7]	NH3 (mg/L)[8]	Analyst(s)
				Initial	Final	Initial	Final	Initial	Final				
0	2024-09-17	23	Composite	8.4		251		7.9		100	0.28		kf
1	2024-09-18	23	5	8.2		259		8.1			NA		kf
2	2024-09-19	22											KF
3	2024-09-20	23	4	7.3		343		8.0			0.00		kf
4	2024-09-21	22											KF
5	2024-09-22	22											KF
6	2024-09-23	23	6	8.0		273		7.8			1.00		cs
7	2024-09-24	22											KF
8	2024-09-25	23	2	8.0		261		8.1			0.00		KF
9	2024-09-26	22											KF
10	2024-09-27	22	1	7.2		292		7.9			0.08		KF
11	2024-09-28	22											KF
12	2024-09-29	22											KF
13	2024-09-30	23	5	7.6		247		7.5			0.00		KF
14	2024-10-01		Composite								0.11		KF

"–" = not measured/not required

[7] TAN = Total ammonia (as N)

[8] NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF
Date : 24/12/12

NOTES : day 0, 1, 3, 6 data entry NL 24/10/22. Day 14 Individual chamber measurements: 1-23, 7.8mg/L, 310us, 8.1units. 2-23, 8.0mg/L, 260us, 8.1units. 3-23, 7.8mg/L, 225us, 7.7units. 4-23, 7.8mg/L, 331us, 8.3units. 5-23, 7.7mg/L, 245us, 7.9units.

Hyalella 14-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	12-3131-9547	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	4AF608BBCAF32405A4412E8E78CBB500	**Editor ID:**	002-704-782-4
Batch ID:	17-0711-4991	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Not Applicable
Ending Date:	01 Oct-24	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CTL_HA_Minnow	12-8136-2938			---	Minnow Environmental	
MP-QUL-LNF1_TO	04-0486-8111	21 Aug-24	29 Aug-24	27d 0h		
MP-QUL-LREF1_T	03-7049-9240	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CTL_HA_Minnow	Sediment	Minnow Environmental		
MP-QUL-LNF1_TO	Sediment	Minnow Environmental		
MP-QUL-LREF1_T	Sediment	Minnow Environmental		

Fisher Exact/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-QUL-LNF1_TOX*	0.0000	Exact	<1.0E-05	Significant Effect
		MP-QUL-LREF1_TO	0.0281	Exact	0.0563	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.254	2.548	0.1951	No Outliers Detected

Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CTL_HA_Minnow	LC	50	0	50	1.0000	0.0000	0.00%
MP-QUL-LNF1_TOX		31	19	50	0.6200	0.3800	38.00%
MP-QUL-LREF1_TO		45	5	50	0.9000	0.1000	10.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CTL_HA_Minnow	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
MP-QUL-LNF1_TO		5	0.6200	0.3655	0.8745	0.6000	0.3000	0.8000	0.0917	33.05%	38.00%
MP-QUL-LREF1_T		5	0.9000	0.7479	1.0000	0.9000	0.7000	1.0000	0.0548	13.61%	10.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	1.0000	1.0000	1.0000	1.0000	1.0000
MP-QUL-LNF1_TO		0.8000	0.6000	0.3000	0.8000	0.6000
MP-QUL-LREF1_T		0.9000	0.9000	0.7000	1.0000	1.0000

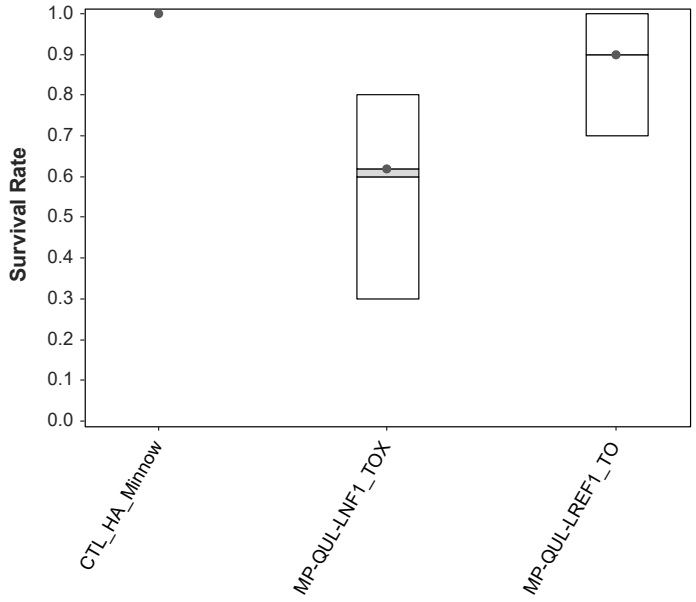
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	10/10	10/10	10/10	10/10	10/10
MP-QUL-LNF1_TO		8/10	6/10	3/10	8/10	6/10
MP-QUL-LREF1_T		9/10	9/10	7/10	10/10	10/10

Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	12-3131-9547	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	4AF608BBCAF32405A4412E8E78CBB500	**Editor ID:**	002-704-782-4

Graphics



Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-6830-0776	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A9C2F8ABFF63E7BD771DD51597BB73C	**Editor ID:**	002-704-782-4
Batch ID:	17-0711-4991	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Not Applicable
Ending Date:	01 Oct-24	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CTL_HA_Minnow	12-8136-2938			---	Minnow Environmental	
MP-QUL-LNF1_TO	04-0486-8111	21 Aug-24	29 Aug-24	27d 0h		
MP-QUL-LREF1_T	03-7049-9240	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CTL_HA_Minnow	Sediment	Minnow Environmental		
MP-QUL-LNF1_TO	Sediment	Minnow Environmental		
MP-QUL-LREF1_T	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	MP-QUL-LNF1_TOX failed dry weight endpoint	22.39%
		MP-QUL-LREF1_TO passed dry weight endpoint	22.39%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-QUL-LNF1_T	8	4.414	2.108	0.05145	CDF	0.0008	Significant Effect
		MP-QUL-LREF1_	8	-3.671	2.108	0.05145	CDF	0.9998	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.965	2.548	0.5434	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0976142	0.0488071	2	32.78	1.4E-05	Significant Effect
Error	0.0178695	0.0014891	12			
Total	0.115484		14			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	3.425	5.991	0.1805	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9721	0.8815	0.8879	Normal Distribution

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CTL_HA_Minnow	LC	5	0.2298	0.1712	0.2884	0.231	0.169	0.3	0.0211	20.53%	0.00%
MP-QUL-LNF1_TO		5	0.1221	0.1008	0.1434	0.1283	0.09875	0.14	0.007672	14.05%	46.87%
MP-QUL-LREF1_T		5	0.3194	0.2646	0.3742	0.3144	0.262	0.3671	0.01974	13.82%	-38.99%

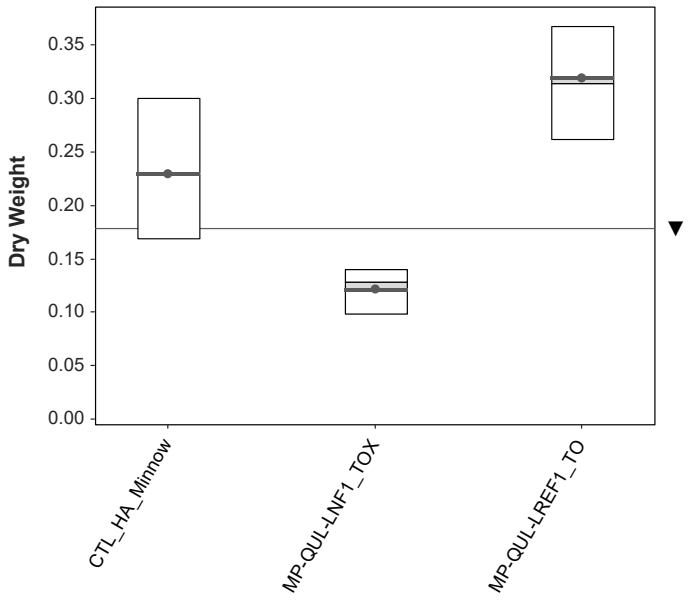
Dry Weight Detail

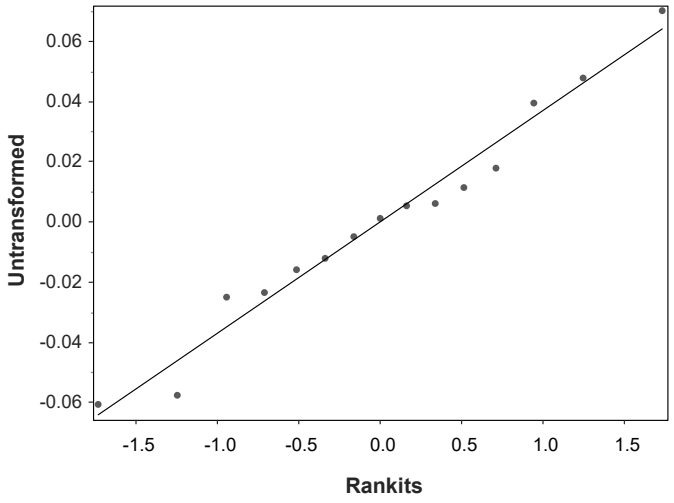
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	0.169	0.214	0.3	0.235	0.231
MP-QUL-LNF1_TO		0.09875	0.1333	0.14	0.11	0.1283
MP-QUL-LREF1_T		0.2944	0.3144	0.3671	0.359	0.262

Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-6830-0776	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A9C2F8ABFF63E7BD771DD51597BB73C	**Editor ID:**	002-704-782-4

Graphics





Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	16-2088-3227	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:19	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	C9A50F21497D95C971B001D60B459A79	**Editor ID:**	002-704-782-4
Batch ID:	17-0711-4991	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Not Applicable
Ending Date:	01 Oct-24	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
MP-QUL-LNF1_TO	04-0486-8111	21 Aug-24	29 Aug-24	27d 0h	Minnow Environmental	
MP-QUL-LREF1_T	03-7049-9240	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
MP-QUL-LNF1_TO	Sediment	Minnow Environmental		
MP-QUL-LREF1_T	Sediment	Minnow Environmental		

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		MP-QUL-LNF1_TOX*	0.0010	Exact	0.0010	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.807	2.29	0.4856	No Outliers Detected

Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
MP-QUL-LNF1_TO	X	31	19	50	0.6200	0.3800	31.11%
MP-QUL-LREF1_T	XC	45	5	50	0.9000	0.1000	0.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
MP-QUL-LREF1_T	XC	5	0.9000	0.7479	1.0000	0.9000	0.7000	1.0000	0.0548	13.61%	0.00%
MP-QUL-LNF1_TO		5	0.6200	0.3655	0.8745	0.6000	0.3000	0.8000	0.0917	33.05%	31.11%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-LREF1_T	XC	0.9000	0.9000	0.7000	1.0000	1.0000
MP-QUL-LNF1_TO		0.8000	0.6000	0.3000	0.8000	0.6000

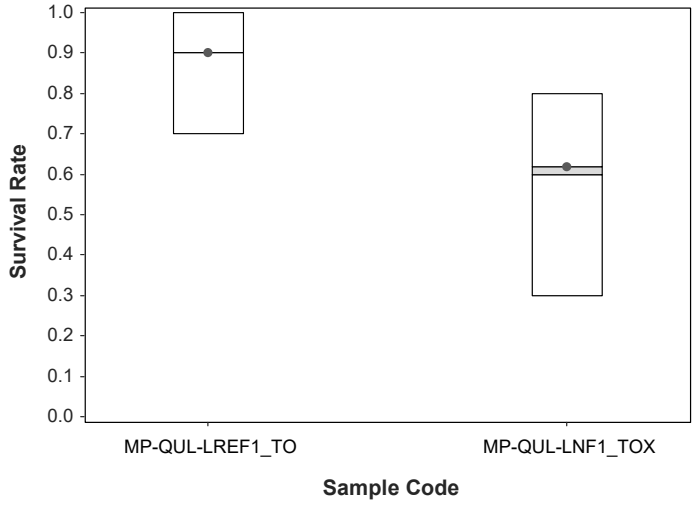
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-LREF1_T	XC	9/10	9/10	7/10	10/10	10/10
MP-QUL-LNF1_TO		8/10	6/10	3/10	8/10	6/10

Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	16-2088-3227	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:19	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	C9A50F21497D95C971B001D60B459A79	**Editor ID:**	002-704-782-4

Graphics



Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	17-2513-3199	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:20	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	4F27C23B0099DC0740D5C8D8B43AC127	**Editor ID:**	002-704-782-4
Batch ID:	17-0711-4991	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Not Applicable
Ending Date:	01 Oct-24	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
MP-QUL-LNF1_TO	04-0486-8111	21 Aug-24	29 Aug-24	27d 0h	Minnow Environmental	
MP-QUL-LREF1_T	03-7049-9240	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
MP-QUL-LNF1_TO	Sediment	Minnow Environmental		
MP-QUL-LREF1_T	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	MP-QUL-LNF1_TOX failed dry weight endpoint	12.33%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Site Control		MP-QUL-LNF1_T	8	9.319	1.86	0.03937	CDF	<1.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.819	2.29	0.4669	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0973409	0.0973409	1	86.85	1.4E-05	Significant Effect
Error	0.0089667	0.0011208	8			
Total	0.106308		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Variance Ratio F Test	6.618	9.605	0.0943	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9795	0.7607	0.9622	Normal Distribution

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
MP-QUL-LREF1_T	XC	5	0.3194	0.2646	0.3742	0.3144	0.262	0.3671	0.01974	13.82%	0.00%
MP-QUL-LNF1_TO		5	0.1221	0.1008	0.1434	0.1283	0.09875	0.14	0.007672	14.05%	61.78%

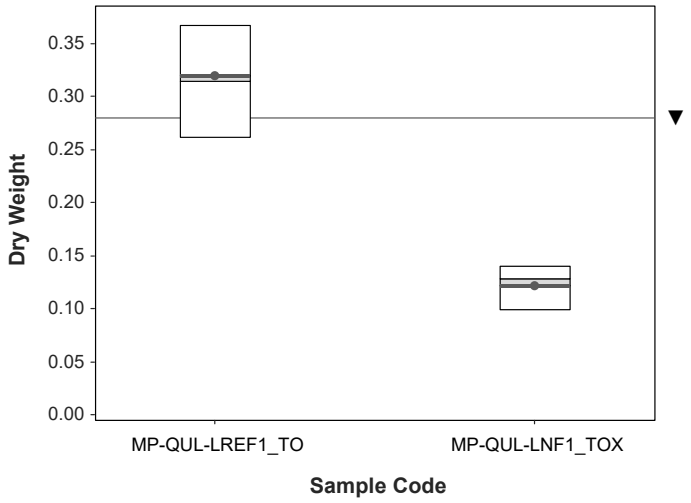
Dry Weight Detail

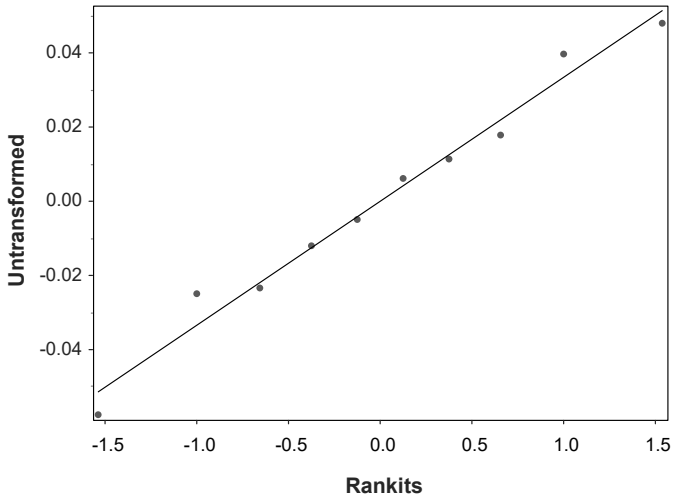
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-LREF1_T	XC	0.2944	0.3144	0.3671	0.359	0.262
MP-QUL-LNF1_TO		0.09875	0.1333	0.14	0.11	0.1283

Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	17-2513-3199	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:20	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	4F27C23B0099DC0740D5C8D8B43AC127	**Editor ID:**	002-704-782-4

Graphics





Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

Batch ID:	17-0711-4991	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer		
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Not Applicable		
Ending Date:	01 Oct-24	**Species:**	Hyalella azteca	**Brine:**			
Test Length:	14d 0h	**Taxon:**	Malacostraca	**Source:**		**Age:**	
Sample ID:	12-8136-2938	**Code:**	CTL_HA_Minnow	**Project:**			
Sample Date:	11 Dec-24 14:54	**Material:**	Sediment	**Source:**	Minnow Environmental		
Receipt Date:		**CAS (PC):**		**Station:**			
Sample Age:	---	**Client:**	Minnow Environmental				

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CTL_HA_Minnow	12-8136-2938	11 Dec-24 14:54		---	Minnow Environmental	
MP-QUL-LNF1_TO	04-0486-8111	21 Aug-24	29 Aug-24	27d 0h		
MP-QUL-LREF1_T	03-7049-9240	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CTL_HA_Minnow	Sediment	Minnow Environmental		
MP-QUL-LNF1_TO	Sediment	Minnow Environmental		
MP-QUL-LREF1_T	Sediment	Minnow Environmental		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
05-6830-0776	Dry Weight	Dunnett Multiple Comparison Test	0.0008	MP-QUL-LNF1_TOX failed dry weight
17-2513-3199	Dry Weight	Equal Variance t Two-Sample Test	<1.0E-05	MP-QUL-LNF1_TOX failed dry weight
05-6830-0776	Dry Weight	Dunnett Multiple Comparison Test	0.9998	MP-QUL-LREF1_TO passed dry weight
16-2088-3227	Survival Rate	Fisher Exact Test	0.0010	MP-QUL-LNF1_TOX failed survival rate
12-3131-9547	Survival Rate	Fisher Exact/Bonferroni Adj Test	<1.0E-05	MP-QUL-LNF1_TOX failed survival rate
12-3131-9547	Survival Rate	Fisher Exact/Bonferroni Adj Test	0.0563	MP-QUL-LREF1_TO passed survival rate

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CTL_HA_Minnow	LC	5	0.2298	0.1712	0.2884	0.169	0.3	0.0211	0.04718	20.53%	0.00%
MP-QUL-LREF1_T	XC	5	0.3194	0.2646	0.3742	0.262	0.3671	0.01974	0.04413	13.82%	-38.99%
MP-QUL-LNF1_TO		5	0.1221	0.1008	0.1434	0.09875	0.14	0.007672	0.01715	14.05%	46.87%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CTL_HA_Minnow	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
MP-QUL-LREF1_T	XC	5	0.9000	0.7479	1.0520	0.7000	1.0000	0.0548	0.1225	13.61%	10.00%
MP-QUL-LNF1_TO		5	0.6200	0.3655	0.8745	0.3000	0.8000	0.0917	0.2049	33.05%	38.00%

Dry Weight Detail MD5: A9C2F8ABFF63E7BD771DD51597BB73CC

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	0.169	0.214	0.3	0.235	0.231
MP-QUL-LREF1_T	XC	0.2944	0.3144	0.3671	0.359	0.262
MP-QUL-LNF1_TO		0.09875	0.1333	0.14	0.11	0.1283

Survival Rate Detail MD5: 4AF608BBCAF32405A4412E8E78CBB500

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	1.0000	1.0000	1.0000	1.0000	1.0000
MP-QUL-LREF1_T	XC	0.9000	0.9000	0.7000	1.0000	1.0000
MP-QUL-LNF1_TO		0.8000	0.6000	0.3000	0.8000	0.6000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CTL_HA_Minnow	LC	10/10	10/10	10/10	10/10	10/10
MP-QUL-LREF1_T	XC	9/10	9/10	7/10	10/10	10/10
MP-QUL-LNF1_TO		8/10	6/10	3/10	8/10	6/10

APPENDIX B – *Chironomus dilutus* Toxicity Test Data

NAUTILUS ENVIRONMENTAL

TEST CONDITIONS
BENCHSHEET COPY

Work Order : 1510-0022407

TEST ORGANISM

Test Organism:	*Chironomus dilutus*	Organism Source:	In-house culture
Organism Batch :	CHd240906	Location of Source :	Point Edward, ON
Life Stage (Test Day 0) :	3rd Instar	Mortality Rate :	0 % (prev. 48 h)

Organism	Head Capsule Width	
	micrometer units	mm
1	0.8	0.37
2	0.8	0.37
3	0.8	0.37
4	0.8	0.37
5	0.8	0.37
6	0.8	0.37
7	0.8	0.37
8	1.1	0.51
9	1.1	0.51
10	0.8	0.37

Organism	Head Capsule Width	
	micrometer units	mm
11	1.1	0.51
12	0.8	0.37
13	0.8	0.37
14	0.8	0.37
15	0.8	0.37
16	0.8	0.37
17	1.1	0.51
18	0.8	0.37
19	0.8	0.37
20	0.8	0.37

Mean	**0.40**
SD	**0.06**
Min	**0.37**
Max	**0.51**
n=	**20**

TEST CONDITIONS

Test Type:	Static (no renewal)	Control Sediment Source :	Washed Lake Huron bea
Test Vessel:	500 ml glass sample jar	Control Sediment Collection Date:	2024-06-24
Sample Type :	Field-collected sediment	Date Exposures Prepared :	2024-09-16
Field Replicates :	5	Time Exposures Prepared :	15:30
Test Replicates:	5	Test Aeration :	Yes (all replicates)
Sediment Depth:	3 cm	Aeration Rate :	2-3 bubbles per second
Sediment Volume per replicate :	100 mL	Photoperiod (light/dark) :	16 h / 8 h
Overlying Water Volume :	175 mL	Minimum Light Intensity :	500 lux
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	50	Test Initiation Date :	2024-09-17
Feed Type:	Tetramin® flakes in RO water	Randomized at Start of Test?:	Yes
Feeding Rate (per replicate):	~6 mg dry solids	Test Duration :	10 days
Feeding Frequency :	Once daily		

NOTES: 5 field replicates were composited to form 5 lab testing replicates.

CONTROL/TEST WATER

Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Date	Temp.	DO Sat.*	DO	pH	Cond.
2024-09-16	23	100	8.6	8.1	240

*adjusted for temperature and barometric pressure

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT
Chironomus dilutus
EPS 1/RM/32

TEST DATA

Work Order :	1510-0022407	Pore Water Ammonia:	NA
Sample Number :	**Control**	Sample Description :	washed beach sand
Sediment pH :	NA	Time Start :	14:20
Pore Water pH :	NA		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	313	8.0	142	0.14		CS/KF
1	2024-09-18	22	1	8.5	332	8.2				KF
2	2024-09-19	22								KF
3	2024-09-20	23	1	23.0	360	7.8		0.00		CS/KF
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	2	8.1	397	8.0		0.00		CS/KF
7	2024-09-24	22								KF
8	2024-09-25	24	9	8.0	403	8.2		0.00		CS/KF
9	2024-09-26	22								KF
10	2024-09-27	22	Composite	8.7	378	8.2		0.09		CS/KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/03

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022407	Pore Water Ammonia :	0.2
Sample Number :	**MP_QUL-PNF-TOX-(**	Sample Description :	Fine grey silt
Sediment pH :	NA	Time Start :	14:45
Pore Water pH :	7.5		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	264	8.0	118	0.64		CS/KF
1	2024-09-18	23	4	7.6	294	8.2				KF
2	2024-09-19	22								KF
3	2024-09-20	23	2	7.7	328	7.9		0.00		KF
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	3	7.7	390	8.0		2.00		CS
7	2024-09-24	22								KF
8	2024-09-25	23	5	7.9	356	8.3		0.00		CS
9	2024-09-26	22								KF
10	2024-09-27		Composite					0.49		CS/KK

NOTES : Day 10 Rep parameters: 1-23deg, 8.3mg/L,8.2units, 381us 2-23deg, 8.3mg/L, 8.2units, 395us 3-23deg, 8.2mg/L, 8.3units, 374us 4-23deg, 8.2mg/L, 8.3units, 383us 5-23deg, 8.2mg/L, 8.3units, 378us

NAUTILUS ENVIRONMENTAL

TEST CONDITIONS
BENCHSHEET COPY

Work Order : 1510-0022408

TEST ORGANISM

Test Organism:	*Chironomus dilutus*	Organism Source:	In-house culture
Organism Batch :	Chd240906	Location of Source :	Point Edward, ON
Life Stage (Test Day 0) :	3rd Instar	Mortality Rate :	0 % (prev. 48 h)

Organism	Head Capsule Width	
	micrometer units	mm
1	0.8	0.37
2	0.8	0.37
3	0.8	0.37
4	0.8	0.37
5	0.8	0.37
6	0.8	0.37
7	0.8	0.37
8	1.1	0.51
9	1.1	0.51
10	0.8	0.37

Organism	Head Capsule Width	
	micrometer units	mm
11	1.1	0.51
12	0.8	0.37
13	0.8	0.37
14	0.8	0.37
15	0.8	0.37
16	0.8	0.37
17	1.1	0.51
18	0.8	0.37
19	0.8	0.37
20	0.8	0.37

Mean	**0.40**
SD	**0.06**
Min	**0.37**
Max	**0.51**
n=	**20**

TEST CONDITIONS

Test Type:	Static (no renewal)	Control Sediment Source :	Washed Lake Huron bea
Test Vessel:	500 ml glass sample jar	Control Sediment Collection Date:	2024-06-24
Sample Type :	Field-collected sediment	Date Exposures Prepared :	2024-09-16
Field Replicates :	5	Time Exposures Prepared :	15:30
Test Replicates:	5	Test Aeration :	Yes (all replicates)
Sediment Depth:	3 cm	Aeration Rate :	2-3 bubbles per second
Sediment Volume per replicate :	100 mL	Photoperiod (light/dark) :	16 h / 8 h
Overlying Water Volume :	175 mL	Minimum Light Intensity :	500 lux
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	50	Test Initiation Date :	2024-09-17
Feed Type:	Tetramin® flakes in RO water	Randomized at Start of Test?:	Yes
Feeding Rate (per replicate):	~6 mg dry solids	Test Duration :	10 days
Feeding Frequency :	Once daily		

NOTES: 5 field replicates were composited to form 5 lab testing replicates.

CONTROL/TEST WATER

Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Date	Temp.	DO Sat.*	DO	pH	Cond.
2024-09-16	23	100	8.6	8.1	240

*adjusted for temperature and barometric pressure

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT
Chironomus dilutus
EPS 1/RM/32

TEST DATA

Work Order :	1510-0022408	Pore Water Ammonia:	NA
Sample Number :	**Control**	Sample Description :	washed beach sand
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	NA		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	313	8.0	142	0.14		cs/kf
1	2024-09-18	23	7	6.5	353	7.4				kf
2	2024-09-19	22								KF
3	2024-09-20	23	1	7.0	360	7.8		0.00		cs/kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	2	8.1	397	8.0		0.00		cs/kf
7	2024-09-24	22								KF
8	2024-09-25	23	5	7.8	413	8.2		0.00		cs/kf
9	2024-09-26	22								KF
10	2024-09-27	22	Composite	8.7	378	8.2		0.09		CS/KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/03

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022408	Pore Water Ammonia :	0.8
Sample Number :	**MP_QUL-PREF1-TOX-(1-5)_2024-08**	Sample Description :	Fine dark brown silt
Sediment pH :	N/A	Time Start :	15:00
Pore Water pH :	7.1		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)	NH3 (mg/L)	Analyst(s)
0	2024-09-17	23	Composite	8.4	223	7.9	88	0.94		kf
1	2024-09-18	23	1	6.9	235	7.4		NA		kf
2	2024-09-19	22								KF
3	2024-09-20	23	2	7.7	244	7.9		0.00		kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	3	7.9	221	7.5		2.00		cs
7	2024-09-24	22								KF
8	2024-09-25	23	4	7.9	214	7.9		0.00		cs
9	2024-09-26	22								KF
10	2024-09-27		Composite					0.05		KF

NOTES : day 0 data entered by NL 2024/10/07, days 1, 3, 6, 8 data entry NL 24/10/08 Day 10 final parameters: 1-23deg, 7.3mg/L, 7.5units, 209us 2-23de 7.3mg/L, 7.6units, 208us 3-23deg, 7.4mg/L, 7.5units, 206us 4-23deg, 7.3mg/L, 7.6units, 219us 5-23deg, 7.3mg/L, 7.6units, 220us

NAUTILUS ENVIRONMENTAL

TEST CONDITIONS
BENCHSHEET COPY

Work Order : 1510-0022409

TEST ORGANISM

Test Organism:	*Chironomus dilutus*	Organism Source:	In-house culture
Organism Batch :	CHd240906	Location of Source :	Point Edward, ON
Life Stage (Test Day 0) :	3rd Instar	Mortality Rate :	0 % (prev. 48 h)

Organism	Head Capsule Width	
	micrometer units	mm
1	0.8	0.37
2	0.8	0.37
3	0.8	0.37
4	0.8	0.37
5	0.8	0.37
6	0.8	0.37
7	0.8	0.37
8	1.1	0.51
9	1.1	0.51
10	0.8	0.37

Organism	Head Capsule Width	
	micrometer units	mm
11	1.1	0.51
12	0.8	0.37
13	0.8	0.37
14	0.8	0.37
15	0.8	0.37
16	0.8	0.37
17	1.1	0.51
18	0.8	0.37
19	0.8	0.37
20	0.8	0.37

Mean	**0.40**
SD	**0.06**
Min	**0.37**
Max	**0.51**
n=	**20**

TEST CONDITIONS

Test Type:	Static (no renewal)	Control Sediment Source :	Washed Lake Huron bea
Test Vessel:	500 ml glass sample jar	Control Sediment Collection Date:	2024-06-24
Sample Type :	Field-collected sediment	Date Exposures Prepared :	2024-09-16
Field Replicates :	5	Time Exposures Prepared :	15:30
Test Replicates:	5	Test Aeration :	Yes (all replicates)
Sediment Depth:	3 cm	Aeration Rate :	2-3 bubbles per second
Sediment Volume per replicate :	100 mL	Photoperiod (light/dark) :	16 h / 8 h
Overlying Water Volume :	175 mL	Minimum Light Intensity :	500 lux
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	50	Test Initiation Date :	2024-09-17
Feed Type:	Tetramin® flakes in RO water	Randomized at Start of Test?:	Yes
Feeding Rate (per replicate):	~6 mg dry solids	Test Duration :	10 days
Feeding Frequency :	Once daily		

NOTES: 5 field replicates were composited to form 5 lab testing replicates.

CONTROL/TEST WATER

Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Date	Temp.	DO Sat.*	DO	pH	Cond.
2024-09-16	23	100	8.6	8.1	240

*adjusted for temperature and barometric pressure

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT
Chironomus dilutus
EPS 1/RM/32

TEST DATA

Work Order :	1510-0022409	Pore Water Ammonia:	NA
Sample Number :	**Control**	Sample Description :	washed beach sand
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	NA		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	313	8.0	142	0.14		cs/kf
1	2024-09-18	23	7	6.5	353	7.4				cs/kf
2	2024-09-19	22								KF
3	2024-09-20	23	1	7.0	360	7.8		0.00		cs/kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	2	8.1	397	8.0		0.00		cs/kf
7	2024-09-24	22								KF
8	2024-09-25	23	5	7.8	413	8.2		0.00		cs/kf
9	2024-09-26	22								KF
10	2024-09-27	22	Composite	8.7	378	8.2		0.09		CS/KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/03

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022409	Pore Water Ammonia :	5.6
Sample Number :	**MP_BOL-B2-TOX-(1**	Sample Description :	Fine dark brown silt
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	6.6		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)	NH3 (mg/L)	Analyst(s)
0	2024-09-17	23	Composite	7.2	215	7.6	80	1.66		cs/kf
1	2024-09-18	23	1	6.3	220	7.9		NA		kf
2	2024-09-19	22								KF
3	2024-09-20	23	4	7.9	218	7.9		2.00		kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	2	7.4	119	7.3		2.00		cs
7	2024-09-24	22								KF
8	2024-09-25	23	5	7.2	202	7.2		2.00		cs
9	2024-09-26	22								KF
10	2024-09-27		Composite					0.27		KF

NOTES : day 0 data entered by NL 2024/10/07, Days 1, 3, 6, 8 data entry NL 24/10/08 day 0 data entered by NL 2024/10/07, days 1, 3, 6, 8 data entry NL 24/10/08 Day 10 rep parameters: 1-23deg, 6.5mg/L, 6.8units, 217us 2-23deg, 5.9mg/L, 6.9units, 220us 3-23deg, 5.9mg/L, 6.9units, 216us 4-23deg, 5.9mg/L, 7.0units, 210us 5-23deg, 5.9mg/L, 6.9units, 218us.

CETIS Analytical Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-5091-0016	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:37	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	EF30E01064B63686289ABF2254D05EC7	**Editor ID:**	002-704-782-4
Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLA	06-6077-0527			---	Minnow Environmental	
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h		
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLA	Sediment	Minnow Environmental		
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		

Fisher Exact/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		MP_QUL-PNF_TOX*	0.0000	Exact	<1.0E-05	Significant Effect
		MP-QUL-PREF1-TO*	0.0000	Exact	2.7E-05	Significant Effect
		MP-BOL-B2-TOX	0.5000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.146	2.708	0.4617	No Outliers Detected

Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CT_CTLA LC		50	0	50	1.0000	0.0000	0.00%
MP_QUL-PNF_TOX		27	23	50	0.5400	0.4600	46.00%
MP-QUL-PREF1-TO		35	15	50	0.7000	0.3000	30.00%
MP-BOL-B2-TOX		49	1	50	0.9800	0.0200	2.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLA LC		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
MP_QUL-PNF_TOX		5	0.5400	0.1613	0.9187	0.5000	0.2000	0.9000	0.1364	56.47%	46.00%
MP-QUL-PREF1-TO		5	0.7000	0.4677	0.9323	0.7000	0.5000	1.0000	0.0837	26.73%	30.00%
MP-BOL-B2-TOX		5	0.9800	0.9245	1.0000	1.0000	0.9000	1.0000	0.0200	4.56%	2.00%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA LC		1.0000	1.0000	1.0000	1.0000	1.0000
MP_QUL-PNF_TOX		0.9000	0.5000	0.3000	0.2000	0.8000
MP-QUL-PREF1-TO		1.0000	0.7000	0.7000	0.5000	0.6000
MP-BOL-B2-TOX		1.0000	1.0000	1.0000	1.0000	0.9000

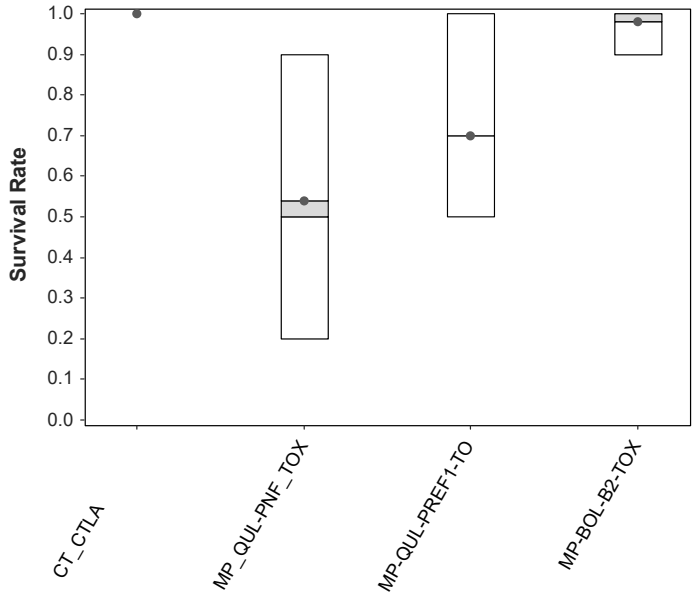
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA LC		10/10	10/10	10/10	10/10	10/10
MP_QUL-PNF_TOX		9/10	5/10	3/10	2/10	8/10
MP-QUL-PREF1-TO		10/10	7/10	7/10	5/10	6/10
MP-BOL-B2-TOX		10/10	10/10	10/10	10/10	9/10

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-5091-0016	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:37	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	EF30E01064B63686289ABF2254D05EC7	**Editor ID:**	002-704-782-4

Graphics



CETIS Analytical Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	09-6816-0266	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	13 Dec-24 18:09	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	13 Dec-24 0:00	**MD5 Hash:**	5FC30947AC2E0BAB287E25435B688B81	**Editor ID:**	002-704-782-4
Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLA	06-6077-0527			---	Minnow Environmental	
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h		
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLA	Sediment	Minnow Environmental		
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	MP_QUL-PNF_TOX passed dry weight endpoint	50.03%
		MP-QUL-PREF1-TO passed dry weight endpoint	50.03%
		MP-BOL-B2-TOX passed dry weight endpoint	50.03%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	df	Test Stat	Critical	Ties	P-Type	P-Value	Decision(α:5%)
Lab Control		MP_QUL-PNF_TO	8	30	17	0	CDF	0.8988	Non-Significant Effect
		MP-QUL-PREF1-T	8	40	17	0	CDF	0.9999	Non-Significant Effect
		MP-BOL-B2-TOX	8	40	17	0	CDF	0.9999	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.585	2.708	0.0885	No Outliers Detected
Overall Effect	Fligner-Wolfe Omnibus Test	130		0.9946	Non-Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.95529	2.31843	3	6.688	0.0039	Significant Effect
Error	5.54651	0.346657	16			
Total	12.5018		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	19.28	7.815	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8974	0.9044	0.0369	Non-Normal Distribution

Dry Weight Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLA	LC	5	1.658	1.512	1.803	1.617	1.565	1.853	0.05239	7.07%	0.00%
MP_QUL-PNF_TOX		5	2.443	1.062	3.825	2.028	1.454	3.84	0.4977	45.55%	-47.39%
MP-QUL-PREF1-TO		5	3.252	2.888	3.617	3.136	2.924	3.689	0.1313	9.03%	-96.17%
MP-BOL-B2-TOX		5	2.051	1.779	2.324	1.998	1.907	2.434	0.0981	10.69%	-23.73%

1 emerged larvae (flier) observed in
Sediment Control Rep 3 - not included
in dry weight measurement or stats

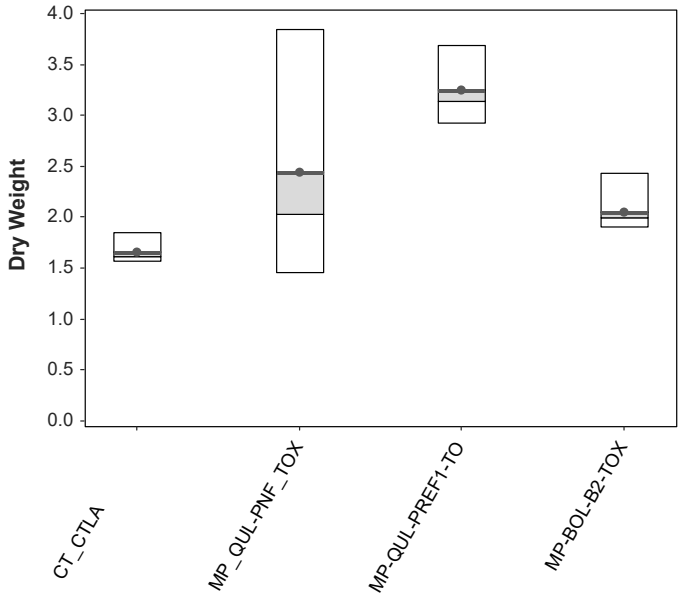
Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

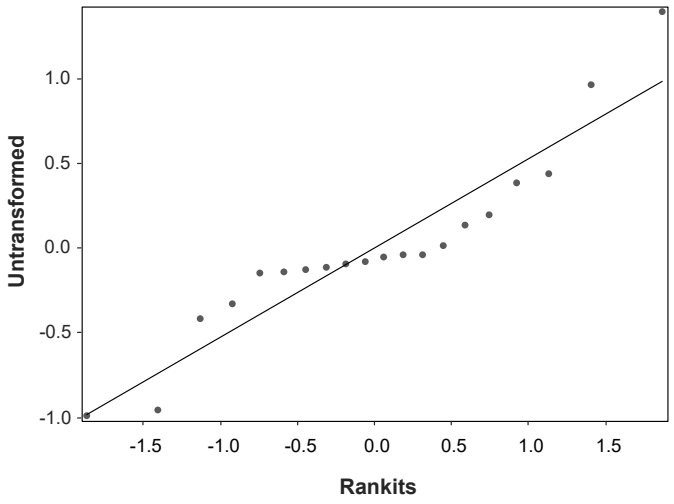
Analysis ID:	09-6816-0266	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	13 Dec-24 18:09	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	13 Dec-24 0:00	**MD5 Hash:**	5FC30947AC2E0BAB287E25435B688B81	**Editor ID:**	002-704-782-4

Dry Weight Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA	LC	1.617	1.853	1.579	1.675	1.565
MP_QUL-PNF_TOX		1.486	2.028	3.41	3.84	1.454
MP-QUL-PREF1-TO		2.924	3.127	3.689	3.136	3.385
MP-BOL-B2-TOX		2.434	1.908	1.907	1.998	2.009

Graphics





CETIS Analytical Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-4833-5987	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:58	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A538341A662877D4950D7012D14431EE	**Editor ID:**	002-704-782-4
Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h	Minnow Environmental	
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		MP_QUL-PNF_TOX	0.0744	Exact	0.0744	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

Survival Rate Frequencies

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
MP_QUL-PNF_TOX		27	23	50	0.5400	0.4600	22.86%
MP-QUL-PREF1-TO	XC	35	15	50	0.7000	0.3000	0.00%

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
MP-QUL-PREF1-TO	XC	5	0.7000	0.4677	0.9323	0.7000	0.5000	1.0000	0.0837	26.73%	0.00%
MP_QUL-PNF_TOX		5	0.5400	0.1613	0.9187	0.5000	0.2000	0.9000	0.1364	56.47%	22.86%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-PREF1-TO	XC	1.0000	0.7000	0.7000	0.5000	0.6000
MP_QUL-PNF_TOX		0.9000	0.5000	0.3000	0.2000	0.8000

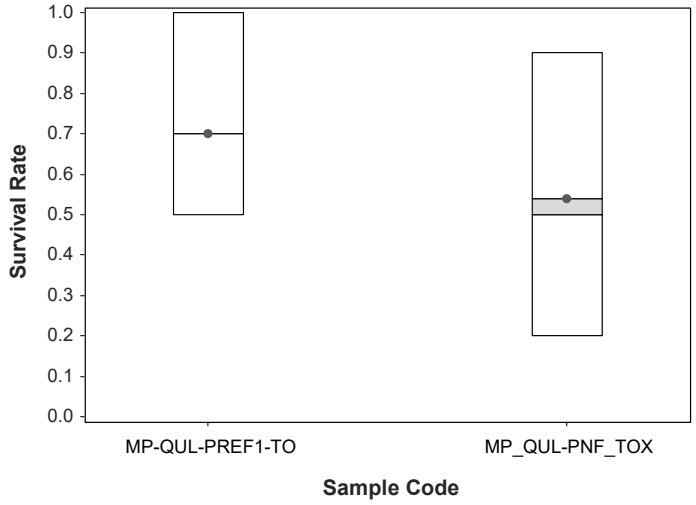
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-PREF1-TO	XC	10/10	7/10	7/10	5/10	6/10
MP_QUL-PNF_TOX		9/10	5/10	3/10	2/10	8/10

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	05-4833-5987	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 15:58	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A538341A662877D4950D7012D14431EE	**Editor ID:**	002-704-782-4

Graphics



Chironomus 10-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	11-4797-7181	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	0282888E40AE941E7599A95D08226458	**Editor ID:**	002-704-782-4
Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h	Minnow Environmental	
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	MP_QUL-PNF_TOX passed dry weight endpoint	33.74%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Site Control		MP_QUL-PNF_TO	4	1.571	2.132	1.097	CDF	0.0956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	1.82	2.29	0.4649	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.63492	1.63492	1	2.468	0.1548	Non-Significant Effect
Error	5.29915	0.662394	8			
Total	6.93406		9			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Variance Ratio F Test	14.36	9.605	0.0243	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9483	0.7607	0.6483	Normal Distribution

Dry Weight Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
MP-QUL-PREF1-TO	XC	5	3.252	2.888	3.617	3.136	2.924	3.689	0.1313	9.03%	0.00%
MP_QUL-PNF_TOX		5	2.443	1.062	3.825	2.028	1.454	3.84	0.4977	45.55%	24.87%

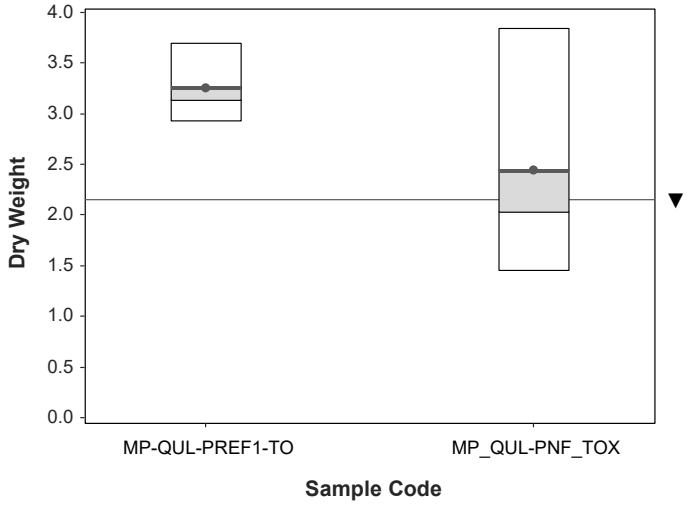
Dry Weight Detail

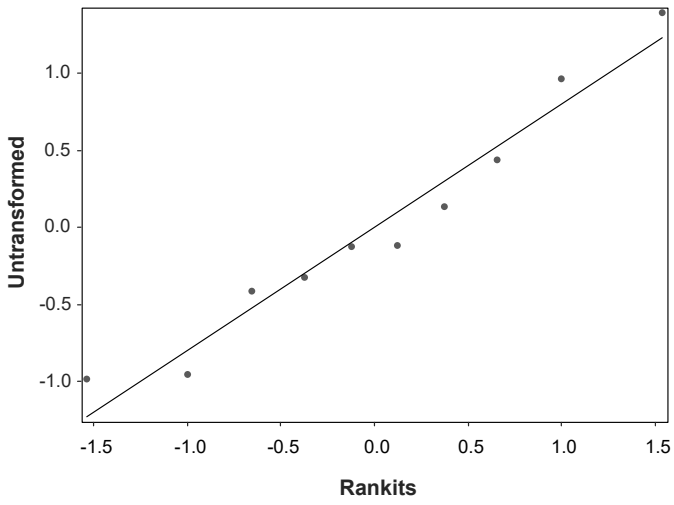
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
MP-QUL-PREF1-TO	XC	2.924	3.127	3.689	3.136	3.385
MP_QUL-PNF_TOX		1.486	2.028	3.41	3.84	1.454

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	11-4797-7181	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	0282888E40AE941E7599A95D08226458	**Editor ID:**	002-704-782-4

Graphics





CETIS Summary Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer		
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable		
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**			
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**		**Age:**	
Sample ID:	06-6077-0527	**Code:**	CT_CTL1_Minnow	**Project:**			
Sample Date:	17 Sep-24	**Material:**	Sediment	**Source:**	Minnow Environmental		
Receipt Date:		**CAS (PC):**		**Station:**			
Sample Age:	---	**Client:**	Minnow Environmental				

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLA	06-6077-0527			---	Minnow Environmental	
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h		
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLA	Sediment	Minnow Environmental		
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
05-5091-0016	Survival Rate	Fisher Exact/Bonferroni Adj Test	<1.0E-05	MP_QUL-PNF_TOX failed survival rate
05-5091-0016	Survival Rate	Fisher Exact/Bonferroni Adj Test	2.7E-05	MP-QUL-PREF1-TO failed survival rate
05-5091-0016	Survival Rate	Fisher Exact/Bonferroni Adj Test	1.0000	MP-BOL-B2-TOX passed survival rate

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLA	LC MP-	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
QUL-PREF1-TO	XC	5	0.7000	0.4677	0.9323	0.5000	1.0000	0.0837	0.1871	26.73%	30.00%
MP_QUL-PNF_TOX		5	0.5400	0.1613	0.9187	0.2000	0.9000	0.1364	0.3050	56.47%	46.00%
MP-BOL-B2-TOX		5	0.9800	0.9245	1.0360	0.9000	1.0000	0.0200	0.0447	4.56%	2.00%

Survival Rate Detail MD5: EF30E01064B63686289ABF2254D05EC7

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA	LC MP-	1.0000	1.0000	1.0000	1.0000	1.0000
QUL-PREF1-TO	XC	1.0000	0.7000	0.7000	0.5000	0.6000
MP_QUL-PNF_TOX		0.9000	0.5000	0.3000	0.2000	0.8000
MP-BOL-B2-TOX		1.0000	1.0000	1.0000	1.0000	0.9000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA	LC MP-	10/10	10/10	10/10	10/10	10/10
QUL-PREF1-TO	XC	10/10	7/10	7/10	5/10	6/10
MP_QUL-PNF_TOX		9/10	5/10	3/10	2/10	8/10
MP-BOL-B2-TOX		10/10	10/10	10/10	10/10	9/10

CETIS Summary Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Batch ID:	02-2078-4743	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample ID:	06-6077-0527	**Code:**	CT_CTL1_Minnow	**Project:**	
Sample Date:	17 Sep-24	**Material:**	Sediment	**Source:**	Minnow Environmental
Receipt Date:		**CAS (PC):**		**Station:**	
Sample Age:	---	**Client:**	Minnow Environmental		

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLA	06-6077-0527			---	Minnow Environmental	
MP_QUL-PNF_TOX	13-4806-9944	23 Aug-24	29 Aug-24	25d 0h		
MP-QUL-PREF1-TO	16-1789-5979	22 Aug-24	29 Aug-24	26d 0h		
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLA	Sediment	Minnow Environmental		
MP_QUL-PNF_TOX	Sediment	Minnow Environmental		
MP-QUL-PREF1-TO	Sediment	Minnow Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
09-6816-0266	Dry Weight	Steel Many-One Rank Sum Test	0.8988	MP_QUL-PNF_TOX passed dry weight
09-6816-0266	Dry Weight	Steel Many-One Rank Sum Test	0.9999	MP-QUL-PREF1-TO passed dry weight
09-6816-0266	Dry Weight	Steel Many-One Rank Sum Test	0.9999	MP-BOL-B2-TOX passed dry weight

Dry Weight Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLA LC		5	1.658	1.512	1.803	1.565	1.853	0.05239	0.1172	7.07%	0.00%
MP_QUL-PNF_TOX		5	2.443	1.062	3.825	1.454	3.84	0.4977	1.113	45.55%	-47.39%
MP-QUL-PREF1-TO		5	3.252	2.888	3.617	2.924	3.689	0.1313	0.2936	9.03%	-96.17%
MP-BOL-B2-TOX		5	2.051	1.779	2.324	1.907	2.434	0.0981	0.2193	10.69%	-23.73%

Dry Weight Detail MD5: 5FC30947AC2E0BAB287E25435B688B81

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLA LC		1.617	1.853	1.579	1.675	1.565
MP_QUL-PNF_TOX		1.486	2.028	3.41	3.84	1.454
MP-QUL-PREF1-TO		2.924	3.127	3.689	3.136	3.385
MP-BOL-B2-TOX		2.434	1.908	1.907	1.998	2.009

1 emerged larvae (flier) observed in Sediment Control Rep 3 - not included in dry weight measurement or stats

NAUTILUS ENVIRONMENTAL

TEST CONDITIONS
BENCHSHEET COPY

Work Order : 1510-0022410

TEST ORGANISM

Test Organism:	*Chironomus dilutus*	Organism Source:	In-house culture
Organism Batch :	CHd240907	Location of Source :	Point Edward, ON
Life Stage (Test Day 0) :	3rd Instar	Mortality Rate :	0 % (prev. 48 h)

Organism	Head Capsule Width	
	micrometer units	mm
1	0.8	0.37
2	0.8	0.37
3	0.8	0.37
4	0.8	0.37
5	0.8	0.37
6	0.8	0.37
7	0.7	0.33
8	0.8	0.37
9	0.7	0.33
10	0.8	0.37

Organism	Head Capsule Width	
	micrometer units	mm
11	0.7	0.33
12	0.8	0.37
13	0.8	0.37
14	0.8	0.37
15	0.8	0.37
16	0.8	0.37
17	0.7	0.33
18	0.8	0.37
19	0.8	0.37
20	0.8	0.37

Mean	**0.36**
SD	**0.02**
Min	**0.33**
Max	**0.37**
n=	**20**

TEST CONDITIONS

Test Type:	Static (no renewal)	Control Sediment Source :	Washed Lake Huron bea
Test Vessel:	500 ml glass sample jar	Control Sediment Collection Date:	2024-06-24
Sample Type :	Field-collected sediment	Date Exposures Prepared :	2024-09-16
Field Replicates :	5	Time Exposures Prepared :	15:30
Test Replicates:	5	Test Aeration :	Yes (all replicates)
Sediment Depth:	3 cm	Aeration Rate :	2-3 bubbles per second
Sediment Volume per replicate :	100 mL	Photoperiod (light/dark) :	16 h / 8 h
Overlying Water Volume :	175 mL	Minimum Light Intensity :	500 lux
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	50	Test Initiation Date :	2024-09-17
Feed Type:	Tetramin® flakes in RO water	Randomized at Start of Test?:	Yes
Feeding Rate (per replicate):	~6 mg dry solids	Test Duration :	10 days
Feeding Frequency :	Once daily		

NOTES: 5 field replicates were composited to form 5 lab testing replicates.

CONTROL/TEST WATER

Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Date	Temp.	DO Sat.*	DO	pH	Cond.
2024-09-16	23	100	8.6	8.1	240

*adjusted for temperature and barometric pressure

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022410	Pore Water Ammonia:	NA
Sample Number :	**Control**	Sample Description :	washed beach sand
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	NA		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	313	8.0	142	0.14		cs/kf
1	2024-09-18	23	7	6.5	353	7.4				cs/kf
2	2024-09-19	22								KF
3	2024-09-20	23	7	7.9	355	7.8		0.00		cs/kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	6	7.9	407	7.9		0.00		cs/kf
7	2024-09-24	22								KF
8	2024-09-25	24	9	8.0	403	8.2		0.00		cs/kf
9	2024-09-26	22								KF
10	2024-09-27	22	Composite	8.7	378	8.2		0.09		CS/KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/03

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022410	Pore Water Ammonia :	0.2
Sample Number :	**MP_POL-P1-TOX-(1-5)_2024-08**	Sample Description :	Fine dark brown silt
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	7.0		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)	NH3 (mg/L)	Analyst(s)
0	2024-09-17	23	Composite	8.3	254	8.0	98	0.99		cs/kf
1	2024-09-18	23	5	8.0	276	8.1		NA		kf
2	2024-09-19	22								KF
3	2024-09-20	23	4	7.4	287	7.8		0.00		kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	2	7.9	314	7.7		0.00		cs
7	2024-09-24	22								KF
8	2024-09-25	23	1	7.9	304	8.0		0.00		cs
9	2024-09-26	22								KF
10	2024-09-27		Composite					0.07		KF

NOTES : day 0 data entered by NL 2024/10/07, days 1, 3, 6, 8 data entry NL 2024/10/08 Day 10 final rep parameters: 1-23deg, 6.7mg/L, 7.6units, 318us 2-23deg, 6.1mg/L, 7.5units, 333us 3-23deg, 5.4mg/L, 7.4units, 335us 4-23deg, 5.4mg/L, 7.4units, 334us 5-23deg, 5.3mg/L, 7.5units, 333us.

NAUTILUS ENVIRONMENTAL

TEST CONDITIONS
BENCHSHEET COPY

Work Order : 1510-0022411

TEST ORGANISM

Test Organism:	*Chironomus dilutus*	Organism Source:	In-house culture
Organism Batch :	CHd240907	Location of Source :	Point Edward, ON
Life Stage (Test Day 0) :	3rd Instar	Mortality Rate :	0 % (prev. 48 h)

Organism	Head Capsule Width	
	micrometer units	mm
1	0.8	0.37
2	0.8	0.37
3	0.8	0.37
4	0.8	0.37
5	0.8	0.37
6	0.8	0.37
7	0.7	0.33
8	0.8	0.37
9	0.7	0.33
10	0.8	0.37

Organism	Head Capsule Width	
	micrometer units	mm
11	0.7	0.33
12	0.8	0.37
13	0.8	0.37
14	0.8	0.37
15	0.8	0.37
16	0.8	0.37
17	0.7	0.33
18	0.8	0.37
19	0.8	0.37
20	0.8	0.37

Mean	**0.36**
SD	**0.02**
Min	**0.33**
Max	**0.37**
n=	**20**

TEST CONDITIONS

Test Type:	Static (no renewal)	Control Sediment Source :	Washed Lake Huron bea
Test Vessel:	500 ml glass sample jar	Control Sediment Collection Date:	2024-06-24
Sample Type :	Field-collected sediment	Date Exposures Prepared :	2024-09-16
Field Replicates :	5	Time Exposures Prepared :	15:30
Test Replicates:	5	Test Aeration :	Yes (all replicates)
Sediment Depth:	3 cm	Aeration Rate :	2-3 bubbles per second
Sediment Volume per replicate :	100 mL	Photoperiod (light/dark) :	16 h / 8 h
Overlying Water Volume :	175 mL	Minimum Light Intensity :	500 lux
Organisms per Replicate:	10	Maximum Light Intensity :	1000 lux
Organisms per Treatment:	50	Test Initiation Date :	2024-09-17
Feed Type:	Tetramin® flakes in RO water	Randomized at Start of Test?:	Yes
Feeding Rate (per replicate):	~6 mg dry solids	Test Duration :	10 days
Feeding Frequency :	Once daily		

NOTES: 5 field replicates were composited to form 5 lab testing replicates.

CONTROL/TEST WATER

Source :	Dechlorinated Municipal Tap Water
Additional Chemicals :	None

Date	Temp.	DO Sat.*	DO	pH	Cond.
2024-09-16	23	100	8.6	8.1	240

*adjusted for temperature and barometric pressure

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT
Chironomus dilutus
EPS 1/RM/32

TEST DATA

Work Order :	1510-0022411	Pore Water Ammonia:	NA
Sample Number :	**Control**	Sample Description :	washed beach sand
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	NA		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)1	NH3 (mg/L)2	Analyst(s)
0	2024-09-17	23	Composite	8.4	313	8.0	142	0.14		KF
1	2024-09-18	23	7	6.5	353	7.4		NA		cs/kf
2	2024-09-19	22								KF
3	2024-09-20	23	7	7.9	355	7.8		0.00		cs/kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	6	7.9	407	7.9		0.00		cs/kf
7	2024-09-24	22								KF
8	2024-09-25	24	9	8.0	403	8.2		0.00		cs/kf
9	2024-09-26	22								KF
10	2024-09-27	22	Composite	8.7	378	8.2		0.09		CS/KF

"–" = not measured/not required

1 TAN = Total ammonia (as N)

2 NH3 = Un-ionized ammonia (calculated from TAN, pH, and temperature)

Test Data Reviewed By : KF

Date : 24/12/03

NAUTILUS ENVIRONMENTAL

TOXICITY TEST REPORT

Chironomus dilutus

EPS 1/RM/32

TEST DATA

Work Order :	1510-0022411	Pore Water Ammonia :	0.4
Sample Number :	**MP-POL-P2-TOX1-5 2024-08**	Sample Description :	Fine dark brown silt
Sediment pH :	NA	Time Start :	15:00
Pore Water pH :	7.1		

Test Day	Date	Temperature (°C)	Replicate	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	pH	Hardness (mg/L as $CaCO_3$)	TAN (mg/L)	NH3 (mg/L)	Analyst(s)
0	2024-09-17	23	Composite	8.1	258	8.0	102	0.99		KF
1	2024-09-18	23	1	7.6	285	8.1		NA		kf
2	2024-09-19	22								KF
3	2024-09-20	23	2	7.6	303	7.8		0.00		kf
4	2024-09-21	22								KF
5	2024-09-22	22								KF
6	2024-09-23	23	3	7.8	331	7.8		0.00		cs
7	2024-09-24	22								KF
8	2024-09-25	24	5	7.8	321	8.0		1.00		cs
9	2024-09-26	22								KF
10	2024-09-27		Composite					0.07		KF

NOTES : day 1 data entry by NL 2024/10/03, days 3, 6, 8 data entry NL 24/10/08 Day 10 final rep parameters: 1-23deg, 6.1mg/L, 7.7units, 351us 2-23deg, 6.2mg/L, 7.7units, 342us 3-23deg, 6.0mg/L, 7.6units, 342us 4-23deg, 5.6mg/L, 7.6units, 349us 5-23deg, 5.6mg/L, 7.7units, 333us.

CETIS Analytical Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	07-6396-9471	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:08	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	2F92916A68239E2163258099AC998559	**Editor ID:**	002-704-782-4
Batch ID:	11-8905-7803	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	17-2774-4340			---	Minnow Environmental	
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

Fisher Exact/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-POL-P1-TOX	0.9703	Exact	1.0000	Non-Significant Effect
		MP-POL-P2-TOX	0.7377	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.523	2.548	0.0572	No Outliers Detected

Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CT_CTLB	LC	44	6	50	0.8800	0.1200	0.00%
MP-POL-P1-TOX		48	2	50	0.9600	0.0400	-9.09%
MP-POL-P2-TOX		45	5	50	0.9000	0.1000	-2.27%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLB	LC	5	0.8800	0.7440	1.0000	0.9000	0.7000	1.0000	0.0490	12.45%	0.00%
MP-POL-P1-TOX		5	0.9600	0.8920	1.0000	1.0000	0.9000	1.0000	0.0245	5.71%	-9.09%
MP-POL-P2-TOX		5	0.9000	0.6849	1.0000	1.0000	0.6000	1.0000	0.0775	19.25%	-2.27%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	0.7000	0.9000	1.0000	0.9000	0.9000
MP-POL-P1-TOX		1.0000	0.9000	0.9000	1.0000	1.0000
MP-POL-P2-TOX		0.6000	0.9000	1.0000	1.0000	1.0000

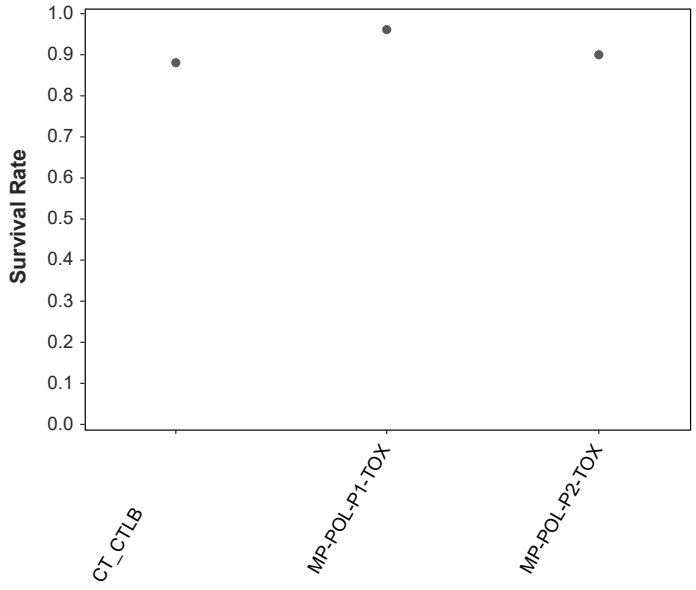
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	7/10	9/10	10/10	9/10	9/10
MP-POL-P1-TOX		10/10	9/10	9/10	10/10	10/10
MP-POL-P2-TOX		6/10	9/10	10/10	10/10	10/10

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	07-6396-9471	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:08	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	2F92916A68239E2163258099AC998559	**Editor ID:**	002-704-782-4

Graphics



CETIS Analytical Report

Chironomus 10-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	19-5458-7141	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:09	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A3C913C3E20C44FDF8EB2CB40C0C0299	**Editor ID:**	002-704-782-4
Batch ID:	11-8905-7803	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	17-2774-4340			---	Minnow Environmental	
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	MP-POL-P1-TOX passed dry weight endpoint	15.76%
		MP-POL-P2-TOX passed dry weight endpoint	15.76%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-POL-P1-TOX	8	-4.272	2.108	0.2789	CDF	0.9999	Non-Significant Effect
		MP-POL-P2-TOX	8	-4.174	2.108	0.2789	CDF	0.9999	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.008	2.548	0.4736	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.04081	0.520406	2	11.89	0.0014	Significant Effect
Error	0.525099	0.0437582	12			
Total	1.56591		14			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	0.1552	5.991	0.9253	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9607	0.8815	0.7054	Normal Distribution

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLB	LC	5	1.77	1.533	2.007	1.737	1.536	2.064	0.08522	10.77%	0.00%
MP-POL-P1-TOX		5	2.335	2.084	2.586	2.299	2.076	2.618	0.09035	8.65%	-31.93%
MP-POL-P2-TOX		5	2.322	2.033	2.611	2.447	1.933	2.489	0.1041	10.02%	-31.20%

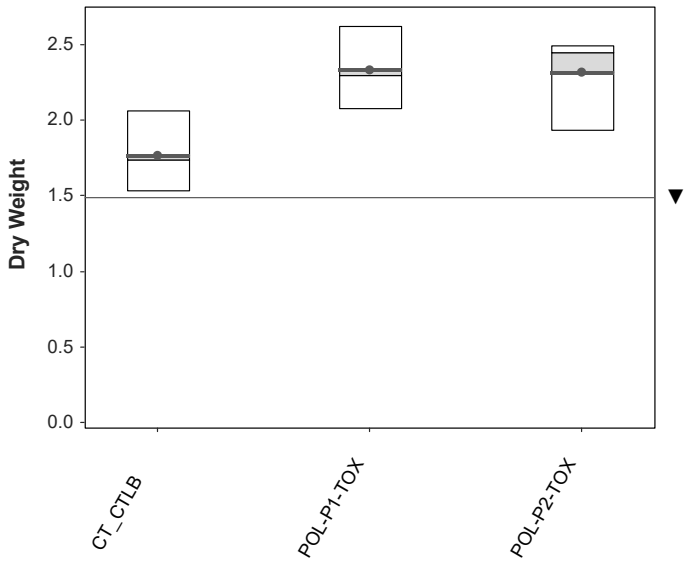
Dry Weight Detail

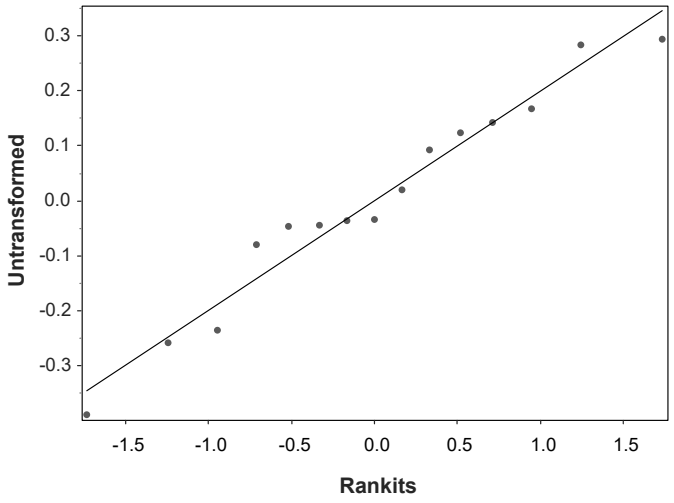
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	2.064	1.737	1.79	1.723	1.536
MP-POL-P1-TOX		2.076	2.299	2.256	2.427	2.618
MP-POL-P2-TOX		1.933	2.447	2.278	2.464	2.489

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	19-5458-7141	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	11 Dec-24 16:09	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	11 Dec-24 0:00	**MD5 Hash:**	A3C913C3E20C44FDF8EB2CB40C0C0299	**Editor ID:**	002-704-782-4

Graphics





CETIS Summary Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Batch ID:	11-8905-7803	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer		
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable		
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**			
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**		**Age:**	
Sample ID:	17-2774-4340	**Code:**	CT_CTL6_Minnow	**Project:**			
Sample Date:	17 Sep-24	**Material:**	Sediment	**Source:**	Minnow Environmental		
Receipt Date:		**CAS (PC):**		**Station:**			
Sample Age:	---	**Client:**	Minnow Environmental				

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	17-2774-4340	1		---	Minnow Environmental	
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
19-5458-7141	Dry Weight	Dunnett Multiple Comparison Test	0.9999	MP-POL-P1-TOX passed dry weight
19-5458-7141	Dry Weight	Dunnett Multiple Comparison Test	0.9999	MP-POL-P2-TOX passed dry weight
07-6396-9471	Survival Rate	Fisher Exact/Bonferroni Adj Test	1.0000	MP-POL-P1-TOX passed survival rate
07-6396-9471	Survival Rate	Fisher Exact/Bonferroni Adj Test	1.0000	MP-POL-P2-TOX passed survival rate

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLB	LC	5	1.77	1.533	2.007	1.536	2.064	0.08522	0.1906	10.77%	0.00%
MP-POL-P1-TOX		5	2.335	2.084	2.586	2.076	2.618	0.09035	0.202	8.65%	-31.93%
MP-POL-P2-TOX		5	2.322	2.033	2.611	1.933	2.489	0.1041	0.2327	10.02%	-31.20%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLB	LC	5	0.8800	0.7440	1.0160	0.7000	1.0000	0.0490	0.1095	12.45%	0.00%
MP-POL-P1-TOX		5	0.9600	0.8920	1.0280	0.9000	1.0000	0.0245	0.0548	5.71%	-9.09%
MP-POL-P2-TOX		5	0.9000	0.6849	1.1150	0.6000	1.0000	0.0775	0.1732	19.25%	-2.27%

Dry Weight Detail MD5: A3C913C3E20C44FDF8EB2CB40C0C0299

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	2.064	1.737	1.79	1.723	1.536
MP-POL-P1-TOX		2.076	2.299	2.256	2.427	2.618
MP-POL-P2-TOX		1.933	2.447	2.278	2.464	2.489

Survival Rate Detail MD5: 2F92916A68239E2163258099AC998559

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	0.7000	0.9000	1.0000	0.9000	0.9000
MP-POL-P1-TOX		1.0000	0.9000	0.9000	1.0000	1.0000
MP-POL-P2-TOX		0.6000	0.9000	1.0000	1.0000	1.0000

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	7/10	9/10	10/10	9/10	9/10
MP-POL-P1-TOX		10/10	9/10	9/10	10/10	10/10
MP-POL-P2-TOX		6/10	9/10	10/10	10/10	10/10

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	02-7145-3423	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	10 Jan-25 15:45	**Analysis:**	Parametric-All Pairwise	**Status Level:**	1
Edit Date:	10 Jan-25 0:00	**MD5 Hash:**	7AA06EE1098AC2F4C9E8EFAE799BEBB	**Editor ID:**	002-704-782-4
Batch ID:	00-1503-4148	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	10-0128-1558	17 Sep-24		---	Minnow Environmental	
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Nautilus Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	D<>0	MP-BOL-B2-TOX passed survival rate endpoint	23.59%
		MP-POL-P1-TOX passed survival rate endpoint	23.59%
		MP-POL-P2-TOX passed survival rate endpoint	23.59%
		MP-POL-P1-TOX passed survival rate endpoint	23.59%
		MP-POL-P2-TOX passed survival rate endpoint	23.59%
		MP-POL-P2-TOX passed survival rate endpoint	23.59%

Tukey-Kramer Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-BOL-B2-TOX	8	2.25	4.046	0.2686	CDF	0.4111	Non-Significant Effect
		MP-POL-P1-TOX	8	1.759	4.046	0.2686	CDF	0.6096	Non-Significant Effect
		MP-POL-P2-TOX	8	0.6653	4.046	0.2686	CDF	0.9645	Non-Significant Effect
MP-BOL-B2-TOX		MP-POL-P1-TOX	8	0.4909	4.046	0.2686	CDF	0.9851	Non-Significant Effect
		MP-POL-P2-TOX	8	1.584	4.046	0.2686	CDF	0.6827	Non-Significant Effect
MP-POL-P1-TOX		MP-POL-P2-TOX	8	1.093	4.046	0.2686	CDF	0.8654	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.849	2.708	0.0242	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0691132	0.0230378	3	1.045	0.3995	Non-Significant Effect
Error	0.352635	0.0220397	16			
Total	0.421748		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	5.601	7.815	0.1327	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8719	0.9044	0.0127	Non-Normal Distribution

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLB	LC	5	0.8800	0.7440	1.0000	0.9000	0.7000	1.0000	0.0490	12.45%	0.00%
MP-BOL-B2-TOX		5	0.9800	0.9245	1.0000	1.0000	0.9000	1.0000	0.0200	4.56%	-11.36%
MP-POL-P1-TOX		5	0.9600	0.8920	1.0000	1.0000	0.9000	1.0000	0.0245	5.71%	-9.09%
MP-POL-P2-TOX		5	0.9000	0.6849	1.0000	1.0000	0.6000	1.0000	0.0775	19.25%	-2.27%

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	02-7145-3423	**Endpoint:**	Survival Rate	**CETIS Version:**	CETIS v2.1.5
Analyzed:	10 Jan-25 15:45	**Analysis:**	Parametric-All Pairwise	**Status Level:**	1
Edit Date:	10 Jan-25 0:00	**MD5 Hash:**	7AA06EE1098AC2F4C9E8EFAE799BEBB	**Editor ID:**	002-704-782-4

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLB	LC	5	1.2300	1.0430	1.4180	1.2490	0.9912	1.4120	0.0676	12.28%	0.00%
MP-BOL-B2-TOX		5	1.3790	1.2890	1.4700	1.4120	1.2490	1.4120	0.0326	5.28%	-12.14%
MP-POL-P1-TOX		5	1.3470	1.2360	1.4580	1.4120	1.2490	1.4120	0.0399	6.63%	-9.49%
MP-POL-P2-TOX		5	1.2740	0.9909	1.5580	1.4120	0.8861	1.4120	0.1020	17.91%	-3.59%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	0.7000	0.9000	1.0000	0.9000	0.9000
MP-BOL-B2-TOX		1.0000	1.0000	1.0000	1.0000	0.9000
MP-POL-P1-TOX		1.0000	0.9000	0.9000	1.0000	1.0000
MP-POL-P2-TOX		0.6000	0.9000	1.0000	1.0000	1.0000

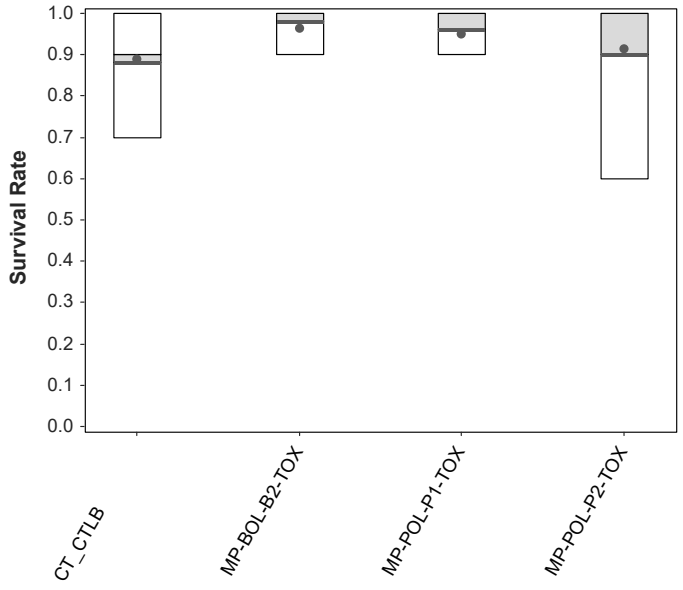
Angular (Corrected) Transformed Detail

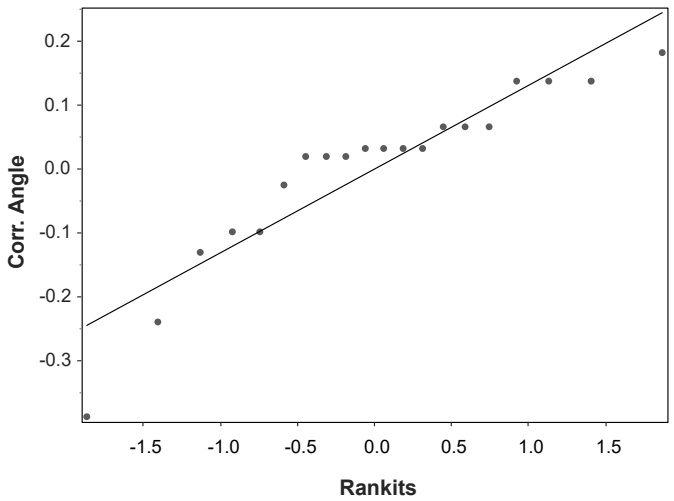
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	0.9912	1.2490	1.4120	1.2490	1.2490
MP-BOL-B2-TOX		1.4120	1.4120	1.4120	1.4120	1.2490
MP-POL-P1-TOX		1.4120	1.2490	1.2490	1.4120	1.4120
MP-POL-P2-TOX		0.8861	1.2490	1.4120	1.4120	1.4120

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	7/10	9/10	10/10	9/10	9/10
MP-BOL-B2-TOX		10/10	10/10	10/10	10/10	9/10
MP-POL-P1-TOX		10/10	9/10	9/10	10/10	10/10
MP-POL-P2-TOX		6/10	9/10	10/10	10/10	10/10

Graphics





Chironomus 10-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	07-9372-2172	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	10 Jan-25 15:47	**Analysis:**	Parametric-All Pairwise	**Status Level:**	1
Edit Date:	10 Jan-25 0:00	**MD5 Hash:**	2C2EE2FBF18604763C8E7174916E6996	**Editor ID:**	002-704-782-4
Batch ID:	00-1503-4148	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**	
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**	**Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	10-0128-1558	17 Sep-24		---	Minnow Environmental	
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Nautilus Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	D<>0	MP-BOL-B2-TOX passed dry weight endpoint	21.65%
		MP-POL-P1-TOX failed dry weight endpoint	21.65%
		MP-POL-P2-TOX failed dry weight endpoint	21.65%
		MP-POL-P1-TOX passed dry weight endpoint	21.65%
		MP-POL-P2-TOX passed dry weight endpoint	21.65%
		MP-POL-P2-TOX passed dry weight endpoint	21.65%

Tukey-Kramer Test

Sample I	vs	Sample II	df	Test Stat	Critical	MSD	P-Type	P-Value	Decision(α:5%)
Lab Control		MP-BOL-B2-TOX	8	2.969	4.046	0.3832	CDF	0.1952	Non-Significant Effect
		MP-POL-P1-TOX*	8	5.967	4.046	0.3832	CDF	0.0033	Significant Effect
		MP-POL-P2-TOX*	8	5.831	4.046	0.3832	CDF	0.0040	Significant Effect
MP-BOL-B2-TOX		MP-POL-P1-TOX	8	2.998	4.046	0.3832	CDF	0.1889	Non-Significant Effect
		MP-POL-P2-TOX	8	2.862	4.046	0.3832	CDF	0.2205	Non-Significant Effect
MP-POL-P1-TOX		MP-POL-P2-TOX	8	0.1361	4.046	0.3832	CDF	0.9997	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.001	2.708	0.7215	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.07203	0.357344	3	7.968	0.0018	Significant Effect
Error	0.717555	0.0448472	16			
Total	1.78959		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Variance	Bartlett Equality of Variance Test	0.1686	7.815	0.9825	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9733	0.9044	0.8232	Normal Distribution

Dry Weight Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CT_CTLB	LC	5	1.77	1.533	2.007	1.737	1.536	2.064	0.08522	10.77%	0.00%
MP-BOL-B2-TOX		5	2.051	1.779	2.324	1.998	1.907	2.434	0.0981	10.69%	-15.89%
MP-POL-P1-TOX		5	2.335	2.084	2.586	2.299	2.076	2.618	0.09035	8.65%	-31.93%
MP-POL-P2-TOX		5	2.322	2.033	2.611	2.447	1.933	2.489	0.1041	10.02%	-31.20%

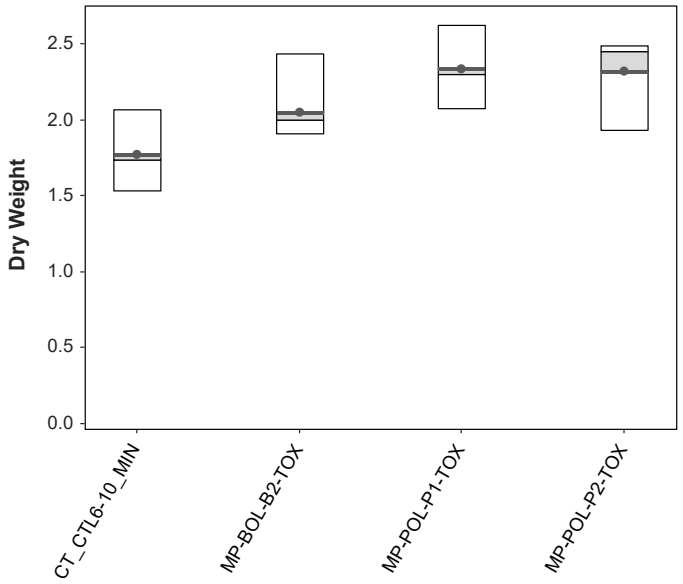
Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

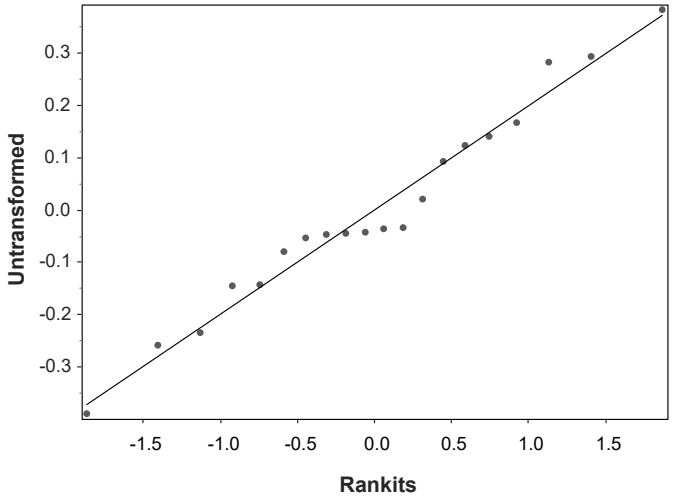
Analysis ID:	07-9372-2172	**Endpoint:**	Dry Weight	**CETIS Version:**	CETIS v2.1.5
Analyzed:	10 Jan-25 15:47	**Analysis:**	Parametric-All Pairwise	**Status Level:**	1
Edit Date:	10 Jan-25 0:00	**MD5 Hash:**	2C2EE2FBF18604763C8E7174916E6996	**Editor ID:**	002-704-782-4

Dry Weight Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	2.064	1.737	1.79	1.723	1.536
MP-BOL-B2-TOX		2.434	1.908	1.907	1.998	2.009
MP-POL-P1-TOX		2.076	2.299	2.256	2.427	2.618
MP-POL-P2-TOX		1.933	2.447	2.278	2.464	2.489

Graphics





CETIS Summary Report

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Batch ID:	00-1503-4148	**Test Type:**	Survival-Growth	**Analyst:**	Daisy Meyer		
Start Date:	17 Sep-24	**Protocol:**	EC/EPS 1/RM/32	**Diluent:**	Not Applicable		
Ending Date:	27 Sep-24	**Species:**	Chironomus dilutus	**Brine:**			
Test Length:	10d 0h	**Taxon:**	Insecta	**Source:**		**Age:**	
Sample ID:	10-0128-1558	**Code:**	CT_CTL6-10_MIN	**Project:**			
Sample Date:	17 Sep-24	**Material:**	Sediment	**Source:**	Nautilus Environmental		
Receipt Date:		**CAS (PC):**		**Station:**			
Sample Age:	---	**Client:**	Minnow Environmental				

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CT_CTLB	10-0128-1558	17 Sep-24		---	Minnow Environmental	
MP-BOL-B2-TOX	01-7953-0665	19 Aug-24	29 Aug-24	29d 0h		
MP-POL-P1-TOX	17-4950-2422	22 Aug-24	29 Aug-24	26d 0h		
MP-POL-P2-TOX	08-4607-3999	21 Aug-24	29 Aug-24	27d 0h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CT_CTLB	Sediment	Nautilus Environmental		
MP-BOL-B2-TOX	Sediment	Minnow Environmental		
MP-POL-P1-TOX	Sediment	Minnow Environmental		
MP-POL-P2-TOX	Sediment	Minnow Environmental		

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.1952	MP-BOL-B2-TOX passed dry weight
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.1889	MP-POL-P1-TOX passed dry weight
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.0033	MP-POL-P1-TOX failed dry weight
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.9997	MP-POL-P2-TOX passed dry weight
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.2205	MP-POL-P2-TOX passed dry weight
07-9372-2172	Dry Weight	Tukey-Kramer Test	0.0040	MP-POL-P2-TOX failed dry weight
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.4111	MP-BOL-B2-TOX passed survival rate
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.9851	MP-POL-P1-TOX passed survival rate
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.6096	MP-POL-P1-TOX passed survival rate
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.8654	MP-POL-P2-TOX passed survival rate
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.6827	MP-POL-P2-TOX passed survival rate
02-7145-3423	Survival Rate	Tukey-Kramer Test	0.9645	MP-POL-P2-TOX passed survival rate

Dry Weight Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLB	LC	5	1.77	1.533	2.007	1.536	2.064	0.08522	0.1906	10.77%	0.00%
MP-BOL-B2-TOX	XC	5	2.051	1.779	2.324	1.907	2.434	0.0981	0.2193	10.69%	-15.89%
MP-POL-P1-TOX		5	2.335	2.084	2.586	2.076	2.618	0.09035	0.202	8.65%	-31.93%
MP-POL-P2-TOX		5	2.322	2.033	2.611	1.933	2.489	0.1041	0.2327	10.02%	-31.20%

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
CT_CTLB	LC	5	0.8800	0.7440	1.0160	0.7000	1.0000	0.0490	0.1095	12.45%	0.00%
MP-BOL-B2-TOX	XC	5	0.9800	0.9245	1.0360	0.9000	1.0000	0.0200	0.0447	4.56%	-11.36%
MP-POL-P1-TOX		5	0.9600	0.8920	1.0280	0.9000	1.0000	0.0245	0.0548	5.71%	-9.09%
MP-POL-P2-TOX		5	0.9000	0.6849	1.1150	0.6000	1.0000	0.0775	0.1732	19.25%	-2.27%

Chironomus 10-d Survival and Growth Sediment Test **Nautilus Environmental**

Dry Weight Detail MD5: 2C2EE2FBF18604763C8E7174916E6996

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	2.064	1.737	1.79	1.723	1.536
MP-BOL-B2-TOX	XC	2.434	1.908	1.907	1.998	2.009
MP-POL-P1-TOX		2.076	2.299	2.256	2.427	2.618
MP-POL-P2-TOX		1.933	2.447	2.278	2.464	2.489

Survival Rate Detail MD5: 7AA06EE1098AC2F4C9E8EFAE799BEBB5

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	0.7000	0.9000	1.0000	0.9000	0.9000
MP-BOL-B2-TOX	XC	1.0000	1.0000	1.0000	1.0000	0.9000
MP-POL-P1-TOX		1.0000	0.9000	0.9000	1.0000	1.0000
MP-POL-P2-TOX		0.6000	0.9000	1.0000	1.0000	1.0000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CT_CTLB	LC	7/10	9/10	10/10	9/10	9/10
MP-BOL-B2-TOX	XC	10/10	10/10	10/10	10/10	9/10
MP-POL-P1-TOX		10/10	9/10	9/10	10/10	10/10
MP-POL-P2-TOX		6/10	9/10	10/10	10/10	10/10

APPENDIX C – Analytical Chemistry

CERTIFICATE OF ANALYSIS

Work Order	:	**WT2430256**			
Client	:	**Nautilus Environmental Company Inc.**	Laboratory	:	ALS Environmental - Waterloo
Contact	:	Carol D'Andrea	Account Manager	:	Khairul Intiar
Address	:	704 Mara St Suite 122 Point Edward Ontario Canada N7V 1X4	Address	:	60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	:	----	Telephone	:	+1 519 886 6910
Project	:	1510-002	Date Samples Received	:	10-Oct-2024 10:00
PO	:	2425-040PE	Date Analysis Commenced	:	10-Oct-2024
C-O-C number	:	----	Issue Date	:	18-Oct-2024 16:55
Sampler	:	----			
Site	:	----			
Quote number	:	Point Edward			
No. of samples received	:	37			
No. of samples analysed	:	37			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Nik Perkio	Senior Analyst	Metals, Waterloo, Ontario
Nik Perkio	Senior Analyst	Inorganics, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre
-	no units

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	1510-0022405-1 HA REP1	1510-0022405-2 HA REP2	1510-0022405-3 HA REP3	1510-0022405-4 HA REP4	1510-0022405-5 HA REP5
				Client sampling date / time	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	WT2430256-001	WT2430256-002	WT2430256-003	WT2430256-004	WT2430256-005
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	146	139	137	135	135
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L	109	97.9	97.6	97.6	98.9
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L	6.32	5.59	6.02	6.02	6.11
Dissolved Metals									
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L	0.0870 DLM	0.0820 DLM	0.0930 DLM	0.0935 DLM	0.0657 DLM
Dissolved metals filtration location	----	EP421/WT	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	1510-0022406-1 HA REP1	1510-0022406-2 HA REP2	1510-0022406-3 HA REP3	1510-0022406-4 HA REP4	1510-0022406-5 HA REP5
				Client sampling date / time	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00	01-Oct-2024 00:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	WT2430256-006	WT2430256-007	WT2430256-008	WT2430256-009	WT2430256-010
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	108	83.3	68.7	114	70.9
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L	78.4	63.3	41.5	111	50.7
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L	6.86	5.57	6.19	9.85	5.98
Dissolved Metals									
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L	0.00411 DLM	0.00386 DLM	0.00202 DLM	0.00385 DLM	0.00251 DLM
Dissolved metals filtration location	----	EP421/WT	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	1510-0022405-11 HA CONTROL FINAL COMP	1510-0022405-11 HA CHD CONTROL FINAL COMP	1510-0022407-1-5 CHD REP1	1510-0022407-1-5 CHD REP2	1510-0022407-1-5 CHD REP3
					Client sampling date / time	01-Oct-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00
						WT2430256-011	WT2430256-012	WT2430256-013	WT2430256-014	WT2430256-015
						Result	Result	Result	Result	Result
Physical Tests										
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L		189	152	131	125	121
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L		115	98.9	71.4	68.0	66.9
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L		7.08	5.13	12.2	10.8	14.1
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00330 DLM	0.00232 DLM	0.00923 DLM	0.00787 DLM	0.0107 DLM
Dissolved metals filtration location	----	EP421/WT	-	-		Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	1510-0022407-1-5 CHD REP4	1510-0022407-1-5 CHD REP5	1510-0022408-1-5 CHD REP1	1510-0022408-1-5 CHD REP2	1510-0022408-1-5 CHD REP3
					Client sampling date / time	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00
						WT2430256-016	WT2430256-017	WT2430256-018	WT2430256-019	WT2430256-020
						Result	Result	Result	Result	Result
Physical Tests										
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L		132	117	67.0	72.8	68.6
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L		68.7	73.1	37.1	42.1	37.2
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L		13.9	16.8	6.52	6.92	6.49
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00925 DLM	0.00935 DLM	0.00258 DLM	0.00380 DLM	0.00291 DLM
Dissolved metals filtration location	----	EP421/WT	-	-		Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	1510-0022408-1-5 CHD REP4	1510-0022408-1-5 CHD REP5	1510-0022409-1-5 CHD REP1	1510-0022409-1-5 CHD REP2	1510-0022409-1-5 CHD REP3
					Client sampling date / time	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00
						WT2430256-021	WT2430256-022	WT2430256-023	WT2430256-024	WT2430256-025
						Result	Result	Result	Result	Result
Physical Tests										
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L		79.8	76.3	64.4	65.8	67.0
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L		49.0	39.2	11.8	13.3	14.1
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L		7.34	6.06	8.17	8.26	8.12
Dissolved Metals										
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00372 DLM	0.00264 DLM	0.00300 DLM	0.00336 DLM	0.00341 DLM
Dissolved metals filtration location	----	EP421/WT	-	-		Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	1510-0022409-1-5 CHD REP4	1510-0022409-1-5 CHD REP5	1510-0022410-1-5 CHD REP1	1510-0022410-1-5 CHD REP2	1510-0022410-1-5 CHD REP3
				Client sampling date / time	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	WT2430256-026	WT2430256-027	WT2430256-028	WT2430256-029	WT2430256-030
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	73.0	60.8	116	118	122
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L	12.2	20.5	56.9	47.9	51.5
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L	9.18	9.20	10.4	11.4	12.1
Dissolved Metals									
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L	0.00356 DLM	0.00303 DLM	0.00889 DLM	0.00881 DLM	0.00814 DLM
Dissolved metals filtration location	----	EP421/WT	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	1510-0022410-1-5 CHD REP4	1510-0022410-1-5 CHD REP5	1510-0022411-1-5 CHD REP1	1510-0022411-1-5 CHD REP2	1510-0022411-1-5 CHD REP3
				Client sampling date / time	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00	27-Sep-2024 00:00
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	WT2430256-031	WT2430256-032	WT2430256-033	WT2430256-034	WT2430256-035
					Result	Result	Result	Result	Result
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	121	120	150	149	148
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L	50.1	45.5	108	107	118
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L	12.2	11.6	6.80	6.26	9.11
Dissolved Metals									
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L	0.00866 DLM	0.00859 DLM	0.0527 DLM	0.0518 DLM	0.0525 DLM
Dissolved metals filtration location	----	EP421/WT	-	-	Field	Field	Field	Field	Field

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Water (Matrix: Water)				Client sample ID	1510-0022411-1-5 CHD REP4	1510-0022411-1-5 CHD REP5	----	----	----
				Client sampling date / time	27-Sep-2024 00:00	27-Sep-2024 00:00	----	----	----
Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	WT2430256-036	WT2430256-037	----	----	----
					Result	Result	----	----	----
Physical Tests									
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L	151	138	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L	109	107	----	----	----
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/WT	0.50	mg/L	7.19	5.90	----	----	----
Dissolved Metals									
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L	0.0507 DLM	0.0479 DLM	----	----	----
Dissolved metals filtration location	----	EP421/WT	-	-	Field	Field	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2430256**	Page	: 1 of 18
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Carol D'Andrea	Account Manager	: Khairul Intiar
Address	: 704 Mara St Suite 122 Point Edward ON Canada N7V 1X4	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: 1510-002	Date Samples Received	: 10-Oct-2024 10:00
PO	: 2425-040PE	Issue Date	: 18-Oct-2024 17:56
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: Point Edward		
No. of samples received	: 37		
No. of samples analysed	: 37		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Organic / Inorganic Carbon	QC-1702721-001	----	Carbon, dissolved organic [DOC]	----	E358-L	0.51 B mg/L	0.5 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-1 HA REP1	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-11 HA CONTROL FINAL COMP	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-2 HA REP2	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-3 HA REP3	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-4 HA REP4	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-5 HA REP5	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022406-1 HA REP1	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022406-2 HA REP2	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022406-3 HA REP3	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022406-4 HA REP4	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022406-5 HA REP5	E421	01-Oct-2024	10-Oct-2024	180 days	10 days	✓	10-Oct-2024	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022405-11 HA CHD CONTROL FINAL COMP	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022407-1-5 CHD REP1	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022407-1-5 CHD REP2	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022407-1-5 CHD REP3	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022407-1-5 CHD REP4	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022407-1-5 CHD REP5	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022408-1-5 CHD REP1	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022408-1-5 CHD REP2	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022408-1-5 CHD REP3	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022408-1-5 CHD REP4	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022408-1-5 CHD REP5	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022409-1-5 CHD REP1	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022409-1-5 CHD REP2	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022409-1-5 CHD REP3	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022409-1-5 CHD REP4	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022409-1-5 CHD REP5	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022410-1-5 CHD REP1	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022410-1-5 CHD REP2	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022410-1-5 CHD REP3	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022410-1-5 CHD REP4	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022410-1-5 CHD REP5	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022411-1-5 CHD REP1	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022411-1-5 CHD REP2	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022411-1-5 CHD REP3	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022411-1-5 CHD REP4	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
1510-0022411-1-5 CHD REP5	E421	27-Sep-2024	10-Oct-2024	180 days	14 days	✓	10-Oct-2024	180 days	14 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-1 HA REP1	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	16-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-11 HA CONTROL FINAL COMP	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-2 HA REP2	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	16-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-3 HA REP3	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-4 HA REP4	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022405-5 HA REP5	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022406-1 HA REP1	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022406-2 HA REP2	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022406-3 HA REP3	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022406-4 HA REP4	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022406-5 HA REP5	E358-L	01-Oct-2024	10-Oct-2024	28 days	10 days	✓	17-Oct-2024	28 days	16 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022405-11 HA CHD CONTROL FINAL COMP	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022407-1-5 CHD REP1	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022407-1-5 CHD REP2	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022407-1-5 CHD REP3	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022407-1-5 CHD REP4	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022407-1-5 CHD REP5	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022408-1-5 CHD REP1	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022408-1-5 CHD REP2	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022408-1-5 CHD REP3	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022408-1-5 CHD REP4	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022408-1-5 CHD REP5	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022409-1-5 CHD REP1	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022409-1-5 CHD REP2	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022409-1-5 CHD REP3	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022409-1-5 CHD REP4	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022409-1-5 CHD REP5	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022410-1-5 CHD REP1	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022410-1-5 CHD REP2	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022410-1-5 CHD REP3	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022410-1-5 CHD REP4	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022410-1-5 CHD REP5	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) 1510-0022411-1-5 CHD REP1	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022411-1-5 CHD REP2	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022411-1-5 CHD REP3	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022411-1-5 CHD REP4	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
1510-0022411-1-5 CHD REP5	E358-L	27-Sep-2024	10-Oct-2024	28 days	14 days	✓	17-Oct-2024	28 days	20 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1510-0022405-1 HA REP1	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1510-0022405-11 HA CONTROL FINAL COMP	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1510-0022405-2 HA REP2	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1510-0022405-3 HA REP3	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
1510-0022405-4 HA REP4	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022405-5 HA REP5	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022406-1 HA REP1	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022406-2 HA REP2	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022406-3 HA REP3	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022406-4 HA REP4	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022406-5 HA REP5	E290	01-Oct-2024	10-Oct-2024	14 days	10 days	✓	11-Oct-2024	14 days	10 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022405-11 HA CHD CONTROL FINAL COMP	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022407-1-5 CHD REP1	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022407-1-5 CHD REP2	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022407-1-5 CHD REP3	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022407-1-5 CHD REP4	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022407-1-5 CHD REP5	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022408-1-5 CHD REP1	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022408-1-5 CHD REP2	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022408-1-5 CHD REP3	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022408-1-5 CHD REP4	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022408-1-5 CHD REP5	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022409-1-5 CHD REP1	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022409-1-5 CHD REP2	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022409-1-5 CHD REP3	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022409-1-5 CHD REP4	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022409-1-5 CHD REP5	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022410-1-5 CHD REP1	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022410-1-5 CHD REP2	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022410-1-5 CHD REP3	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022410-1-5 CHD REP4	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022410-1-5 CHD REP5	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022411-1-5 CHD REP1	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022411-1-5 CHD REP2	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022411-1-5 CHD REP3	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022411-1-5 CHD REP4	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE 1510-0022411-1-5 CHD REP5	E290	27-Sep-2024	10-Oct-2024	14 days	14 days	✓	11-Oct-2024	14 days	14 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1702827	3	40	7.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702915	2	37	5.4	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1702717	3	60	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1702827	3	40	7.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702915	2	37	5.4	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1702717	3	60	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1702827	3	40	7.5	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702915	2	37	5.4	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1702717	3	60	5.0	5.0	✓
Matrix Spikes (MS)							
Dissolved Metals in Water by CRC ICPMS	E421	1702915	2	37	5.4	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1702717	3	60	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Waterloo	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Waterloo	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Waterloo	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **WT2430256**	Page	: 1 of 6
Client	: Nautilus Environmental Company Inc.	Laboratory	: ALS Environmental - Waterloo
Contact	: Carol D'Andrea	Account Manager	: Khairul Intiar
Address	: 704 Mara St Suite 122 Point Edward ON Canada N7V 1X4	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: 1510-002	Date Samples Received	: 10-Oct-2024 10:00
PO	: 2425-040PE	Date Analysis Commenced	: 10-Oct-2024
C-O-C number	: ----	Issue Date	: 18-Oct-2024 17:12
Sampler	: ----		
Site	: ----		
Quote number	: Point Edward		
No. of samples received	: 37		
No. of samples analysed	: 37		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Nik Perkio	Senior Analyst	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Metals, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1702816)											
WT2430256-012	1510-0022405-11 HA CHD CONTROL FINAL COMP	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	98.9	101	2.18%	20%	----
Physical Tests (QC Lot: 1702823)											
WT2430256-015	1510-0022407-1-5 CHD REP3	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	66.9	68.4	2.24%	20%	----
Physical Tests (QC Lot: 1702827)											
HA2402305-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	25.0	25.6	2.21%	20%	----
Organic / Inorganic Carbon (QC Lot: 1702717)											
WT2430256-001	1510-0022405-1 HA REP1	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.32	6.36	0.572%	20%	----
Organic / Inorganic Carbon (QC Lot: 1702720)											
WT2430256-003	1510-0022405-3 HA REP3	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	6.02	6.16	2.38%	20%	----
Organic / Inorganic Carbon (QC Lot: 1702721)											
WT2430256-023	1510-0022409-1-5 CHD REP1	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	8.17	8.58	4.87%	20%	----
Dissolved Metals (QC Lot: 1702914)											
WT2430256-001	1510-0022405-1 HA REP1	Copper, dissolved	7440-50-8	E421	0.00200	mg/L	0.0870	0.0887	1.98%	20%	----
Dissolved Metals (QC Lot: 1702915)											
WT2430256-021	1510-0022408-1-5 CHD REP4	Copper, dissolved	7440-50-8	E421	0.00200	mg/L	0.00372	0.00392	0.00020	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1702816)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1702823)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1702827)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Organic / Inorganic Carbon (QCLot: 1702717)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1702720)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1702721)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	# 0.51	B
Dissolved Metals (QCLot: 1702914)						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1702915)						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1702816)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	99.9	85.0	115	----
Physical Tests (QCLot: 1702823)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	100	85.0	115	----
Physical Tests (QCLot: 1702827)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	102	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1702717)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1702720)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1702721)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	104	80.0	120	----
Dissolved Metals (QCLot: 1702914)									
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	96.1	80.0	120	----
Dissolved Metals (QCLot: 1702915)									
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	96.5	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Organic / Inorganic Carbon (QCLot: 1702717)										
WT2430256-001	1510-0022405-1 HA REP1	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1702720)										
WT2430256-003	1510-0022405-3 HA REP3	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1702721)										
WT2430256-023	1510-0022409-1-5 CHD REP1	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Dissolved Metals (QCLot: 1702914)										
WT2430256-002	1510-0022405-2 HA REP2	Copper, dissolved	7440-50-8	E421	0.116 mg/L	0.125 mg/L	92.7	70.0	130	----
Dissolved Metals (QCLot: 1702915)										
WT2430256-022	1510-0022408-1-5 CHD REP5	Copper, dissolved	7440-50-8	E421	0.121 mg/L	0.125 mg/L	97.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: LON -

Page 1 of 4

VM

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental Company
Contact:	Carol or Ken
Phone:	519-339-8787
	Company address below will appear on the final report
Street:	704 Mara St, Suite 122
City/Province:	Point Edward, Ontario
Postal Code:	N7V 1X4
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	carol@nautilusenvironmental.ca
Email 2	Ken@nautilusenvironmental.ca
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	
Job #:	1510-002
PO / AFE:	2425-040PE
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): WT2430256

ALS Contact: Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P

Environmental Division Waterloo
Work Order Reference
WT2430256

Telephone : +1 519 886 6910

SAMPLES ON HOLD

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	DOC	dissolved Copper	alkalinity	hardness	SUSPECTED HAZARD (see Special Instructions)
	1510-0022405-1 HA Rep1	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-2 HA Rep2	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-3 HA Rep3	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-4 HA Rep4	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-5 HA Rep5	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022406-1 HA Rep1	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022406-2 HA Rep2	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022406-3 HA Rep3	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022406-4 HA Rep4	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022406-5 HA Rep5	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-11 HA Control Final Comp	1-Oct-24	pm	water	3	R	R	R	R	
	1510-0022405-11 CHd Control Final Comp	27-Sep-24	pm	water	3	R	R	R	R	

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				1.0	4.3	3.5	

SHIPMENT RELEASE (client use)		
KF	9/10/2024	PM

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date: 10/10/24	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2018 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

BC - 958, 959

MM - 232, 233

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: LON -

Page 2 of 4

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental Company
Contact:	Carol or Ken
Phone:	519-339-8787
	Company address below will appear on the final report
Street:	704 Mara St, Suite 122
City/Province:	Point Edward, Ontario
Postal Code:	N7V 1X4
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	carol@nautilusenvironmental.ca
Email 2	Ken@nautilusenvironmental.ca
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	
Job #:	1510-002
PO / AFE:	2425-040PE
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	DOC	dissolved Copper	alkalinity	hardness	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	1510-0022407-1-5 CHd Rep1	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022407-1-5 CHd Rep2	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022407-1-5 CHd Rep3	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022407-1-5 CHd Rep4	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022407-1-5 CHd Rep5	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022408-1-5 CHd Rep1	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022408-1-5 CHd Rep2	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022408-1-5 CHd Rep3	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022408-1-5 CHd Rep4	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022408-1-5 CHd Rep5	27-Sep-24	pm	water	3	R	R	R	R		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				1.6			

SHIPMENT RELEASE (client use)		
KF	9/10/2024	PM

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date: 10/10/24	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2018 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: LON -

Page 3 of 4

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental Company
Contact:	Carol or Ken
Phone:	519-339-8787
	Company address below will appear on the final report
Street:	704 Mara St, Suite 122
City/Province:	Point Edward, Ontario
Postal Code:	N7V 1X4
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	carol@nautilusenvironmental.ca
Email 2	Ken@nautilusenvironmental.ca
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	
Job #:	1510-002
PO / AFE:	2425-040PE
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): | **ALS Contact:** | **Sampler:**

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	DOC	dissolved Copper	alkalinity	hardness	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	1510-0022409-1-5 CHd Rep1	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022409-1-5 CHd Rep2	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022409-1-5 CHd Rep3	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022409-1-5 CHd Rep4	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022409-1-5 CHd Rep5	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022410-1-5 CHd Rep1	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022410-1-5 CHd Rep2	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022410-1-5 CHd Rep3	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022410-1-5 CHd Rep4	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022410-1-5 CHd Rep5	27-Sep-24	pm	water	3	R	R	R	R		
			pm	water							
			pm	water							

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				1.6			

SHIPMENT RELEASE (client use)		
KF	9/10/2024	PM

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date: 10/10/24	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: LON -

Report To	Contact and company name below will appear on the final report
Company:	Nautilus Environmental Company
Contact:	Carol or Ken
Phone:	519-339-8787
	Company address below will appear on the final report
Street:	704 Mara St, Suite 122
City/Province:	Point Edward, Ontario
Postal Code:	N7V 1X4
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☐ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax carol@nautilusenvironmental.ca

Email 2 Ken@nautilusenvironmental.ca

Email 3

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	1510-002	Major/Minor Code:	Routing Code:
PO / AFE:	2425-040PE	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	DOC	dissolved Copper	alkalinity	hardness	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	1510-0022411-1-5 CHd Rep1	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022411-1-5 CHd Rep2	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022411-1-5 CHd Rep3	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022411-1-5 CHd Rep4	27-Sep-24	pm	water	3	R	R	R	R		
	1510-0022411-1-5 CHd Rep5	27-Sep-24	pm	water	3	R	R	R	R		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				1.6			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
KF	9/10/2024	PM	Received by:	Date:	Time:	Received by:	Date: 10/10/24	Time: 7000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX D – Chain-of-Custody Forms

NAUTILUS ENVIRONMENTAL

TEST LOCATION (Please Circle)

Burnaby
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N7
Phone 604.420.8773

Calgary
#4 6125 12th St S E
Calgary, Alberta, Canada T2H 2K1
Phone 403.253.7121

Chain of Custody

Date August-2024

Page 1 of 4

Report to:		Invoice To:	
Company	Minnow Environmental	Company	Mount Polley Mining Corporation
Address	210-1175 Cook Street	Address	PO Box 12
City/State/Zip	Victoria, BC, V8V 4A1	City/State/Zip	Likely, BC, V0L 1N0
Contact	Katharina Batchelar	Contact	Gabriel Holmes
Phone	250-595-1627 ext. 7254	Phone	236-317-4939
Email	katchelar@minnow.ca	Email	gabriel.holmes@mountpolley.com
	slatimer@minnow.ca, simone derosemond@minnow	PO No.	24-04-7

Sample Collection By:

Sample Type: Grab ○ **OR** Composite ●

	SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: 14 day *Hyalella azteca* test	ANALYSES REQUIRED: 10 day *Chironomus dilitus* test	Receipt Temperature (°C)
1	MP_QUL-LNF1_TOX-1_2024-08	21-Aug-24	7:29	sediment	1 x 500 mL glass	Replicate 1	✓		19.1
2	MP_QUL-LNF1_TOX-2_2024-08	21-Aug-24	8:17	sediment	1 x 500 mL glass	Replicate 2	✓		
3	MP_QUL-LNF1_TOX-3_2024-08	21-Aug-24	7:16	sediment	1 x 500 mL glass	Replicate 3	✓		
4	MP_QUL-LNF1_TOX-4_2024-08	21-Aug-24	8:01	sediment	1 x 500 mL glass	Replicate 4	✓		
5	MP_QUL-LNF1_TOX-5_2024-08	21-Aug-24	7:46	sediment	1 x 500 mL glass	Replicate 5	✓		
6	MP_QUL-LREF1_TOX-1_2024-08	21-Aug-24	15:36	sediment	1 x 500 mL glass	Replicate 1	✓		
7	MP_QUL-LREF1_TOX-2_2024-08	21-Aug-24	14:36	sediment	1 x 500 mL glass	Replicate 2	✓		
8	MP_QUL-LREF1_TOX-3_2024-08	21-Aug-24	15:26	sediment	1 x 500 mL glass	Replicate 3	✓		
9	MP_QUL-LREF1_TOX-4_2024-08	21-Aug-24	15:46	sediment	1 x 500 mL glass	Replicate 4	✓		
10	MP_QUL-LREF1_TOX-5_2024-08	21-Aug-24	16:08	sediment	1 x 500 mL glass	Replicate 5	✓		

1510-0022405

1510-0022406

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

Overlying water must be measured for dissolved copper, alkalinity and hardness concentrations in each toxicity replicate for all samples. Please contact Katharina Batchelar (kbatchelar@minnow.ca) to discuss.

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers	10	4. Ice Present In Cooler?	(Y)/ N
2. Courier	Van Kam	5. Seal Present on Cooler?	Y /(N)
3. Good Condition?	(Y)/ N	6. Initials Present on Seal?	Y /(N)

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

RELINQUISHED BY (CLIENT)

(Printed Name)	(Signature)
(Company)	28 Aug 24 16 (Date and Time)

RECEIVED BY (LABORATORY)

Ethan Hoggarth (Printed Name)	(Signature)
Nautilus (Company)	2024-08-29 @10:34 (Date and Time)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

TEST LOCATION (Please Circle)

NAUTILUS ENVIRONMENTAL

Burnaby
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604.420.8773

Calgary
#4 6125 12th St S.E.
Calgary, Alberta, Canada
T2H 2K1
Phone 403.253.7121

Chain of Custody

Date August-2024

Report to:

Company	Minnow Environmental
Address	210-1175 Cook Street
City/State/Zip	Victoria, BC, V8V 4A1
Contact	Katharina Batchelar
Phone	250-595-1627 ext. 7254
Email	katchelar@minnow.ca
	slatimer@minnow.ca, simone.derosemond@minnow

Invoice To:

Company	Mount Polley Mining Corporation
Address	PO Box 12
City/State/Zip	Likely, BC, V0L 1N0
Contact	Gabriel Holmes
Phone	236-317-4939
Email	gabriel.holmes@mountpolley.com
PO No.	24-04-7

Sample Collection By:

Sample Type: Grab ○ OR Composite ●

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	14 day *Hyallela azteca* test	10 day *Chironomus dilitus* test									Receipt Temperature (°C)
1	MP_QUL-PNF_TOX-1_2024-08	23 -Aug-24	12:00	sediment	1 x 500 mL glass	Replicate 1		✓		1510-0022407							10.1-1.9
2	MP_QUL-PNF_TOX-2_2024-08	23 -Aug-24	12:40	sediment	1 x 500 mL glass	Replicate 2		✓									
3	MP_QUL-PNF_TOX-3_2024-08	24 -Aug-24	7:30	sediment	1 x 500 mL glass	Replicate 3		✓									
4	MP_QUL-PNF_TOX-4_2024-08	24 -Aug-24	9:00	sediment	1 x 500 mL glass	Replicate 4		✓									
5	MP_QUL-PNF_TOX-5_2024-08	24 Aug-24	11:00	sediment	1 x 500 mL glass	Replicate 5		✓									
6	MP_QUL-PREF1_TOX-1_2024-08	22 -Aug-24	9:15	sediment	1 x 500 mL glass	Replicate 1		✓		1510-002208							
7	MP_QUL-PREF1_TOX-2_2024-08	22 -Aug-24	11:15	sediment	1 x 500 mL glass	Replicate 2		✓									
8	MP_QUL-PREF1_TOX-3_2024-08	22 -Aug-24	14:35	sediment	1 x 500 mL glass	Replicate 3		✓									
9	MP_QUL-PREF1_TOX-4_2024-08	23 -Aug-24	7:40	sediment	1 x 500 mL glass	Replicate 4		✓									
10	MP_QUL-PREF1_TOX-5_2024-08	23 -Aug-24	9:45	sediment	1 x 500 mL glass	Replicate 5		✓									

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

Overlying water must be measured for dissolved copper, alkalinity and hardness concentrations in each toxicity replicate for all samples. Please contact Katharina Batchelar (kbatchelar@minnow.ca) to discuss.

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers	10	**4. Ice Present in Cooler?**	Y/N
2. Courier	Van Kam	**5. Seal Present on Cooler?**	Y/N
3. Good Condition?	Y/N	**6. Initials Present on Seal?**	Y/N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

RELINQUISHED BY (CLIENT)

(Printed Name) (Signature)

(Company) (Date and Time)

RECEIVED BY (LABORATORY)

Ethan Hogerdyk (Printed Name) (Signature)

Nautilus (Company) 2024-08-29 @10:34 (Date and Time)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

TESTIN OCATION (Please Circle)

NAUTILUS ENVIRONMENTAL

Burnaby
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N7
Phone 604.420.8773

Calgary
#4 6125 12th St S.E.
Calgary, Alberta, Canada T2H 2K1
Phone 403.253.7121

Chain of Custody

Date August-2024

Page 3 of 4

Report to:		Invoice To:	
Company	Minnow Environmental	Company	Mount Polley Mining Corporation
Address	210-1175 Cook Street	Address	PO Box 12
City/State/Zip	Victoria, BC, V8V 4A1	City/State/Zip	Likely, BC, V0L 1N0
Contact	Katharina Batchelar	Contact	Gabriel Holmes
Phone	250-595-1627 ext. 7254	Phone	236-317-4939
Email	katchelar@minnow.ca slatimer@minnow.ca, simone.derosemond@minnow	Email	gabriel.holmes@mountpolley.com
		PO No.	24-04-7

Sample Collection By:

Sample Type: Grab ○ OR Composite ●

	SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	14 day *Hyallela azteca* test	10 day *Chironomus dilitus* test 24hr	ANALYSES REQUIRED	Receipt Temperature (°C)
1	MP_BOL-B2_TOX-1_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 1		✓	1510-00224109	10.1-11.9
2	MP_BOL-B2_TOX-2_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 2		✓		
3	MP_BOL-B2_TOX-3_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 3		✓		
4	MP_BOL-B2_TOX-4_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 4		✓		
5	MP_BOL-B2_TOX-5_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 5		✓		
6	MP_POL-P1_TOX-1_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 1		✓	1510-00224110	
7	MP_POL-P1_TOX-2_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 2		✓		
8	MP_POL-P1_TOX-3_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 3		✓		
9	MP_POL-P1_TOX-4_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 4		✓		
10	MP_POL-P1_TOX-5_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 5		✓		

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

Overlying water must be measured for dissolved copper, alkalinity and hardness concentrations in each toxicity replicate for all samples. Please contact Katharina Batchelar (kbatchelar@minnow.ca) to discuss.

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers	10	4. Ice Present in Cooler?	Y / N
2. Courier	VanKam	5. Seal Present on Cooler?	Y / N
3. Good Condition?	Y / N	6. Initials Present on Seal?	Y / N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

RELINQUISHED BY (CLIENT)

(Printed Name)	(Signature)
(Company)	(Date and Time)

RECEIVED BY (LABORATORY)

Ethan Hoggatsyk (Printed Name)	(Signature)
Nautilus (Company)	2024-08-29 @10:34 (Date and Time)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

TESTIN' OCATION (Please Circle)

NAUTILUS ENVIRONMENTAL

Burnaby
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604 420 8773

Calgary
#4 6125 12th St S.E
Calgary, Alberta, Canada
T2H 2K1
Phone 403.253 7121

Chain of Custody

Date August 2024

Report to:		Invoice To:	
Company	Minnow Environmental	Company	Mount Polley Mining Corporation
Address	210-1175 Cook Street	Address	PO Box 12
City/State/Zip	Victoria, BC, V8V 4A1	City/State/Zip	Likely, BC, V0L 1N0
Contact	Katharina Batchelar	Contact	Gabriel Holmes
Phone	250-595-1627 ext. 7254	Phone	236-317-4939
Email	katchelar@minnow.ca	Email	gabriel.holmes@mountpolley.com
	slatimer@minnow.ca; simone.derosemond@minnow	PO No.	24-04-7

Sample Collection By:

Sample Type: Grab ○ **OR** Composite ●

	SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: 14 day *Hyallela azteca* test	ANALYSES REQUIRED: 10 day *Chironomus dilitus* test	Receipt Temperature (°C)
1	MP_POL-P2_TOX-1_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 1		✓	10.1-11.9
2	MP_POL-P2_TOX-2_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 2		✓	
3	MP_POL-P2_TOX-3_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 3		✓	
4	MP_POL-P2_TOX-4_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 4		✓	
5	MP_POL-P2_TOX-5_2024-08	-Aug-24		sediment	1 x 500 mL glass	Replicate 5		✓	
6	[redacted]	Aug-24		sediment	1 x 500 mL glass	Replicate 1		✓	
7	[redacted]	Aug-24		sediment	1 x 500 mL glass	Replicate 2		✓	
8		-Aug-24		sediment	1 x 500 mL glass	Replicate 3		✓	
9		-Aug-24		sediment	1 x 500 mL glass	Replicate 4		✓	
10		-Aug-24		sediment	1 x 500 mL glass	Replicate 5		✓	

1510-0022411

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

Overlying water must be measured for dissolved copper, alkalinity and hardness concentrations in each toxicity replicate for all samples. Please contact Katharina Batchelar (kbatchelar@minnow.ca) to discuss.

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers	5	4. Ice Present in Cooler?	Y/N
2. Courier	VanKam	5. Seal Present on Cooler?	Y/N
3. Good Condition?	Y/N	6. Initials Present on Seal?	Y/N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

RELINQUISHED BY (CLIENT)

(Printed Name) (Signature)

(Company) (Date and Time)

RECEIVED BY (LABORATORY)

Ethan Hoogerdyk (Printed Name) (Signature)

Nautilus (Company) 2024-08-29 @10:34 (Date and Time)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

END OF REPORT

PLANKTON COMMUNITY

Biologica Laboratory Reports fp24-169
Freshwater Phytoplankton

(Finalized November 15, 2024)

Freshwater Phytoplankton Enumeration and Identification Methods
Client: Minnow Environmental
Project: Mount Polley

Sample Inventory

Sample arrival: 26-Jun-24; 29-Jul-24; 03-Sep-24
Number of samples: 28 (4, 20, 4)
Number of jars: 28
Biologica project number: fp24-169

Upon arrival samples were examined, and Lugol's preservative was added to ensure adequate preservation of samples. An inventory form was created and verified with the chain of custody (COC) to ensure (1) all samples are accounted for, and (2) each sample had the appropriate number of jars as indicated on the COC. Any discrepancies were reported to the client and were resolved before further sample handling.

Sample Processing

Samples were thoroughly mixed by shaking, and sub-samples (10-100 mL) were dispensed into Utermohl settling chambers and allowed to settle for 12-48 hours (depending on sub-sample volume). Sub-samples were then systematically scanned using a Zeiss Axio Vert A.1 inverted phase-contrast microscope at 400x magnification. All algal units were counted in a series of randomly located fields of view (FOV) until a minimum of 300 units were enumerated. Algal units represent single cells of all algal groups, as well as colonies or filaments of blue-green algae. Given that blue-green algal colonies/filaments may contain hundreds of cells, enumerating units rather than individual cells allows for a more equal representation of algal groups. The mean number of cells per unit (= 1 for single cells, >1 for all other algal forms) was estimated for all taxa and used to calculate total densities. Only "viable" cells (those that appeared to be alive at the time of collection) were identified and enumerated. Chrysophyte loricas were also counted (EPA, 2003).

Algae were identified to genus, where possible, following the most up-to-date taxonomic references and collaborations with international and local algal taxonomic experts. Species-level identifications were only given to identifiable taxa for which there are reliable taxonomic references available that encompass the species-level morphological diversity in North America. This approach ensures the long-term consistency of data sets and is in accordance with the trend in algal taxonomic practice to be more conservative with the delineation of species. Species-level identifications for some taxa are problematic due to widespread phenotypic plasticity that can artificially inflate species richness (Wehr *et al.* 2015). When applicable, the terms "cf." (*confertim*, possibly for species) and "sp.1" (a single undetermined species) were employed to distinguish between different species in the same genus.

Table 1. Summary of phytoplankton samples processed for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Date Sampled	Biologica Sample ID	Subsample Volume (mL)	Fields of View Counted	Sum of Units Counted*
MP_POL-P2_PHYC-1_2024-06	19-Jun-24	fp24-169-001	25	65	309
MP_BOL-B2_PHYC-1_2024-06	19-Jun-24	fp24-169-002	25	33	328
MP_QUL-ZOO-1_PHYC-1_2024-06	20-Jun-24	fp24-169-003	10	17	312
MP_QUL-ZOO-7_PHYC-1_2024-06	20-Jun-24	fp24-169-004	10	25	326
MP_POL-P2_PHYC-1_2024-07	23-Jul-24	fp24-169-009	25	23	344
MP_POL-P2_PHYC-2_2024-07	23-Jul-24	fp24-169-010	25	20	301
MP_POL-P2_PHYC-3_2024-07	23-Jul-24	fp24-169-011	25	23	334
MP_POL-P2_PHYC-4_2024-07	23-Jul-24	fp24-169-012	25	20	369
MP_POL-P2_PHYC-5_2024-07	23-Jul-24	fp24-169-013	25	20	331
MP_BOL-B2_PHYC-1_2024-07	25-Jul-24	fp24-169-014	10	63	351
MP_BOL-B2_PHYC-2_2024-07	25-Jul-24	fp24-169-015	10	53	306
MP_BOL-B2_PHYC-3_2024-07	25-Jul-24	fp24-169-016	10	53	321
MP_BOL-B2_PHYC-4_2024-07	25-Jul-24	fp24-169-017	10	50	309
MP_BOL-B2_PHYC-5_2024-07	25-Jul-24	fp24-169-018	10	45	321
MP_QUL-ZOO-1_PHYC-1_2024-07	24-Jul-24	fp24-169-019	10	23	331
MP_QUL-ZOO-1_PHYC-2_2024-07	24-Jul-24	fp24-169-020	10	23	326
MP_QUL-ZOO-1_PHYC-3_2024-07	24-Jul-24	fp24-169-021	10	25	312
MP_QUL-ZOO-1_PHYC-4_2024-07	24-Jul-24	fp24-169-022	10	25	322
MP_QUL-ZOO-1_PHYC-5_2024-07	24-Jul-24	fp24-169-023	10	20	316
MP_QUL-ZOO-7_PHYC-1_2024-07	24-Jul-24	fp24-169-024	10	25	310
MP_QUL-ZOO-7_PHYC-2_2024-07	24-Jul-24	fp24-169-025	10	25	312
MP_QUL-ZOO-7_PHYC-3_2024-07	24-Jul-24	fp24-169-026	10	25	327
MP_QUL-ZOO-7_PHYC-4_2024-07	24-Jul-24	fp24-169-027	10	25	345
MP_QUL-ZOO-7_PHYC-5_2024-07	24-Jul-24	fp24-169-028	10	30	312
MP_POL-P2_PHYC-1_2024-08	26-Aug-24	fp24-169-049	25	40	326
MP_BOL-B2_PHYC-1_2024-08	26-Aug-24	fp24-169-050	10	55	303
MP_QUL-ZOO-1_PHYC-1_2024-08	25-Aug-24	fp24-169-051	100	30	316
MP_QUL-ZOO-7_PHYC-1_2024-08	25-Aug-24	fp24-169-052	100	40	325

*Algal units represent single cells, colonies, coenobia or filaments.

QA/QC

Three samples (10% of samples) were reanalyzed to assess sub-sampling and enumeration precision (Table 2). Samples were randomly selected and processed at different times to reduce counting and identification bias.

Table 2. Summary of enumeration QA/QC results for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Biologica Sample ID	Original Density (cells/L)	QA Density (cells/L)	% Agreement
MP_QUL-ZOO-1_PHYC-1_2024-06	fp24-169-003	3,688,046	3,605,302	97.76
MP_POL-P2_PHYC-5_2024-07	fp24-169-013	7,472,098	6,397,347	85.62
MP_BOL-B2_PHYC-1_2024-07	fp24-169-014	12,438,776	11,071,457	89.01

Client Sample ID	Biologica Sample ID	Original Density (cells/L)	QA Density (cells/L)	% Agreement
			Average:	90.79

* Percent Agreement: [100- (difference in abundance between samples) / total abundance of the original sample)] %

Data

Algal densities expressed as the number of cells per litre (cells/L) were derived for each sample from the sub-sample volume, number of FOV assessed, number of units counted, and number of cells per unit.

Results were provided to the Minnow Environmental project manager in Excel spreadsheets via email.

Methodological and Taxonomic References

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-001	fp24-169-002	fp24-169-003	fp24-169-004	fp24-169-009	fp24-169-010	fp24-169-011
Client Sample ID							MP_POL-P2_PHYC-1_2024-06	MP_BOL-B2_PHYC-1_2024-06	MP_QUL-ZOO-1_PHYC-1_2024-06	MP_QUL-ZOO-7_PHYC-1_2024-06	MP_POL-P2_PHYC-1_2024-07	MP_POL-P2_PHYC-2_2024-07	MP_POL-P2_PHYC-3_2024-07
Date Sampled							19-Jun-24	19-Jun-24	20-Jun-24	20-Jun-24	23-Jul-24	23-Jul-24	23-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	128,997	2,473	9,743	23,641	16,076			
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.	1	15,149	11,130						
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.	1	30,752		2,436		8,038			
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	7,729	3,710						
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	8,038				8,038			
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	32,152				24,114			
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.	1	2,473	2,473						
Diatoms	Bacillariophyta	Eunotiales	Eunotiaceae	Eunotia sp.	1	1,237	1,237						
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	6,698							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		53,513	1,237		23,641	8,038			
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	32,977	6,183	26,794					
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	2,010							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Asterionella formosa	1	79,647		9,743					3,495
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	8,038				8,038			
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Tabellaria fenestrata	1	26,841		2,436					
Diatoms	Bacillariophyta	Rhizosoleniales	Rhizosoleniaceae	Urosolenia sp.	1	933,972				24,114			
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	1,237	1,237						
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella sp.		57,803			23,641	32,152			
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella cf. atomus	1	420,813			118,207	40,190			
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Lindavia sp.	1	77,252		19,486					
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Stephanodiscus sp.	1	87,093		9,743					
Diatoms	Bacillariophyta			Centric diatom		22,451,512	17,313	14,615	1,938,589	1,535,268		8,038	17,474
Diatoms	Bacillariophyta			Pennate diatom		38,713	3,710			16,076	3,495		3,495
				Total Diatoms		**24,504,645**	**50,702**	**94,995**	**2,127,719**	**1,720,143**	**3,495**	**8,038**	**24,464**
Green Algae	Charophyta	Desmidiales	Desmidiaceae	Staurastrum sp.	1	3,654							
Green Algae	Charophyta	Klebsormidiales	Elakatotrichaceae	Elakatothrix sp.	1	308,019	4,946			16,076		16,076	
Green Algae	Chlorophyta	Chlamydomonadales	Chlamydomonadaceae	Chlamydomonas sp.	1	15,019							
Green Algae	Chlorophyta	Chlamydomonadales	Sphaerocystidaceae	Sphaerocystis sp.	1	1,101,565	37,099	314,215			27,958		
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Nephrocytium sp.	1	44,672			11,821				
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Oocystis sp.	1	867,962	12,366	148,582			125,813	8,038	52,422
Green Algae	Chlorophyta	Chlorodendrophyceae	Chlorodendraceae	Tetraselmis sp.	1	8,373							
Green Algae	Chlorophyta	Prasiolales	Prasiolaceae	Stichococcus sp.	1	18,755							
Green Algae	Chlorophyta	Pyramimonadales	Pyramimonadaceae	Pyramimonas sp.	1	32,088	1,237						
Green Algae	Chlorophyta	Sphaeropleales	Characiaceae	Ankyra sp.	1	24,333							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Pseudopediastrum boryanum	1	160,412							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	3,190							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron sp.		261,539			11,821				
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus arcuatus	1	373,525						40,190	
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.		67,413							
Green Algae	Chlorophyta	Sphaeropleales	Schizochlamydaceae	Planktosphaeria sp.	1	7,691	1,237	2,436					
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Kirchneriella sp.	1	16,076							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	52,007	13,603	4,872	11,821		10,484		
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Quadrigula sp.	1	30,332							
Green Algae	Chlorophyta	Trebouxiales	Botryococcaceae	Botryococcus sp.	1	281,523							
Green Algae	Chlorophyta	Trebouxiophyceae ordo incertae sedis	Trebouxiophyceae incertae sedis	Crucigenia sp.	1	54,002							
Green Algae	Chlorophyta			Chlorophyte		20,623							
				Total Green Algae		**3,752,775**	**70,488**	**470,104**	**35,462**	**16,076**	**164,256**	**64,304**	**52,422**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-001	fp24-169-002	fp24-169-003	fp24-169-004	fp24-169-009	fp24-169-010	fp24-169-011
Client Sample ID							MP_POL-P2_PHYC-1_2024-06	MP_BOL-B2_PHYC-1_2024-06	MP_QUL-ZOO-1_PHYC-1_2024-06	MP_QUL-ZOO-7_PHYC-1_2024-06	MP_POL-P2_PHYC-1_2024-07	MP_POL-P2_PHYC-2_2024-07	MP_POL-P2_PHYC-3_2024-07
Date Sampled							19-Jun-24	19-Jun-24	20-Jun-24	20-Jun-24	23-Jul-24	23-Jul-24	23-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Golden Algae	Haptophyta	Prymnesiales	Chrysochromulinaceae	Chrysochromulina sp.	1	1,319,607	1,237	9,743	94,565	176,837	3,495	36,171	45,432
Golden Algae	Ochrophyta	Chromulinales	Chromulinaceae	Uroglena sp.	1	2,448,317	33,389	48,715	366,441	120,571	17,474	12,057	10,484
Golden Algae	Ochrophyta	Chromulinales	Chrysocapsaceae	Chrysocapsa sp.	1	7,420	7,420						
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Chrysolykos sp.	1	101,106			35,462	16,076			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon bavaricum	1	228,857			82,745	80,380			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon borgei	1	24,114				8,038			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon crenulatum	1	300,667			35,462	8,038			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon divergens	1	209,423			11,821	16,076			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon sp.		1,647,824			319,158	208,989	3,495		3,495
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Kephyrion/Pseudokephyrion sp.	1	965,684	24,732		236,413	136,647			
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia chodatii	1	9,593							
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia sp.		502							
Golden Algae	Ochrophyta	Pedinellales	Pedinellaceae	Pseudopedinella sp.	1	306,061			11,821				
Golden Algae	Ochrophyta	Phaeothamniales	Phaeothamniaceae	Stichogloea sp.	1	4,903,655	21,023	24,358			863,217	763,615	653,528
Golden Algae	Ochrophyta	Synurales	Mallomonadaceae	Mallomonas sp.	1	118,531	8,656	2,436	11,821				
Golden Algae	Ochrophyta			Chrysophyte		500,970	7,420	14,615	70,924	16,076		16,076	3,495
				Total Golden Algae		**13,092,329**	**103,876**	**99,867**	**1,276,631**	**787,729**	**887,680**	**827,919**	**716,435**
Cryptomonads	Cryptophyta	Cryptomonadales	Cryptomonadaceae	Cryptomonas sp.	1	462,046	7,420	21,922		8,038			
Cryptomonads	Cryptophyta	Pyrenomonadales	Geminigeraceae	Plagioselmis nannoplanctica	1	3,510,072	108,823	60,894	165,489	80,380		12,057	6,990
Cryptomonads	Katablepharidophyta	Katablepharidales	Katablepharidaceae	Katablepharis ovalis	1	502							
				Total Cryptomonads		**3,972,620**	**116,243**	**82,816**	**165,489**	**88,419**	**0**	**12,057**	**6,990**
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Euglena sp.	1	15,028							
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Trachelomonas sp.	1	59,119		7,307					
				Total Euglenoids		**74,147**	**0**	**7,307**	**0**	**0**	**0**	**0**	**0**
Blue-green Algae	Cyanophyta	Chroococcales	Chroococcaceae	Chroococcus sp.	1	54,675							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	68,242,651	452,604	2,116,687			2,908,454	2,982,117	4,302,803
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Coelosphaerium sp.	1	624,684							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Snowella sp.	1	45,498							
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Aphanizomenon sp.	1	1,681,599	111,296				6,990	84,400	255,121
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Dolichospermum sp.	1	1,669,083	225,065	87,688			164,256		38,443
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	378,300							
Blue-green Algae	Cyanophyta	Synechococcales	Coelosphaeriaceae	Coelomoron sp.	1	677,992							
Blue-green Algae	Cyanophyta	Synechococcales	Merismopediaceae	Aphanocapsa sp.	1	15,216,932					3,085,912	1,627,705	1,391,761
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Cyanodictyon sp.	1	10,677,006					723,424	381,807	1,096,786
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Synechococcus sp.	1	230,695		2,436	70,924	8,038			
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		227,962	21,023	7,307				16,076	24,464
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		35,440							
				Total Blue-green Algae		**99,762,518**	**809,988**	**2,214,117**	**70,924**	**8,038**	**6,889,036**	**5,092,105**	**7,109,378**
Yellow-green Algae	Ochrophyta	Chattonellales	Vacuolariaceae	Gonyostomum sp.	1	4,019							
				Total Yellow-green Algae		**4,019**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Dinoflagellates	Miozoa	Gonyaulacales	Ceratiaceae	Ceratium hirundinella	1	11,811							
Dinoflagellates	Miozoa	Gymnodiniales	Gymnodiniaceae	Gymnodinium sp.	1	243,495	1,237	4,872	11,821			4,019	
Dinoflagellates	Miozoa	Peridiniales	Peridiniaceae	Peridinium sp.	1	9,485							
				Total Dinoflagellates		**264,791**	**1,237**	**4,872**	**11,821**	**0**	**0**	**4,019**	**0**
Other Algae				Flagellated algal cell (< 10µm in length)		3,792							
				Total Other Algae		**3,792**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
				Total Phytoplankton		**145,431,637**	**1,152,533**	**2,974,079**	**3,688,046**	**2,620,404**	**7,944,467**	**6,008,442**	**7,909,688**
				Total Unique Taxa	**71**		**26**	**22**	**18**	**20**	**13**	**13**	**13**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-012	fp24-169-013	fp24-169-014	fp24-169-015	fp24-169-016	fp24-169-017	fp24-169-018
Client Sample ID							MP_POL-P2_PHYC-4_2024-07	MP_POL-P2_PHYC-5_2024-07	MP_BOL-B2_PHYC-1_2024-07	MP_BOL-B2_PHYC-2_2024-07	MP_BOL-B2_PHYC-3_2024-07	MP_BOL-B2_PHYC-4_2024-07	MP_BOL-B2_PHYC-5_2024-07
Date Sampled							23-Jul-24	23-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	128,997			12,759			60,285	
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.	1	15,149						4,019	
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.	1	30,752			6,379				
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	7,729	4,019						
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	8,038							
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	32,152							
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.	1	2,473							
Diatoms	Bacillariophyta	Eunotiales	Eunotiaceae	Eunotia sp.	1	1,237							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	6,698							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		53,513						4,019	
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	32,977							
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	2,010							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Asterionella formosa	1	79,647				15,166		28,133	
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	8,038							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Tabellaria fenestrata	1	26,841				15,166			
Diatoms	Bacillariophyta	Rhizosoleniales	Rhizosoleniaceae	Urosolenia sp.	1	933,972							
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	1,237							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella sp.		57,803							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella cf. atomus	1	420,813							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Lindavia sp.	1	77,252		4,019	15,949	7,583	7,583	8,038	8,931
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Stephanodiscus sp.	1	87,093			15,949			28,133	31,259
Diatoms	Bacillariophyta			Centric diatom		22,451,512		4,019	22,328	3,792		8,038	22,328
Diatoms	Bacillariophyta			Pennate diatom		38,713					7,583		
				Total Diatoms		**24,504,645**	**4,019**	**8,038**	**73,363**	**41,707**	**15,166**	**140,666**	**62,518**
Green Algae	Charophyta	Desmidiales	Desmidiaceae	Staurastrum sp.	1	3,654							
Green Algae	Charophyta	Klebsormidiales	Elakatotrichaceae	Elakatothrix sp.	1	308,019	20,095	4,019		15,166	15,166	16,076	13,397
Green Algae	Chlorophyta	Chlamydomonadales	Chlamydomonadaceae	Chlamydomonas sp.	1	15,019			3,190	3,792			
Green Algae	Chlorophyta	Chlamydomonadales	Sphaerocystidaceae	Sphaerocystis sp.	1	1,101,565	4,019	80,380	38,276	30,332	87,205	12,057	209,882
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Nephrocytium sp.	1	44,672							
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Oocystis sp.	1	867,962	20,095	80,380	82,932	60,665	53,081	24,114	17,862
Green Algae	Chlorophyta	Chlorodendrophyceae	Chlorodendraceae	Tetraselmis sp.	1	8,373							
Green Algae	Chlorophyta	Prasiolales	Prasiolaceae	Stichococcus sp.	1	18,755							
Green Algae	Chlorophyta	Pyramimonadales	Pyramimonadaceae	Pyramimonas sp.	1	32,088				11,375	3,792		4,466
Green Algae	Chlorophyta	Sphaeropleales	Characiaceae	Ankyra sp.	1	24,333	12,057			3,792		4,019	4,466
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Pseudopediastrum boryanum	1	160,412							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	3,190			3,190				
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron sp.		261,539							
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus arcuatus	1	373,525	60,285				18,958	148,704	89,312
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.		67,413					15,166		
Green Algae	Chlorophyta	Sphaeropleales	Schizochlamydaceae	Planktosphaeria sp.	1	7,691						4,019	
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Kirchneriella sp.	1	16,076							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	52,007			3,190				
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Quadrigula sp.	1	30,332				30,332			
Green Algae	Chlorophyta	Trebouxiales	Botryococcaceae	Botryococcus sp.	1	281,523		56,266	76,553			68,323	40,190
Green Algae	Chlorophyta	Trebouxiophyceae ordo incertae sedis	Trebouxiophyceae incertae sedis	Crucigenia sp.	1	54,002			31,897				
Green Algae	Chlorophyta			Chlorophyte		20,623							8,931
				Total Green Algae		**3,752,775**	**116,552**	**221,046**	**239,228**	**155,453**	**193,368**	**277,313**	**388,506**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-012	fp24-169-013	fp24-169-014	fp24-169-015	fp24-169-016	fp24-169-017	fp24-169-018
Client Sample ID							MP_POL-P2_PHYC-4_2024-07	MP_POL-P2_PHYC-5_2024-07	MP_BOL-B2_PHYC-1_2024-07	MP_BOL-B2_PHYC-2_2024-07	MP_BOL-B2_PHYC-3_2024-07	MP_BOL-B2_PHYC-4_2024-07	MP_BOL-B2_PHYC-5_2024-07
Date Sampled							23-Jul-24	23-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Golden Algae	Haptophyta	Prymnesiales	Chrysochromulinaceae	Chrysochromulina sp.	1	1,319,607	144,685		31,897	75,831	64,456	72,342	71,449
Golden Algae	Ochrophyta	Chromulinales	Chromulinaceae	Uroglena sp.	1	2,448,317		8,038	19,138	22,749	30,332	12,057	49,121
Golden Algae	Ochrophyta	Chromulinales	Chrysocapsaceae	Chrysocapsa sp.	1	7,420							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Chrysolykos sp.	1	101,106							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon bavaricum	1	228,857							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon borgei	1	24,114							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon crenulatum	1	300,667							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon divergens	1	209,423							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon sp.		1,647,824							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Kephyrion/Pseudokephyrion sp.	1	965,684		4,019					
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia chodatii	1	9,593				7,583			
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia sp.		502							
Golden Algae	Ochrophyta	Pedinellales	Pedinellaceae	Pseudopedinella sp.	1	306,061	12,057		6,379	3,792			
Golden Algae	Ochrophyta	Phaeothamniales	Phaeothamniaceae	Stichogloea sp.	1	4,903,655	538,549	904,281	271,125	106,163	337,446	140,666	254,538
Golden Algae	Ochrophyta	Synurales	Mallomonadaceae	Mallomonas sp.	1	118,531	4,019		6,379	15,166		4,019	8,931
Golden Algae	Ochrophyta			Chrysophyte		500,970	8,038		25,518	15,166	3,792	12,057	8,931
				Total Golden Algae		**13,092,329**	**707,348**	**916,338**	**360,436**	**246,450**	**436,026**	**241,142**	**392,971**
Cryptomonads	Cryptophyta	Cryptomonadales	Cryptomonadaceae	Cryptomonas sp.	1	462,046	8,038		38,276	53,081	26,541	64,304	53,587
Cryptomonads	Cryptophyta	Pyrenomonadales	Geminigeraceae	Plagioselmis nannoplanctica	1	3,510,072	196,932		306,211	390,528	333,655	409,941	406,368
Cryptomonads	Katablepharidophyta	Katablepharidales	Katablepharidaceae	Katablepharis ovalis	1	502							
				Total Cryptomonads		**3,972,620**	**204,970**	**0**	**344,488**	**443,609**	**360,196**	**474,245**	**459,955**
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Euglena sp.	1	15,028					11,375		
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Trachelomonas sp.	1	59,119			12,759	3,792	15,166	20,095	
				Total Euglenoids		**74,147**	**0**	**0**	**12,759**	**3,792**	**26,541**	**20,095**	**0**
Blue-green Algae	Cyanophyta	Chroococcales	Chroococcaceae	Chroococcus sp.	1	54,675					7,583		17,862
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	68,242,651	3,885,057	4,035,832	9,462,784	7,661,424	7,732,452	5,916,005	8,452,791
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Coelosphaerium sp.	1	624,684							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Snowella sp.	1	45,498					45,498		
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Aphanizomenon sp.	1	1,681,599	136,647	285,351					
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Dolichospermum sp.	1	1,669,083	12,057	12,057	124,398	147,870	219,909	204,970	165,227
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	378,300				41,707			
Blue-green Algae	Cyanophyta	Synechococcales	Coelosphaeriaceae	Coelomoron sp.	1	677,992	96,457		191,382	15,166		4,019	267,935
Blue-green Algae	Cyanophyta	Synechococcales	Merismopediaceae	Aphanocapsa sp.	1	15,216,932	1,746,108	1,547,325	1,110,016	1,046,463	485,316	192,913	937,773
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Cyanodictyon sp.	1	10,677,006	208,989	442,093	516,732	1,061,629	1,497,656	1,334,316	1,384,331
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Synechococcus sp.	1	230,695				3,792		4,019	
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		227,962	28,133	4,019		72,039	22,749		
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		35,440	28,133						
				Total Blue-green Algae		**99,762,518**	**6,141,581**	**6,326,676**	**11,405,313**	**10,050,090**	**10,011,164**	**7,656,243**	**11,225,918**
Yellow-green Algae	Ochrophyta	Chattonellales	Vacuolariaceae	Gonyostomum sp.	1	4,019						4,019	
				Total Yellow-green Algae		**4,019**	**0**	**0**	**0**	**0**	**0**	**4,019**	**0**
Dinoflagellates	Miozoa	Gonyaulacales	Ceratiaceae	Ceratium hirundinella	1	11,811			3,190				4,466
Dinoflagellates	Miozoa	Gymnodiniales	Gymnodiniaceae	Gymnodinium sp.	1	243,495					3,792		4,466
Dinoflagellates	Miozoa	Peridiniales	Peridiniaceae	Peridinium sp.	1	9,485				3,792		4,019	
				Total Dinoflagellates		**264,791**	**0**	**0**	**3,190**	**3,792**	**3,792**	**4,019**	**8,931**
Other Algae				Flagellated algal cell (< 10µm in length)		3,792				3,792			
				Total Other Algae		**3,792**	**0**	**0**	**0**	**3,792**	**0**	**0**	**0**
				Total Phytoplankton		**145,431,637**	**7,174,471**	**7,472,098**	**12,438,776**	**10,948,684**	**11,046,252**	**8,817,741**	**12,538,800**
				Total Unique Taxa	**71**		**18**	**13**	**25**	**27**	**21**	**28**	**23**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-019	fp24-169-020	fp24-169-021	fp24-169-022	fp24-169-023	fp24-169-024	fp24-169-025
Client Sample ID							MP_QUL-ZOO-1_PHYC-1_2024-07	MP_QUL-ZOO-1_PHYC-2_2024-07	MP_QUL-ZOO-1_PHYC-3_2024-07	MP_QUL-ZOO-1_PHYC-4_2024-07	MP_QUL-ZOO-1_PHYC-5_2024-07	MP_QUL-ZOO-7_PHYC-1_2024-07	MP_QUL-ZOO-7_PHYC-2_2024-07
Date Sampled							24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	128,997							
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.	1	15,149							
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.	1	30,752							
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	7,729							
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	8,038							
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	32,152							
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.	1	2,473							
Diatoms	Bacillariophyta	Eunotiales	Eunotiaceae	Eunotia sp.	1	1,237							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	6,698							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		53,513				8,038		8,038	
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	32,977							
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	2,010							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Asterionella formosa	1	79,647							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	8,038							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Tabellaria fenestrata	1	26,841		8,737					
Diatoms	Bacillariophyta	Rhizosoleniales	Rhizosoleniaceae	Urosolenia sp.	1	933,972	96,107	69,896	32,152	56,266	40,190	144,685	168,799
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	1,237							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella sp.		57,803							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella cf. atomus	1	420,813	26,211	26,211	16,076	48,228	50,238		16,076
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Lindavia sp.	1	77,252							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Stephanodiscus sp.	1	87,093							
Diatoms	Bacillariophyta			Centric diatom		22,451,512	2,402,678	1,948,353	1,776,409	1,768,371	2,351,130	1,599,572	1,679,952
Diatoms	Bacillariophyta			Pennate diatom		38,713							
				Total Diatoms		**24,504,645**	**2,524,996**	**2,053,198**	**1,824,637**	**1,880,904**	**2,441,558**	**1,752,295**	**1,864,828**
Green Algae	Charophyta	Desmidiales	Desmidiaceae	Staurastrum sp.	1	3,654							
Green Algae	Charophyta	Klebsormidiales	Elakatotrichaceae	Elakatothrix sp.	1	308,019		34,948		16,076	40,190		48,228
Green Algae	Chlorophyta	Chlamydomonadales	Chlamydomonadaceae	Chlamydomonas sp.	1	15,019							8,038
Green Algae	Chlorophyta	Chlamydomonadales	Sphaerocystidaceae	Sphaerocystis sp.	1	1,101,565							
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Nephrocytium sp.	1	44,672	8,737			8,038		8,038	
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Oocystis sp.	1	867,962		43,685	16,076	8,038		24,114	8,038
Green Algae	Chlorophyta	Chlorodendrophyceae	Chlorodendraceae	Tetraselmis sp.	1	8,373							
Green Algae	Chlorophyta	Prasiolales	Prasiolaceae	Stichococcus sp.	1	18,755							8,038
Green Algae	Chlorophyta	Pyramimonadales	Pyramimonadaceae	Pyramimonas sp.	1	32,088							
Green Algae	Chlorophyta	Sphaeropleales	Characiaceae	Ankyra sp.	1	24,333							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Pseudopediastrum boryanum	1	160,412	96,107						
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	3,190							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron sp.		261,539	8,737	52,422	16,076	40,190	40,190	16,076	
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus arcuatus	1	373,525							
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.		67,413					20,095		
Green Algae	Chlorophyta	Sphaeropleales	Schizochlamydaceae	Planktosphaeria sp.	1	7,691							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Kirchneriella sp.	1	16,076							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	52,007			8,038				
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Quadrigula sp.	1	30,332							
Green Algae	Chlorophyta	Trebouxiales	Botryococcaceae	Botryococcus sp.	1	281,523							
Green Algae	Chlorophyta	Trebouxiophyceae ordo incertae sedis	Trebouxiophyceae incertae sedis	Crucigenia sp.	1	54,002							
Green Algae	Chlorophyta			Chlorophyte		20,623							
				Total Green Algae		**3,752,775**	**113,581**	**131,055**	**40,190**	**72,342**	**100,476**	**48,228**	**72,342**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-019	fp24-169-020	fp24-169-021	fp24-169-022	fp24-169-023	fp24-169-024	fp24-169-025
Client Sample ID							MP_QUL-ZOO-1_PHYC-1_2024-07	MP_QUL-ZOO-1_PHYC-2_2024-07	MP_QUL-ZOO-1_PHYC-3_2024-07	MP_QUL-ZOO-1_PHYC-4_2024-07	MP_QUL-ZOO-1_PHYC-5_2024-07	MP_QUL-ZOO-7_PHYC-1_2024-07	MP_QUL-ZOO-7_PHYC-2_2024-07
Date Sampled							24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Golden Algae	Haptophyta	Prymnesiales	Chrysochromulinaceae	Chrysochromulina sp.	1	1,319,607	17,474	61,159	48,228	32,152	20,095	80,380	48,228
Golden Algae	Ochrophyta	Chromulinales	Chromulinaceae	Uroglena sp.	1	2,448,317	78,633	218,425	152,723	249,180	200,951	152,723	152,723
Golden Algae	Ochrophyta	Chromulinales	Chrysocapsaceae	Chrysocapsa sp.	1	7,420							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Chrysolykos sp.	1	101,106			8,038		10,048	16,076	
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon bavaricum	1	228,857	26,211		8,038		10,048		
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon borgei	1	24,114			8,038			8,038	
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon crenulatum	1	300,667		34,948	8,038	16,076		40,190	40,190
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon divergens	1	209,423			8,038	8,038			8,038
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon sp.		1,647,824	87,370	139,792	128,609	104,495	100,476	136,647	96,457
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Kephyrion/Pseudokephyrion sp.	1	965,684	26,211	34,948	56,266	48,228	30,143	64,304	128,609
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia chodatii	1	9,593							
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia sp.		502							
Golden Algae	Ochrophyta	Pedinellales	Pedinellaceae	Pseudopedinella sp.	1	306,061		17,474	16,076	24,114	20,095	56,266	16,076
Golden Algae	Ochrophyta	Phaeothamniales	Phaeothamniaceae	Stichogloea sp.	1	4,903,655		17,474					
Golden Algae	Ochrophyta	Synurales	Mallomonadaceae	Mallomonas sp.	1	118,531				16,076	10,048		16,076
Golden Algae	Ochrophyta			Chrysophyte		500,970	8,737	34,948	48,228	40,190	30,143	24,114	8,038
				Total Golden Algae		**13,092,329**	**244,636**	**559,169**	**490,321**	**538,549**	**432,045**	**578,740**	**514,435**
Cryptomonads	Cryptophyta	Cryptomonadales	Cryptomonadaceae	Cryptomonas sp.	1	462,046		17,474	24,114	8,038	10,048	24,114	8,038
Cryptomonads	Cryptophyta	Pyrenomonadales	Geminigeraceae	Plagioselmis nannoplanctica	1	3,510,072		34,948	96,457	48,228	100,476	72,342	32,152
Cryptomonads	Katablepharidophyta	Katablepharidales	Katablepharidaceae	Katablepharis ovalis	1	502							
				Total Cryptomonads		**3,972,620**	**0**	**52,422**	**120,571**	**56,266**	**110,523**	**96,457**	**40,190**
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Euglena sp.	1	15,028							
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Trachelomonas sp.	1	59,119							
				Total Euglenoids		**74,147**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Blue-green Algae	Cyanophyta	Chroococcales	Chroococcaceae	Chroococcus sp.	1	54,675							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	68,242,651							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Coelosphaerium sp.	1	624,684							
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Snowella sp.	1	45,498							
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Aphanizomenon sp.	1	1,681,599							
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Dolichospermum sp.	1	1,669,083							
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	378,300							
Blue-green Algae	Cyanophyta	Synechococcales	Coelosphaeriaceae	Coelomoron sp.	1	677,992							
Blue-green Algae	Cyanophyta	Synechococcales	Merismopediaceae	Aphanocapsa sp.	1	15,216,932							
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Cyanodictyon sp.	1	10,677,006							
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Synechococcus sp.	1	230,695		8,737	8,038	16,076	50,238		
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		227,962							
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		35,440							
				Total Blue-green Algae		**99,762,518**	**0**	**8,737**	**8,038**	**16,076**	**50,238**	**0**	**0**
Yellow-green Algae	Ochrophyta	Chattonellales	Vacuolariaceae	Gonyostomum sp.	1	4,019							
				Total Yellow-green Algae		**4,019**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Dinoflagellates	Miozoa	Gonyaulacales	Ceratiaceae	Ceratium hirundinella	1	11,811							
Dinoflagellates	Miozoa	Gymnodiniales	Gymnodiniaceae	Gymnodinium sp.	1	243,495	8,737	43,685	24,114	24,114	40,190	16,076	16,076
Dinoflagellates	Miozoa	Peridiniales	Peridiniaceae	Peridinium sp.	1	9,485							
				Total Dinoflagellates		**264,791**	**8,737**	**43,685**	**24,114**	**24,114**	**40,190**	**16,076**	**16,076**
Other Algae				Flagellated algal cell (< 10µm in length)		3,792							
				Total Other Algae		**3,792**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
				Total Phytoplankton		**145,431,637**	**2,891,951**	**2,848,266**	**2,507,872**	**2,588,252**	**3,175,030**	**2,491,795**	**2,507,872**
				Total Unique Taxa	**71**		**10**	**16**	**18**	**18**	**16**	**15**	**16**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-026	fp24-169-027	fp24-169-028	fp24-169-049	fp24-169-050	fp24-169-051	fp24-169-052
Client Sample ID							MP_QUL-ZOO-7_PHYC-3_2024-07	MP_QUL-ZOO-7_PHYC-4_2024-07	MP_QUL-ZOO-7_PHYC-5_2024-07	MP_POL-P2_PHYC-1_2024-08	MP_BOL-B2_PHYC-1_2024-08	MP_QUL-ZOO-1_PHYC-1_2024-08	MP_QUL-ZOO-7_PHYC-1_2024-08
Date Sampled							24-Jul-24	24-Jul-24	24-Jul-24	26-Aug-24	26-Aug-24	25-Aug-24	25-Aug-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	128,997							4,019
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.	1	15,149							
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.	1	30,752			6,698	2,010		670	4,521
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	7,729							
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	8,038							
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	32,152		8,038					
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.	1	2,473							
Diatoms	Bacillariophyta	Eunotiales	Eunotiaceae	Eunotia sp.	1	1,237							
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	6,698						6,698	
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		53,513							502
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	32,977							
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	2,010				2,010			
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Asterionella formosa	1	79,647				22,105			1,005
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	8,038							
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Tabellaria fenestrata	1	26,841							502
Diatoms	Bacillariophyta	Rhizosoleniales	Rhizosoleniaceae	Urosolenia sp.	1	933,972	104,495	120,571	73,682				3,014
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	1,237							
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella sp.		57,803				2,010			
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella cf. atomus	1	420,813	16,076	32,152	26,793			3,349	1,005
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Lindavia sp.	1	77,252				2,010	3,654		
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Stephanodiscus sp.	1	87,093				2,010			
Diatoms	Bacillariophyta			Centric diatom		22,451,512	1,760,333	1,840,713	1,614,308	6,029		63,635	48,228
Diatoms	Bacillariophyta			Pennate diatom		38,713						3,349	1,005
				Total Diatoms		**24,504,645**	**1,880,904**	**2,001,474**	**1,721,482**	**38,181**	**3,654**	**77,701**	**63,802**
Green Algae	Charophyta	Desmidiales	Desmidiaceae	Staurastrum sp.	1	3,654					3,654		
Green Algae	Charophyta	Klebsormidiales	Elakatotrichaceae	Elakatothrix sp.	1	308,019	16,076	16,076	6,698	6,029		670	2,010
Green Algae	Chlorophyta	Chlamydomonadales	Chlamydomonadaceae	Chlamydomonas sp.	1	15,019							
Green Algae	Chlorophyta	Chlamydomonadales	Sphaerocystidaceae	Sphaerocystis sp.	1	1,101,565		8,038			252,102		
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Nephrocytium sp.	1	44,672	8,038						
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Oocystis sp.	1	867,962	8,038	8,038		46,219	7,307	8,038	4,019
Green Algae	Chlorophyta	Chlorodendrophyceae	Chlorodendraceae	Tetraselmis sp.	1	8,373						5,359	3,014
Green Algae	Chlorophyta	Prasiolales	Prasiolaceae	Stichococcus sp.	1	18,755			6,698			2,010	2,010
Green Algae	Chlorophyta	Pyramimonadales	Pyramimonadaceae	Pyramimonas sp.	1	32,088	8,038			2,010		670	502
Green Algae	Chlorophyta	Sphaeropleales	Characiaceae	Ankyra sp.	1	24,333							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Pseudopediastrum boryanum	1	160,412		64,304					
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	3,190							
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron sp.		261,539	32,152	8,038	33,492			1,340	1,005
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus arcuatus	1	373,525				16,076			
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.		67,413		32,152					
Green Algae	Chlorophyta	Sphaeropleales	Schizochlamydaceae	Planktosphaeria sp.	1	7,691							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Kirchneriella sp.	1	16,076	16,076						
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	52,007							
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Quadrigula sp.	1	30,332							
Green Algae	Chlorophyta	Trebouxiales	Botryococcaceae	Botryococcus sp.	1	281,523				40,190			
Green Algae	Chlorophyta	Trebouxiophyceae ordo incertae sedis	Trebouxiophyceae incertae sedis	Crucigenia sp.	1	54,002				22,105			
Green Algae	Chlorophyta			Chlorophyte		20,623		8,038			3,654		
				Total Green Algae		**3,752,775**	**88,419**	**144,685**	**46,889**	**132,628**	**266,717**	**18,086**	**12,559**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-026	fp24-169-027	fp24-169-028	fp24-169-049	fp24-169-050	fp24-169-051	fp24-169-052
Client Sample ID							MP_QUL-ZOO-7_PHYC-3_2024-07	MP_QUL-ZOO-7_PHYC-4_2024-07	MP_QUL-ZOO-7_PHYC-5_2024-07	MP_POL-P2_PHYC-1_2024-08	MP_BOL-B2_PHYC-1_2024-08	MP_QUL-ZOO-1_PHYC-1_2024-08	MP_QUL-ZOO-7_PHYC-1_2024-08
Date Sampled							24-Jul-24	24-Jul-24	24-Jul-24	26-Aug-24	26-Aug-24	25-Aug-24	25-Aug-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)	(cells/L)
Golden Algae	Haptophyta	Prymnesiales	Chrysochromulinaceae	Chrysochromulina sp.	1	1,319,607	32,152	72,342	20,095	38,181	14,615	5,359	1,005
Golden Algae	Ochrophyta	Chromulinales	Chromulinaceae	Uroglena sp.	1	2,448,317	225,065	112,533	100,476	18,086	32,883	3,349	
Golden Algae	Ochrophyta	Chromulinales	Chrysocapsaceae	Chrysocapsa sp.	1	7,420							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Chrysolykos sp.	1	101,106		8,038	6,698			670	
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon bavaricum	1	228,857	8,038		13,397				
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon borgei	1	24,114							
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon crenulatum	1	300,667	40,190	48,228	26,793				2,512
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon divergens	1	209,423		16,076	6,698	134,637			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon sp.		1,647,824	96,457	136,647	53,587	22,105		4,019	6,029
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Kephyrion/Pseudokephyrion sp.	1	965,684	24,114	56,266	66,984	4,019		8,708	15,071
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia chodatii	1	9,593				2,010			
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia sp.		502							502
Golden Algae	Ochrophyta	Pedinellales	Pedinellaceae	Pseudopedinella sp.	1	306,061	32,152	24,114	13,397	8,038		30,143	14,067
Golden Algae	Ochrophyta	Phaeothamniales	Phaeothamniaceae	Stichogloea sp.	1	4,903,655				4,019	3,654		
Golden Algae	Ochrophyta	Synurales	Mallomonadaceae	Mallomonas sp.	1	118,531		8,038		2,010		3,349	1,507
Golden Algae	Ochrophyta			Chrysophyte		500,970	48,228	24,114	13,397	2,010	3,654	8,038	5,024
				Total Golden Algae		**13,092,329**	**506,397**	**506,397**	**321,522**	**235,113**	**54,805**	**63,635**	**45,716**
Cryptomonads	Cryptophyta	Cryptomonadales	Cryptomonadaceae	Cryptomonas sp.	1	462,046		24,114		6,029	29,229	16,076	13,564
Cryptomonads	Cryptophyta	Pyrenomonadales	Geminigeraceae	Plagioselmis nannoplanctica	1	3,510,072	80,380	72,342		158,751	284,985	28,133	22,607
Cryptomonads	Katablepharidophyta	Katablepharidales	Katablepharidaceae	Katablepharis ovalis	1	502							502
				Total Cryptomonads		**3,972,620**	**80,380**	**96,457**	**0**	**164,780**	**314,215**	**44,209**	**36,674**
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Euglena sp.	1	15,028					3,654		
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Trachelomonas sp.	1	59,119							
				Total Euglenoids		**74,147**	**0**	**0**	**0**	**0**	**3,654**	**0**	**0**
Blue-green Algae	Cyanophyta	Chroococcales	Chroococcaceae	Chroococcus sp.	1	54,675					29,229		
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	68,242,651		337,598		4,692,803	3,303,240		
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Coelosphaerium sp.	1	624,684					314,215	24,114	286,356
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Snowella sp.	1	45,498							
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Aphanizomenon sp.	1	1,681,599				118,561	683,234		
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Dolichospermum sp.	1	1,669,083				48,228	215,566	3,349	
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	378,300					336,593		
Blue-green Algae	Cyanophyta	Synechococcales	Coelosphaeriaceae	Coelomoron sp.	1	677,992				48,228	54,805		
Blue-green Algae	Cyanophyta	Synechococcales	Merismopediaceae	Aphanocapsa sp.	1	15,216,932				578,740	1,466,900		
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Cyanodictyon sp.	1	10,677,006				1,641,954	387,288		
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Synechococcus sp.	1	230,695	32,152				25,576	670	
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		227,962	32,152						
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		35,440					7,307		
				Total Blue-green Algae		**99,762,518**	**64,304**	**337,598**	**0**	**7,128,515**	**6,823,953**	**28,133**	**286,356**
Yellow-green Algae	Ochrophyta	Chattonellales	Vacuolariaceae	Gonyostomum sp.	1	4,019							
				Total Yellow-green Algae		**4,019**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Dinoflagellates	Miozoa	Gonyaulacales	Ceratiaceae	Ceratium hirundinella	1	11,811					3,654		502
Dinoflagellates	Miozoa	Gymnodiniales	Gymnodiniaceae	Gymnodinium sp.	1	243,495	8,038	16,076		2,010	7,307	5,359	1,507
Dinoflagellates	Miozoa	Peridiniales	Peridiniaceae	Peridinium sp.	1	9,485						670	1,005
				Total Dinoflagellates		**264,791**	**8,038**	**16,076**	**0**	**2,010**	**10,961**	**6,029**	**3,014**
Other Algae				Flagellated algal cell (< 10µm in length)		3,792							
				Total Other Algae		**3,792**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
				Total Phytoplankton		**145,431,637**	**2,628,442**	**3,102,687**	**2,089,893**	**7,701,226**	**7,477,958**	**237,792**	**448,121**
				Total Unique Taxa	**71**		**17**	**21**	**14**	**29**	**22**	**23**	**26**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-003_QA	fp24-169-013_QA	fp24-169-014_QA
Client Sample ID							MP_QUL-ZOO-1_PHYC-1_2024-06_QA	MP_POL-P2_PHYC-5_2024-07_QA	MP_BOL-B2_PHYC-1_2024-07_QA
Date Sampled							20-Jun-24	23-Jul-24	25-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	128,997			
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.	1	15,149			
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.	1	30,752			
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	7,729			
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	8,038			
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	32,152			
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.	1	2,473			
Diatoms	Bacillariophyta	Eunotiales	Eunotiaceae	Eunotia sp.	1	1,237			
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	6,698			
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		53,513	23,641		
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	32,977		12,057	
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	2,010			
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Asterionella formosa	1	79,647	23,641		
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	8,038			
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Tabellaria fenestrata	1	26,841			
Diatoms	Bacillariophyta	Rhizosoleniales	Rhizosoleniaceae	Urosolenia sp.	1	933,972			
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	1,237			
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella sp.		57,803	11,821		
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Cyclotella cf. atomus	1	420,813	11,821		
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Lindavia sp.	1	77,252		4,019	6,379
Diatoms	Bacillariophyta	Stephanodiscales	Stephanodiscaceae	Stephanodiscus sp.	1	87,093			19,138
Diatoms	Bacillariophyta			Centric diatom		22,451,512	2,340,491		12,759
Diatoms	Bacillariophyta			Pennate diatom		38,713			
				Total Diatoms		**24,504,645**	**2,411,415**	**16,076**	**38,276**
Green Algae	Charophyta	Desmidiales	Desmidiaceae	Staurastrum sp.	1	3,654			
Green Algae	Charophyta	Klebsormidiales	Elakatotrichaceae	Elakatothrix sp.	1	308,019	23,641		19,138
Green Algae	Chlorophyta	Chlamydomonadales	Chlamydomonadaceae	Chlamydomonas sp.	1	15,019			
Green Algae	Chlorophyta	Chlamydomonadales	Sphaerocystidaceae	Sphaerocystis sp.	1	1,101,565		4,019	95,691
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Nephrocytium sp.	1	44,672			
Green Algae	Chlorophyta	Chlorellales	Oocystaceae	Oocystis sp.	1	867,962		32,152	98,881
Green Algae	Chlorophyta	Chlorodendrophyceae	Chlorodendraceae	Tetraselmis sp.	1	8,373			
Green Algae	Chlorophyta	Prasiolales	Prasiolaceae	Stichococcus sp.	1	18,755			
Green Algae	Chlorophyta	Pyramimonadales	Pyramimonadaceae	Pyramimonas sp.	1	32,088			
Green Algae	Chlorophyta	Sphaeropleales	Characiaceae	Ankyra sp.	1	24,333			
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Pseudopediastrum boryanum	1	160,412			
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	3,190			3,190
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron sp.		261,539	11,821		
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus arcuatus	1	373,525		40,190	51,035
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.		67,413			
Green Algae	Chlorophyta	Sphaeropleales	Schizochlamydaceae	Planktosphaeria sp.	1	7,691			3,190
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Kirchneriella sp.	1	16,076			
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	52,007			
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Quadrigula sp.	1	30,332			
Green Algae	Chlorophyta	Trebouxiales	Botryococcaceae	Botryococcus sp.	1	281,523			38,276
Green Algae	Chlorophyta	Trebouxiophyceae ordo incertae sedis	Trebouxiophyceae incertae sedis	Crucigenia sp.	1	54,002			
Green Algae	Chlorophyta			Chlorophyte		20,623			
				Total Green Algae		**3,752,775**	**35,462**	**76,361**	**309,401**

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Total Phytoplankton Density (cells/L) for Minnow Environmental Inc., Mount Polley, 2024

Biologica Sample ID							fp24-169-003_QA	fp24-169-013_QA	fp24-169-014_QA
Client Sample ID							MP_QUL-ZOO-1_PHYC-1_2024-06_QA	MP_POL-P2_PHYC-5_2024-07_QA	MP_BOL-B2_PHYC-1_2024-07_QA
Date Sampled							20-Jun-24	23-Jul-24	25-Jul-24
Common Name	Phylum	Order	Family	Taxon	Grand Total		Total Density	Total Density	Total Density
					Unique Taxa	Density (cells/L)	(cells/L)	(cells/L)	(cells/L)
Golden Algae	Haptophyta	Prymnesiales	Chrysochromulinaceae	Chrysochromulina sp.	1	1,319,607	94,565	8,038	89,312
Golden Algae	Ochrophyta	Chromulinales	Chromulinaceae	Uroglena sp.	1	2,448,317	236,413	16,076	28,707
Golden Algae	Ochrophyta	Chromulinales	Chrysocapsaceae	Chrysocapsa sp.	1	7,420			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Chrysolykos sp.	1	101,106	35,462		
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon bavaricum	1	228,857	94,565		
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon borgei	1	24,114			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon crenulatum	1	300,667	11,821		
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon divergens	1	209,423			
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Dinobryon sp.		1,647,824	224,593		
Golden Algae	Ochrophyta	Chromulinales	Dinobryaceae	Kephyrion/Pseudokephyrion sp.	1	965,684	177,310		
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia chodatii	1	9,593			
Golden Algae	Ochrophyta	Hibberdinales	Stylococcaceae	Bitrichia sp.		502			
Golden Algae	Ochrophyta	Pedinellales	Pedinellaceae	Pseudopedinella sp.	1	306,061	11,821		
Golden Algae	Ochrophyta	Phaeothamniales	Phaeothamniaceae	Stichogloea sp.	1	4,903,655		1,032,889	63,794
Golden Algae	Ochrophyta	Synurales	Mallomonadaceae	Mallomonas sp.	1	118,531	11,821		6,379
Golden Algae	Ochrophyta			Chrysophyte		500,970			6,379
				Total Golden Algae		**13,092,329**	**898,370**	**1,057,004**	**194,572**
Cryptomonads	Cryptophyta	Cryptomonadales	Cryptomonadaceae	Cryptomonas sp.	1	462,046	23,641		47,846
Cryptomonads	Cryptophyta	Pyrenomonadales	Geminigeraceae	Plagioselmis nannoplanctica	1	3,510,072	177,310	4,019	366,816
Cryptomonads	Katablepharidophyta	Katablepharidales	Katablepharidaceae	Katablepharis ovalis	1	502			
				Total Cryptomonads		**3,972,620**	**200,951**	**4,019**	**414,661**
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Euglena sp.	1	15,028			6,379
Euglenoids	Euglenozoa	Euglenida	Euglenidae	Trachelomonas sp.	1	59,119			15,949
				Total Euglenoids		**74,147**	**0**	**0**	**22,328**
Blue-green Algae	Cyanophyta	Chroococcales	Chroococcaceae	Chroococcus sp.	1	54,675			
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	68,242,651		1,241,879	8,325,123
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Coelosphaerium sp.	1	624,684			
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Snowella sp.	1	45,498		72,342	
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Aphanizomenon sp.	1	1,681,599		88,419	
Blue-green Algae	Cyanophyta	Nostocales	Aphanizomenonaceae	Dolichospermum sp.	1	1,669,083		80,380	127,588
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	378,300			
Blue-green Algae	Cyanophyta	Synechococcales	Coelosphaeriaceae	Coelomoron sp.	1	677,992			446,558
Blue-green Algae	Cyanophyta	Synechococcales	Merismopediaceae	Aphanocapsa sp.	1	15,216,932		2,269,808	1,001,567
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Cyanodictyon sp.	1	10,677,006		1,483,020	181,813
Blue-green Algae	Cyanophyta	Synechococcales	Synechococcaceae	Synechococcus sp.	1	230,695			
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		227,962	11,821	8,038	
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		35,440			
				Total Blue-green Algae		**99,762,518**	**11,821**	**5,243,887**	**10,082,649**
Yellow-green Algae	Ochrophyta	Chattonellales	Vacuolariaceae	Gonyostomum sp.	1	4,019			
				Total Yellow-green Algae		**4,019**	**0**	**0**	**0**
Dinoflagellates	Miozoa	Gonyaulacales	Ceratiaceae	Ceratium hirundinella	1	11,811			3,190
Dinoflagellates	Miozoa	Gymnodiniales	Gymnodiniaceae	Gymnodinium sp.	1	243,495	47,283		6,379
Dinoflagellates	Miozoa	Peridiniales	Peridiniaceae	Peridinium sp.	1	9,485			
				Total Dinoflagellates		**264,791**	**47,283**	**0**	**9,569**
Other Algae				Flagellated algal cell (< 10µm in length)		3,792			
				Total Other Algae		**3,792**	**0**	**0**	**0**
				Total Phytoplankton		**145,431,637**	**3,605,302**	**6,397,347**	**11,071,457**
				Total Unique Taxa	**71**		**16**	**15**	**24**

PLANKTON COMMUNITY

Biologica Laboratory Reports fz24-169
Freshwater Zooplankton

(Finalized November 25, 2024)

Freshwater Zooplankton Enumeration and Identification Methods
Client: Minnow Environmental
Project: Mount Polley

Sample Inventory

Sample arrival: 26-Jun-24; 29-July-24; 3-Sept-24
Number of samples: 28 (4, 20, 4)
Number of jars: 28
Screen size: 50 µm
Biologica project number: fz24-169

Upon arrival, the samples were examined and double-checked against the chain of custody to ensure that (1) all samples were accounted for, and (2) each sample had the appropriate number of jars as indicated on the COC. Any discrepancies were reported to the client and were resolved before further sample handling. Samples arrived in formalin and were assigned a unique identification number. For processing, samples were analyzed in water and then transferred back into 10% Formalin for storage.

Sample Processing

Freshwater zooplankton samples were analyzed in three fractions as follows:

(1) A "Coarse" URL (Unique, Rare and Large) fraction, in which a check of the entire sample was performed to look for URL taxa. These organisms were enumerated as a whole count; and

(2) A "Coarse" fraction comprised of cladocerans, adult copepods, and copepedids, in which a minimum count of 200 organisms was obtained; and

(3) A "Fine" or "Micro" fraction, in which only copepod nauplii and rotifers were identified and enumerated. Processing of the micro fraction was completed to either a 100-count or a maximum of three sub-samples. The Micro fraction was analyzed using a 1-mL Sedgewick-Rafter counting chamber.

The Coarse fraction was analyzed in a Bogorov tray through a stereo microscope at 10-40x magnification. All organisms were identified by taxonomic experts to the lowest taxonomic level using a compound microscope (100–400x magnification), appropriate dissection tools, and standard taxonomic references. For copepods, the stage of development was also recorded (copepodite stages I-V) as is the sex for mature individuals (copepod stage VI).

Sub-sampling for all fractions was performed using Hensen-Stempel pipettes. Generally sub-samples are 1/10 of total sample volume for the "Coarse" fraction and 1/100 for the "Micro" fraction

Zooplankton were identified to species wherever possible, although immature copepods lack differentiating features required for identification beyond order (e.g., Calanoida, Cyclopoida, or

Harpacticoida). All identifications were performed using taxonomic references and collaborations with external experts, where necessary.

Table 1. Summary of zooplankton samples processed for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Date Sampled	Biologica Sample ID	Fraction	Split	Specimens Counted
MP_POL-P2_ZOOC-1_2024-06	19-Jun-24	fz24-169-005	Coarse	10/300	226
			Fine	1/200	159
			Whole	Whole	0
MP_BOL-B2_ZOOC-1_2024-06	19-Jun-24	fz24-169-006	Coarse	7/300	212
			Fine	1/300	163
			Whole	Whole	1
MP_QUL-ZOO-1_ZOOC-1_2024-06	20-Jun-24	fz24-169-007	Coarse	17/200	227
			Fine	2/200	105
			Whole	Whole	0
MP_QUL-ZOO-7_ZOOC-1_2024-06	20-Jun-24	fz24-169-008	Coarse	15/100	206
			Fine	3/100	112
			Whole	Whole	0
MP_POL-P2_ZOOC-1_2024-07	23-Jul-24	fz24-169-029	Coarse	3/200	269
			Fine	3/200	104
			Whole	Whole	0
MP_POL-P2_ZOOC-2_2024-07	23-Jul-24	fz24-169-030	Coarse	3/150	234
			Fine	3/150	109
			Whole	Whole	0
MP_POL-P2_ZOOC-3_2024-07	23-Jul-24	fz24-169-031	Coarse	5/150	224
			Fine	3/150	149
			Whole	Whole	0
MP_POL-P2_ZOOC-4_2024-07	23-Jul-24	fz24-169-032	Coarse	6/100	215
			Fine	1/100	184
			Whole	Whole	0
MP_POL-P2_ZOOC-5_2024-07	23-Jul-24	fz24-169-033	Coarse	3/120	263
			Fine	2/120	137
			Whole	Whole	1
MP_BOL-B2_ZOOC-1_2024-07	25-Jul-24	fz24-169-034	Coarse	7/120	217
			Fine	1/120	117
			Whole	Whole	10
MP_BOL-B2_ZOOC-2_2024-07	25-Jul-24	fz24-169-035	Coarse	15/120	214
			Fine	1/120	161
			Whole	Whole	13
MP_BOL-B2_ZOOC-3_2024-07	25-Jul-24	fz24-169-036	Coarse	12/120	228
			Fine	2/120	316
			Whole	Whole	9
MP_BOL-B2_ZOOC-4_2024-07	25-Jul-24	fz24-169-037	Coarse	10/120	234
			Fine	1/120	148
			Whole	Whole	2

Client Sample ID	Date Sampled	Biologica Sample ID	Fraction	Split	Specimens Counted
MP_BOL-B2_ZOOC-5_2024-07	25-Jul-24	fz24-169-038	Coarse	15/120	235
			Fine	2/120	136
			Whole	Whole	9
MP_QUL-ZOO-1_ZOOC-1_2024-07	24-Jul-24	fz24-169-039	Coarse	15/100	238
			Fine	2/100	149
			Whole	Whole	0
MP_QUL-ZOO-1_ZOOC-2_2024-07	24-Jul-24	fz24-169-040	Coarse	12/80	229
			Fine	1/80	114
			Whole	Whole	0
MP_QUL-ZOO-1_ZOOC-3_2024-07	24-Jul-24	fz24-169-041	Coarse	12/80	231
			Fine	1/80	120
			Whole	Whole	0
MP_QUL-ZOO-1_ZOOC-4_2024-07	24-Jul-24	fz24-169-042	Coarse	15/80	235
			Fine	1/80	108
			Whole	Whole	0
MP_QUL-ZOO-1_ZOOC-5_2024-07	24-Jul-24	fz24-169-043	Coarse	10/80	216
			Fine	1/80	103
			Whole	Whole	0
MP_QUL-ZOO-7_ZOOC-1_2024-07	24-Jul-24	fz24-169-044	Coarse	5/80	202
			Fine	1/80	158
			Whole	Whole	1
MP_QUL-ZOO-7_ZOOC-2_2024-07	24-Jul-24	fz24-169-045	Coarse	10/80	234
			Fine	1/80	139
			Whole	Whole	0
MP_QUL-ZOO-7_ZOOC-3_2024-07	24-Jul-24	fz24-169-046	Coarse	6/90	234
			Fine	1/90	172
			Whole	Whole	0
MP_QUL-ZOO-7_ZOOC-4_2024-07	24-Jul-24	fz24-169-047	Coarse	15/80	314
			Fine	1/80	149
			Whole	Whole	0
MP_QUL-ZOO-7_ZOOC-5_2024-07	24-Jul-24	fz24-169-048	Coarse	7/80	226
			Fine	1/80	255
			Whole	Whole	0
MP_POL-P2_ZOOC-1_2024-08	26-Aug-24	fz24-169-053	Coarse	3/120	235
			Fine	2/120	109
			Whole	Whole	0
MP_BOL-B2_ZOOC-1_2024-08	26-Aug-24	fz24-169-054	Coarse	7/120	218
			Fine	2/120	131
			Whole	Whole	47
MP_QUL-ZOO-1_ZOOC-1_2024-08	25-Aug-24	fz24-169-055	Coarse	10/100	338
			Fine	2/100	207
			Whole	Whole	1

Client Sample ID	Date Sampled	Biologica Sample ID	Fraction	Split	Specimens Counted
MP_QUL-ZOO-7_ZOOC-1_2024-08	25-Aug-24	fz24-169-056	Coarse	10/120	266
			Fine	2/120	164
			Whole	Whole	2

QA/QC

Ten percent (10%) of samples were reanalyzed to assess sub-sampling accuracy and taxonomic consistency. The sample(s) were chosen at random and processed at different times to reduce counting and identification bias. The percent agreement between QA samples is reported in Table 2.

Table 2. Summary of enumeration QA/QC results for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Biologica Sample ID	Original Total Abundance	QA Total Abundance	Percent Agreement
MP_POL-P2_ZOOC-4_2024-07	fz24-169-032	21,983	21,050	95.75%
MP_BOL-B2_ZOOC-2_2024-07	fz24-169-035	21,045	18,877	89.70%
MP_QUL-ZOO-1_ZOOC-2_2024-07	fz24-169-040	10,647	12,307	84.41%
MP_QUL-ZOO-7_ZOOC-1_2024-08	fz24-169-056	13,056	12,300	94.21%
			Average:	**91.02%**

Percent Agreement:
100 – [(difference in abundance between samples/total abundance of original sample) x 100]

Data

Biomass calculations were also performed for the 7 dominant zooplankton taxa by measuring at least 5-10 specimens of each taxon and applying length/weight regression formulae (EPA, 2003). Biomass estimates were presented as total per-sample wet-weight and dry-weight values derived from per-sample abundances.

Taxonomic data were recorded in Biologica's custom database. Results were provided to the Minnow Environmental project manager in Excel spreadsheets via email.

Methodological and Taxonomic References

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Zooplankton Total Abundance Data Matrix for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID					Grand Total		fz24-169-005	fz24-169-006	fz24-169-007	fz24-169-008	fz24-169-029	fz24-169-030	fz24-169-031	fz24-169-032
Lake							Polley	Bootjack	Quesnel	Quesnel	Polley	Polley	Polley	Polley
Client Sample ID							MP_POL-P2_ZOOC-1_2024-06	MP_BOL-B2_ZOOC-1_2024-06	MP_QUL-ZOO-1_ZOOC-1_2024-06	MP_QUL-ZOO-7_ZOOC-1_2024-06	MP_POL-P2_ZOOC-1_2024-07	MP_POL-P2_ZOOC-2_2024-07	MP_POL-P2_ZOOC-3_2024-07	MP_POL-P2_ZOOC-4_2024-07
Date Sampled							19-Jun-24	19-Jun-24	20-Jun-24	20-Jun-24	23-Jul-24	23-Jul-24	23-Jul-24	23-Jul-24
					Total	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance
Groupcode	Major Group	Family	Taxon	Stage	Unique Taxa	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)
CRCL	Crustacea Cladocera	Bosminidae	Eubosmina sp.	F	1	5,162			12	27				
CRCL	Crustacea Cladocera	Daphniidae	Daphnia catawba	F	1	3,000	1,230	1,757		13				
CRCL	Crustacea Cladocera	Daphniidae	Daphnia longiremis	F	1	1,548	240	171	24	7				
CRCL	Crustacea Cladocera	Daphniidae	Daphnia mendotae complex	F	1	14,477					1,067	1,000	780	683
CRCL	Crustacea Cladocera	Daphniidae	Daphnia pulex	F	1	2,378					67	150	120	150
CRCL	Crustacea Cladocera	Daphniidae	Scapholeberis sp.	F	1	55								
CRCL	Crustacea Cladocera	Holopediidae	Holopedium sp.	F	1	21								
CRCL	Crustacea Cladocera	Leptodoridae	Leptodora kindtii	F	1	27								
CRCL	Crustacea Cladocera	Sididae	Diaphanosoma sp.	F	1	32								
			Total Cladocera			**26,700**	**1,470**	**1,929**	**35**	**47**	**1,133**	**1,150**	**900**	**833**
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIf	1	523								33
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIm		549	60	43		7				
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIf	1	172				7				
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIm		105			71	13				
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIf	1	318								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIm		180								
CRCO	Crustacea Copepoda Calanoida	Temoridae	Epischura sp.	VIm	1	10								
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	I-V		8,299	180	857	518	367	267	600	240	633
			Total Calanoida			**10,156**	**240**	**900**	**588**	**393**	**267**	**600**	**240**	**667**
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	1	19,163	360		176	80	4,467	950	1,770	17
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIm		1,270	30		82	47				
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V		66,494	4,680	6,257	1,788	807	12,067	9,000	3,810	2,067
			Total Cyclopoida			**86,927**	**5,070**	**6,257**	**2,047**	**933**	**16,533**	**9,950**	**5,580**	**2,083**
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	Nauplius		8,980	800	300	800	233	67	50	5,500	200
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius		89,297	3,000	18,900	1,700	967	4,200	2,450	50	13,800
			Total Copepoda Nauplii			**98,277**	**3,800**	**19,200**	**2,500**	**1,200**	**4,267**	**2,500**	**5,550**	**14,000**
			Total Crustacean Zooplankton			**222,060**	**10,580**	**28,286**	**5,171**	**2,573**	**22,200**	**14,200**	**12,270**	**17,583**
INDI	Insecta Diptera	Chaoboridae	Chaoborus sp.	L	1	88		1						
			Total Diptera			**88**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
ROTI	Rotifera	Asplanchnidae	Asplanchna sp.	Individual	1	80								
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1	155,910	9,600	26,400	3,600	800	2,400	2,200	1,100	2,800
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	1	63,096	1,000	900	2,900	1,233	133	600	350	600
ROTI	Rotifera	Brachionidae	Keratella sp. 2	Individual	1	3,544		1,200	400	67	67		50	
ROTI	Rotifera	Collothecidae	Collotheca sp.	Individual	1	100								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Colony		1,567	1,200	300		67				
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	1	24,934	15,200	300		67	67	50	250	100
ROTI	Rotifera	Filiniidae	Filinia sp.	Individual	1	1,080	200							200
ROTI	Rotifera	Gastropodidae	Ascomorpha sp.	Individual	1	2,250	600	600	400	100				
ROTI	Rotifera	Gastropodidae	Gastropus sp.	Individual	1	850								
ROTI	Rotifera	Lecanidae	Lecane sp.	Individual	1	120								
ROTI	Rotifera	Lepadellidae	Lepadella sp.	Individual	1	150								
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	1	16,670	200		700	200		100	150	700
ROTI	Rotifera	Synchaetidae	Synchaeta sp.	Individual	1	200								
			Total Rotifera			**270,551**	**28,000**	**29,700**	**8,000**	**2,534**	**2,667**	**2,950**	**1,900**	**4,400**
			Total Zooplankton			**492,698**	**38,580**	**57,987**	**13,171**	**5,107**	**24,867**	**17,150**	**14,170**	**21,983**
			Total Unique Taxa		**28**		**10**	**10**	**9**	**12**	**8**	**8**	**9**	**9**

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Zooplankton Total Abundance Data Matrix for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID					Grand Total		fz24-169-033	fz24-169-034	fz24-169-035	fz24-169-036	fz24-169-037	fz24-169-038	fz24-169-039	fz24-169-040
Lake							Polley	Bootjack	Bootjack	Bootjack	Bootjack	Bootjack	Quesnel	Quesnel
Client Sample ID							MP_POL-P2_ZOOC-5_2024-07	MP_BOL-B2_ZOOC-1_2024-07	MP_BOL-B2_ZOOC-2_2024-07	MP_BOL-B2_ZOOC-3_2024-07	MP_BOL-B2_ZOOC-4_2024-07	MP_BOL-B2_ZOOC-5_2024-07	MP_QUL-ZOO-1_ZOOC-1_2024-07	MP_QUL-ZOO-1_ZOOC-2_2024-07
Date Sampled							23-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	25-Jul-24	24-Jul-24	24-Jul-24
					Total	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance
Groupcode	Major Group	Family	Taxon	Stage	Unique Taxa	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)
CRCL	Crustacea Cladocera	Bosminidae	Eubosmina sp.	F	1	5,162				70	12	88	340	287
CRCL	Crustacea Cladocera	Daphniidae	Daphnia catawba	F	1	3,000								
CRCL	Crustacea Cladocera	Daphniidae	Daphnia longiremis	F	1	1,548							40	93
CRCL	Crustacea Cladocera	Daphniidae	Daphnia mendotae complex	F	1	14,477	560	1,286	32	300	816	416	220	120
CRCL	Crustacea Cladocera	Daphniidae	Daphnia pulex	F	1	2,378	240	223	552	230	84	488		
CRCL	Crustacea Cladocera	Daphniidae	Scapholeberis sp.	F	1	55								
CRCL	Crustacea Cladocera	Holopediidae	Holopedium sp.	F	1	21							10	
CRCL	Crustacea Cladocera	Leptodoridae	Leptodora kindtii	F	1	27	1		1		2	8		
CRCL	Crustacea Cladocera	Sididae	Diaphanosoma sp.	F	1	32								
			Total Cladocera			**26,700**	**801**	**1,509**	**585**	**600**	**914**	**1,000**	**610**	**500**
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIf	1	523	80	51	48	60	72	24		
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIm		549		51	8	30	24			
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIf	1	172								7
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIm		105								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIf	1	318								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIm		180								
CRCO	Crustacea Copepoda Calanoida	Temoridae	Epischura sp.	VIm	1	10								
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	I-V		8,299	400	189	80	210	240	32	300	100
			Total Calanoida			**10,156**	**480**	**291**	**136**	**300**	**336**	**56**	**300**	**107**
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	1	19,163	5,240	137	56	320	360	216	320	247
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIm		1,270	40	103	128	110	72	56	80	27
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V		66,494	3,960	1,680	808	950	1,128	552	1,070	647
			Total Cyclopoida			**86,927**	**9,240**	**1,920**	**992**	**1,380**	**1,560**	**824**	**1,470**	**920**
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	Nauplius		8,980	120		120	420			50	
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius		89,297	4,200	3,240	7,800	4,020	5,040	2,700	950	1,040
			Total Copepoda Nauplii			**98,277**	**4,320**	**3,240**	**7,920**	**4,440**	**5,040**	**2,700**	**1,000**	**1,040**
			Total Crustacean Zooplankton			**222,060**	**14,841**	**6,960**	**9,633**	**6,720**	**7,850**	**4,580**	**3,380**	**2,567**
INDI	Insecta Diptera	Chaoboridae	Chaoborus sp.	L	1	88		10	12	9		9		
			Total Diptera			**88**	**0**	**10**	**12**	**9**	**0**	**9**	**0**	**0**
ROTI	Rotifera	Asplanchnidae	Asplanchna sp.	Individual	1	80								
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1	155,910	2,280	6,120	6,000	6,660	5,760	2,820	4,300	5,840
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	1	63,096	1,020	4,200	4,440	6,720	5,760	2,160	1,150	1,760
ROTI	Rotifera	Brachionidae	Keratella sp. 2	Individual	1	3,544	180	240	240	480	120	60		
ROTI	Rotifera	Collothecidae	Collotheca sp.	Individual	1	100								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Colony		1,567								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	1	24,934		240	240	240	240	120	300	
ROTI	Rotifera	Filiniidae	Filinia sp.	Individual	1	1,080	180							80
ROTI	Rotifera	Gastropodidae	Ascomorpha sp.	Individual	1	2,250								
ROTI	Rotifera	Gastropodidae	Gastropus sp.	Individual	1	850				60		120		240
ROTI	Rotifera	Lecanidae	Lecane sp.	Individual	1	120								
ROTI	Rotifera	Lepadellidae	Lepadella sp.	Individual	1	150				60				
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	1	16,670	240		480	300	840	180	700	160
ROTI	Rotifera	Synchaetidae	Synchaeta sp.	Individual	1	200								
			Total Rotifera			**270,551**	**3,900**	**10,800**	**11,400**	**14,520**	**12,720**	**5,460**	**6,450**	**8,080**
			Total Zooplankton			**492,698**	**18,741**	**17,770**	**21,045**	**21,249**	**20,570**	**10,049**	**9,830**	**10,647**
			Total Unique Taxa		**28**		**10**	**9**	**11**	**13**	**11**	**13**	**10**	**10**

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Zooplankton Total Abundance Data Matrix for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID					Grand Total		fz24-169-041	fz24-169-042	fz24-169-043	fz24-169-044	fz24-169-045	fz24-169-046	fz24-169-047	fz24-169-048
Lake							Quesnel	Quesnel	Quesnel	Quesnel	Quesnel	Quesnel	Quesnel	Quesnel
Client Sample ID							MP_QUL-ZOO-1_ZOOC-3_2024-07	MP_QUL-ZOO-1_ZOOC-4_2024-07	MP_QUL-ZOO-1_ZOOC-5_2024-07	MP_QUL-ZOO-7_ZOOC-1_2024-07	MP_QUL-ZOO-7_ZOOC-2_2024-07	MP_QUL-ZOO-7_ZOOC-3_2024-07	MP_QUL-ZOO-7_ZOOC-4_2024-07	MP_QUL-ZOO-7_ZOOC-5_2024-07
Date Sampled							24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24	24-Jul-24
					Total	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance
Groupcode	Major Group	Family	Taxon	Stage	Unique Taxa	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)
CRCL	Crustacea Cladocera	Bosminidae	Eubosmina sp.	F	1	5,162	107	192	312	960	272	1,155	368	469
CRCL	Crustacea Cladocera	Daphniidae	Daphnia catawba	F	1	3,000								
CRCL	Crustacea Cladocera	Daphniidae	Daphnia longiremis	F	1	1,548	27	27	72	208	32	150	85	149
CRCL	Crustacea Cladocera	Daphniidae	Daphnia mendotae complex	F	1	14,477	87	69	96	288	136	150	48	217
CRCL	Crustacea Cladocera	Daphniidae	Daphnia pulex	F	1	2,378								
CRCL	Crustacea Cladocera	Daphniidae	Scapholeberis sp.	F	1	55					40	15		
CRCL	Crustacea Cladocera	Holopediidae	Holopedium sp.	F	1	21							11	
CRCL	Crustacea Cladocera	Leptodoridae	Leptodora kindtii	F	1	27				1				11
CRCL	Crustacea Cladocera	Sididae	Diaphanosoma sp.	F	1	32								
			Total Cladocera			**26,700**	**220**	**288**	**480**	**1,457**	**480**	**1,470**	**512**	**846**
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIf	1	523								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIm		549								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIf	1	172	47	16	8	32		45	11	
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIm		105				16			5	
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIf	1	318								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIm		180								
CRCO	Crustacea Copepoda Calanoida	Temoridae	Epischura sp.	VIm	1	10								
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	I-V		8,299	167	117	168	448	184	270	160	423
			Total Calanoida			**10,156**	**213**	**133**	**176**	**496**	**184**	**315**	**176**	**423**
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	1	19,163	293	117	240	288	224	465	277	320
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIm		1,270	40	37	48	48	64	15	48	23
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V		66,494	773	677	784	944	920	1,245	661	971
			Total Cyclopoida			**86,927**	**1,107**	**832**	**1,072**	**1,280**	**1,208**	**1,725**	**987**	**1,314**
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	Nauplius		8,980		80			80			
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius		89,297	1,200	1,040	640	1,440	720	990	640	1,200
			Total Copepoda Nauplii			**98,277**	**1,200**	**1,120**	**640**	**1,440**	**800**	**990**	**640**	**1,200**
			Total Crustacean Zooplankton			**222,060**	**2,740**	**2,373**	**2,368**	**4,673**	**2,672**	**4,500**	**2,315**	**3,783**
INDI	Insecta Diptera	Chaoboridae	Chaoborus sp.	L	1	88								
			Total Diptera			**88**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ROTI	Rotifera	Asplanchnidae	Asplanchna sp.	Individual	1	80	80							
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1	155,910	5,840	4,880	5,200	7,200	7,440	9,990	8,000	9,040
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	1	63,096	1,520	1,680	1,600	2,240	1,920	2,520	2,160	8,000
ROTI	Rotifera	Brachionidae	Keratella sp. 2	Individual	1	3,544				80	80		80	80
ROTI	Rotifera	Collothecidae	Collotheca sp.	Individual	1	100								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Colony		1,567								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	1	24,934	80		240	400	160	810	400	640
ROTI	Rotifera	Filiniidae	Filinia sp.	Individual	1	1,080	80				160			
ROTI	Rotifera	Gastropodidae	Ascomorpha sp.	Individual	1	2,250			80					80
ROTI	Rotifera	Gastropodidae	Gastropus sp.	Individual	1	850	80					90	80	
ROTI	Rotifera	Lecanidae	Lecane sp.	Individual	1	120								
ROTI	Rotifera	Lepadellidae	Lepadella sp.	Individual	1	150						90		
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	1	16,670	720	960	480	1,280	560	990	560	1,280
ROTI	Rotifera	Synchaetidae	Synchaeta sp.	Individual	1	200								80
			Total Rotifera			**270,551**	**8,400**	**7,520**	**7,600**	**11,200**	**10,320**	**14,490**	**11,280**	**19,200**
			Total Zooplankton			**492,698**	**11,140**	**9,893**	**9,968**	**15,873**	**12,992**	**18,990**	**13,595**	**22,983**
			Total Unique Taxa		**28**		**12**	**8**	**10**	**11**	**12**	**12**	**12**	**13**

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Zooplankton Total Abundance Data Matrix for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID					Grand Total		fz24-169-053	fz24-169-054	fz24-169-055	fz24-169-056	fz24-169-032_QA	fz24-169-035_QA	fz24-169-040_QA	fz24-169-056_QA
Lake							Polley	Bootjack	Quesnel	Quesnel	Polley	Bootjack	Quesnel	Quesnel
Client Sample ID							MP_POL-P2_ZOOC-1_2024-08	MP_BOL-B2_ZOOC-1_2024-08	MP_QUL-ZOO-1_ZOOC-1_2024-08	MP_QUL-ZOO-7_ZOOC-1_2024-08	MP_POL-P2_ZOOC-4_2024-07_QA	MP_BOL-B2_ZOOC-2_2024-07_QA	MP_QUL-ZOO-1_ZOOC-2_2024-07_QA	MP_QUL-ZOO-7_ZOOC-1_2024-08_QA
Date Sampled							26-Aug-24	26-Aug-24	25-Aug-24	25-Aug-24	23-Jul-24	25-Jul-24	24-Jul-24	25-Aug-24
					Total	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance	Total Abundance
Groupcode	Major Group	Family	Taxon	Stage	Unique Taxa	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)	(#/sample)
CRCL	Crustacea Cladocera	Bosminidae	Eubosmina sp.	F	1	5,162	40	34	130	288			273	240
CRCL	Crustacea Cladocera	Daphniidae	Daphnia catawba	F	1	3,000								
CRCL	Crustacea Cladocera	Daphniidae	Daphnia longiremis	F	1	1,548	40	34	30	120			80	96
CRCL	Crustacea Cladocera	Daphniidae	Daphnia mendotae complex	F	1	14,477	1,520	2,126	1,440	1,020	783	40	100	1104
CRCL	Crustacea Cladocera	Daphniidae	Daphnia pulex	F	1	2,378	40	34			133	512		
CRCL	Crustacea Cladocera	Daphniidae	Scapholeberis sp.	F	1	55								
CRCL	Crustacea Cladocera	Holopediidae	Holopedium sp.	F	1	21								
CRCL	Crustacea Cladocera	Leptodoridae	Leptodora kindtii	F	1	27			1	2		1		3
CRCL	Crustacea Cladocera	Sididae	Diaphanosoma sp.	F	1	32			20	12				12
			Total Cladocera			**26,700**	**1,640**	**2,229**	**1,621**	**1,442**	**917**	**553**	**453**	**1,455**
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIf	1	523		154			17	40		
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Aglaodiaptomus leptopus	VIm		549	120	206				24		
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIf	1	172							7	
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus ashlandi	VIm		105								
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIf	1	318			150	168				180
CRCO	Crustacea Copepoda Calanoida	Diaptomidae	Leptodiaptomus sicilis	VIm		180			60	120				120
CRCO	Crustacea Copepoda Calanoida	Temoridae	Epischura sp.	VIm	1	10			10					
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	I-V		8,299	400	154	380	216	767	72	107	252
			Total Calanoida			**10,156**	**520**	**514**	**600**	**504**	**783**	**136**	**113**	**552**
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	1	19,163	1,280	69	490	384	233	32	213	468
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIm		1,270	40		60	72		80	27	48
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V		66,494	5,920	926	610	792	1,717	784	700	744
			Total Cyclopoida			**86,927**	**7,240**	**994**	**1,160**	**1,248**	**1,950**	**896**	**940**	**1,260**
CRCO	Crustacea Copepoda Calanoida		Calanoida indet.	Nauplius		8,980			100	60	200	120		180
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius		89,297	3,780	240	1,850	1,500	13,100	6,720	720	1260
			Total Copepoda Nauplii			**98,277**	**3,780**	**240**	**1,950**	**1,560**	**13,300**	**6,840**	**720**	**1,440**
			Total Crustacean Zooplankton			**222,060**	**13,180**	**3,977**	**5,331**	**4,754**	**16,950**	**8,425**	**2,227**	**4,707**
INDI	Insecta Diptera	Chaoboridae	Chaoborus sp.	L	1	88		47				12		
			Total Diptera			**88**	**0**	**47**	**0**	**0**	**0**	**12**	**0**	
ROTI	Rotifera	Asplanchnidae	Asplanchna sp.	Individual	1	80								
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1	155,910	540	1,620	3,400	4,080	2,600	5,400	7,360	3540
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	1	63,096	840	360	3,050	2,280	700	3,840	2,000	2340
ROTI	Rotifera	Brachionidae	Keratella sp. 2	Individual	1	3,544	60	60				240		
ROTI	Rotifera	Collothecidae	Collotheca sp.	Individual	1	100			100					
ROTI	Rotifera	Conochilidae	Conochilus sp.	Colony		1,567								
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	1	24,934	420	4,200	50	120	200	480		120
ROTI	Rotifera	Filiniidae	Filinia sp.	Individual	1	1,080	60	120			100		160	
ROTI	Rotifera	Gastropodidae	Ascomorpha sp.	Individual	1	2,250			150	240				240
ROTI	Rotifera	Gastropodidae	Gastropus sp.	Individual	1	850	60			120			320	60
ROTI	Rotifera	Lecanidae	Lecane sp.	Individual	1	120		120						
ROTI	Rotifera	Lepadellidae	Lepadella sp.	Individual	1	150								
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	1	16,670	660	1,140	1,650	1,440	500	480	240	1260
ROTI	Rotifera	Synchaetidae	Synchaeta sp.	Individual	1	200	120							
			Total Rotifera			**270,551**	**2,760**	**7,620**	**8,400**	**8,280**	**4,100**	**10,440**	**10,080**	**7,560**
			Total Zooplankton			**492,698**	**15,940**	**11,644**	**13,731**	**13,034**	**21,050**	**18,877**	**12,307**	**12,267**
			Total Unique Taxa		**28**		**14**	**14**	**14**	**13**	**9**	**11**	**10**	**13**

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Zooplankton Total Wet (WW) and Dry (DW) Weight Biomass Data Matrix for Minnow Environmental Mount Polley, 2024

Biologica Sample ID					fz24-169-005		fz24-169-006		fz24-169-007		fz24-169-008		fz24-169-029		fz24-169-030		fz24-169-031	
Lake					Polley		Bootjack		Quesnel		Quesnel		Polley		Polley		Polley	
Client Sample ID					MP_POL-P2_ZOOC-1_2024-06		MP_BOL-B2_ZOOC-1_2024-06		MP_QUL-ZOO-1_ZOOC-1_2024-06		MP_QUL-ZOO-7_ZOOC-1_2024-06		MP_POL-P2_ZOOC-1_2024-07		MP_POL-P2_ZOOC-2_2024-07		MP_POL-P2_ZOOC-3_2024-07	
Date Sampled					19-Jun-24		19-Jun-24		20-Jun-24		20-Jun-24		23-Jul-24		23-Jul-24		23-Jul-24	
					Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass	
Groupcode	Major Group	Family	Taxon	Stage	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	162.28	811.41	3.05	15.24			1.49	7.47	0.68	3.39	37.83	189.13	8.05	40.23	14.99	74.95
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V	263.51	1,317.55	18.55	92.73	24.80	123.98	7.09	35.43	3.20	15.98	47.82	239.10	35.67	178.33	15.10	75.49
Total Cyclopoida					**425.79**	**2,128.97**	**21.60**	**107.98**	**24.80**	**123.98**	**8.58**	**42.91**	**3.87**	**19.37**	**85.64**	**428.22**	**43.71**	**218.56**	**30.09**	**150.44**
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius	8.54	42.70	0.29	1.43	1.81	9.04	0.16	0.81	0.09	0.46	0.40	2.01	0.23	1.17	0.00	0.02
Total Copepoda Nauplii					**8.54**	**42.70**	**0.29**	**1.43**	**1.81**	**9.04**	**0.16**	**0.81**	**0.09**	**0.46**	**0.40**	**2.01**	**0.23**	**1.17**	**0.00**	**0.02**
Total Crustacean Zooplankton					**434.33**	**2,171.66**	**21.88**	**109.41**	**26.60**	**133.02**	**8.74**	**43.72**	**3.97**	**19.83**	**86.05**	**430.23**	**43.95**	**219.73**	**30.09**	**150.46**
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1.44	14.40	0.09	0.89	0.24	2.44	0.03	0.33	0.01	0.07	0.02	0.22	0.02	0.20	0.01	0.10
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	6.65	66.55	0.11	1.05	0.09	0.95	0.31	3.06	0.13	1.30	0.01	0.14	0.06	0.63	0.04	0.37
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	0.21	2.09	0.13	1.28	0.00	0.03			0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	0.72	7.23	0.01	0.09			0.03	0.30	0.01	0.09			0.00	0.04	0.01	0.07
Total Rotifera					**9.03**	**90.27**	**0.33**	**3.30**	**0.34**	**3.41**	**0.37**	**3.69**	**0.15**	**1.47**	**0.04**	**0.37**	**0.09**	**0.88**	**0.06**	**0.56**
Total Zooplankton					**443.36**	**2,261.93**	**22.21**	**112.71**	**26.95**	**136.43**	**9.11**	**47.41**	**4.11**	**21.30**	**86.08**	**430.60**	**44.03**	**220.61**	**30.15**	**151.02**

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Zooplankton Total Wet (WW) and Dry (DW) Weight Biomass Data Matrix for Minnow Environmental Mount Polley, 2024

Biologica Sample ID							fz24-169-032		fz24-169-033		fz24-169-034		fz24-169-035		fz24-169-036		fz24-169-037		fz24-169-038	
Lake							Polley		Polley		Bootjack		Bootjack		Bootjack		Bootjack		Bootjack	
Client Sample ID							MP_POL-P2_ZOOC-4_2024-07		MP_POL-P2_ZOOC-5_2024-07		MP_BOL-B2_ZOOC-1_2024-07		MP_BOL-B2_ZOOC-2_2024-07		MP_BOL-B2_ZOOC-3_2024-07		MP_BOL-B2_ZOOC-4_2024-07		MP_BOL-B2_ZOOC-5_2024-07	
Date Sampled							23-Jul-24		23-Jul-24		25-Jul-24		25-Jul-24		25-Jul-24		25-Jul-24		25-Jul-24	
					Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass	
Groupcode	Major Group	Family	Taxon	Stage	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	162.28	811.41	0.14	0.71	44.37	221.87	1.16	5.81	0.47	2.37	2.71	13.55	3.05	15.24	1.83	9.15
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V	263.51	1,317.55	8.19	40.95	15.69	78.47	6.66	33.29	3.20	16.01	3.76	18.82	4.47	22.35	2.19	10.94
Total Cyclopoida					**425.79**	**2,128.97**	**8.33**	**41.66**	**60.07**	**300.34**	**7.82**	**39.10**	**3.68**	**18.38**	**6.47**	**32.37**	**7.52**	**37.59**	**4.02**	**20.08**
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius	8.54	42.70	1.32	6.60	0.40	2.01	0.31	1.55	0.75	3.73	0.38	1.92	0.48	2.41	0.26	1.29
Total Copepoda Nauplii					**8.54**	**42.70**	**1.32**	**6.60**	**0.40**	**2.01**	**0.31**	**1.55**	**0.75**	**3.73**	**0.38**	**1.92**	**0.48**	**2.41**	**0.26**	**1.29**
Total Crustacean Zooplankton					**434.33**	**2,171.66**	**9.65**	**48.25**	**60.47**	**302.35**	**8.13**	**40.64**	**4.42**	**22.11**	**6.86**	**34.30**	**8.00**	**40.00**	**4.27**	**21.37**
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1.44	14.40	0.03	0.26	0.02	0.21	0.06	0.57	0.06	0.55	0.06	0.62	0.05	0.53	0.03	0.26
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	6.65	66.55	0.06	0.63	0.11	1.08	0.44	4.43	0.47	4.68	0.71	7.09	0.61	6.07	0.23	2.28
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	0.21	2.09	0.00	0.01			0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.01
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	0.72	7.23	0.03	0.30	0.01	0.10			0.02	0.21	0.01	0.13	0.04	0.36	0.01	0.08
Total Rotifera					**9.03**	**90.27**	**0.12**	**1.20**	**0.14**	**1.39**	**0.50**	**5.01**	**0.55**	**5.47**	**0.79**	**7.85**	**0.70**	**6.99**	**0.26**	**2.63**
Total Zooplankton					**443.36**	**2,261.93**	**9.77**	**49.46**	**60.61**	**303.74**	**8.63**	**45.66**	**4.97**	**27.58**	**7.64**	**42.15**	**8.70**	**47.00**	**4.54**	**24.00**

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Zooplankton Total Wet (WW) and Dry (DW) Weight Biomass Data Matrix for Minnow Environmental Mount Polley, 2024

Biologica Sample ID							fz24-169-039		fz24-169-040		fz24-169-041		fz24-169-042		fz24-169-043		fz24-169-044		fz24-169-045	
Lake							Quesnel		Quesnel		Quesnel		Quesnel		Quesnel		Quesnel		Quesnel	
Client Sample ID							MP_QUL-ZOO-1_ZOOC-1_2024-07		MP_QUL-ZOO-1_ZOOC-2_2024-07		MP_QUL-ZOO-1_ZOOC-3_2024-07		MP_QUL-ZOO-1_ZOOC-4_2024-07		MP_QUL-ZOO-1_ZOOC-5_2024-07		MP_QUL-ZOO-7_ZOOC-1_2024-07		MP_QUL-ZOO-7_ZOOC-2_2024-07	
Date Sampled							24-Jul-24		24-Jul-24		24-Jul-24		24-Jul-24		24-Jul-24		24-Jul-24		24-Jul-24	
						Total Biomass	Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass	
Groupcode	Major Group	Family	Taxon	Stage	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	162.28	811.41	2.71	13.55	2.09	10.44	2.48	12.42	0.99	4.97	2.03	10.16	2.44	12.19	1.90	9.48
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V	263.51	1,317.55	4.24	21.20	2.56	12.81	3.06	15.32	2.68	13.42	3.11	15.53	3.74	18.70	3.65	18.23
Total Cyclopoida					**425.79**	**2,128.97**	**6.95**	**34.75**	**4.65**	**23.26**	**5.55**	**27.74**	**3.68**	**18.39**	**5.14**	**25.70**	**6.18**	**30.90**	**5.54**	**27.71**
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius	8.54	42.70	0.09	0.45	0.10	0.50	0.11	0.57	0.10	0.50	0.06	0.31	0.14	0.69	0.07	0.34
Total Copepoda Nauplii					**8.54**	**42.70**	**0.09**	**0.45**	**0.10**	**0.50**	**0.11**	**0.57**	**0.10**	**0.50**	**0.06**	**0.31**	**0.14**	**0.69**	**0.07**	**0.34**
Total Crustacean Zooplankton					**434.33**	**2,171.66**	**7.04**	**35.21**	**4.75**	**23.76**	**5.66**	**28.32**	**3.78**	**18.89**	**5.20**	**26.00**	**6.32**	**31.59**	**5.61**	**28.06**
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1.44	14.40	0.04	0.40	0.05	0.54	0.05	0.54	0.05	0.45	0.05	0.48	0.07	0.67	0.07	0.69
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	6.65	66.55	0.12	1.21	0.19	1.86	0.16	1.60	0.18	1.77	0.17	1.69	0.24	2.36	0.20	2.02
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	0.21	2.09	0.00	0.03			0.00	0.01			0.00	0.02	0.00	0.03	0.00	0.01
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	0.72	7.23	0.03	0.30	0.01	0.07	0.03	0.31	0.04	0.42	0.02	0.21	0.06	0.56	0.02	0.24
Total Rotifera					**9.03**	**90.27**	**0.19**	**1.94**	**0.25**	**2.46**	**0.25**	**2.46**	**0.26**	**2.64**	**0.24**	**2.40**	**0.36**	**3.62**	**0.30**	**2.97**
Total Zooplankton					**443.36**	**2,261.93**	**7.23**	**37.14**	**5.00**	**26.22**	**5.91**	**30.78**	**4.04**	**21.53**	**5.44**	**28.40**	**6.68**	**35.20**	**5.91**	**31.03**

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Zooplankton Total Wet (WW) and Dry (DW) Weight Biomass Data Matrix for Minnow Environmental Mount Polley, 2024

Biologica Sample ID					fz24-169-046		fz24-169-047		fz24-169-048		fz24-169-053		fz24-169-054		fz24-169-055		fz24-169-056	
Lake					Quesnel		Quesnel		Quesnel		Polley		Bootjack		Quesnel		Quesnel	
Client Sample ID					MP_QUL-ZOO-7_ZOOC-3_2024-07		MP_QUL-ZOO-7_ZOOC-4_2024-07		MP_QUL-ZOO-7_ZOOC-5_2024-07		MP_POL-P2_ZOOC-1_2024-08		MP_BOL-B2_ZOOC-1_2024-08		MP_QUL-ZOO-1_ZOOC-1_2024-08		MP_QUL-ZOO-7_ZOOC-1_2024-08	
Date Sampled					24-Jul-24		24-Jul-24		24-Jul-24		26-Aug-24		26-Aug-24		25-Aug-24		25-Aug-24	
					Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass	
Groupcode	Major Group	Family	Taxon	Stage	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	162.28	811.41	3.94	19.69	2.35	11.74	2.71	13.55	10.84	54.20	0.58	2.90	4.15	20.75	3.25	16.26
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V	263.51	1,317.55	4.93	24.67	2.62	13.10	3.85	19.25	23.46	117.30	3.67	18.34	2.42	12.09	3.14	15.69
				Total Cyclopoida	**425.79**	**2,128.97**	**8.87**	**44.36**	**4.97**	**24.85**	**6.56**	**32.80**	**34.30**	**171.50**	**4.25**	**21.25**	**6.57**	**32.83**	**6.39**	**31.95**
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius	8.54	42.70	0.09	0.47	0.06	0.31	0.11	0.57	0.36	1.81	0.02	0.11	0.18	0.88	0.14	0.72
				Total Copepoda Nauplii	**8.54**	**42.70**	**0.09**	**0.47**	**0.06**	**0.31**	**0.11**	**0.57**	**0.36**	**1.81**	**0.02**	**0.11**	**0.18**	**0.88**	**0.14**	**0.72**
				Total Crustacean Zooplankton	**434.33**	**2,171.66**	**8.97**	**44.83**	**5.03**	**25.15**	**6.67**	**33.37**	**34.66**	**173.31**	**4.27**	**21.36**	**6.74**	**33.72**	**6.53**	**32.67**
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1.44	14.40	0.09	0.92	0.07	0.74	0.08	0.83	0.00	0.05	0.01	0.15	0.03	0.31	0.04	0.38
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	6.65	66.55	0.27	2.66	0.23	2.28	0.84	8.44	0.09	0.89	0.04	0.38	0.32	3.22	0.24	2.40
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	0.21	2.09	0.01	0.07	0.00	0.03	0.01	0.05	0.00	0.04	0.04	0.35	0.00	0.00	0.00	0.01
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	0.72	7.23	0.04	0.43	0.02	0.24	0.06	0.56	0.03	0.29	0.05	0.49	0.07	0.72	0.06	0.62
				Total Rotifera	**9.03**	**90.27**	**0.41**	**4.08**	**0.33**	**3.29**	**0.99**	**9.88**	**0.13**	**1.26**	**0.14**	**1.38**	**0.43**	**4.25**	**0.34**	**3.42**
				Total Zooplankton	**443.36**	**2,261.93**	**9.37**	**48.91**	**5.36**	**28.45**	**7.66**	**43.25**	**34.79**	**174.57**	**4.41**	**22.74**	**7.17**	**37.97**	**6.88**	**36.09**

biologica

Zooplankton Total Wet (WW) and Dry (DW) Weight Biomass Data Matrix for Minnow Environmental Mount Polley, 2024

Biologica Sample ID							fz24-169-032_QA		fz24-169-035_QA		fz24-169-040_QA		fz24-169-056_QA	
Lake							Polley		Bootjack		Quesnel		Quesnel	
Client Sample ID							MP_POL-P2_ZOOC-4_2024-07_QA		MP_BOL-B2_ZOOC-2_2024-07_QA		MP_QUL-ZOO-1_ZOOC-2_2024-07_QA		MP_QUL-ZOO-7_ZOOC-1_2024-08_QA	
Date Sampled							23-Jul-24		25-Jul-24		24-Jul-24		25-Aug-24	
					Total Biomass		Total Biomass		Total Biomass		Total Biomass		Total Biomass	
Groupcode	Major Group	Family	Taxon	Stage	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)	DW (mg/sample)	WW (mg/sample)
CRCO	Crustacea Copepoda Cyclopoida	Cyclopidae	Diacyclops thomasi	VIf	162.28	811.41	1.98	9.88	0.27	1.35	1.81	9.03	3.96	19.82
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	I-V	263.51	1,317.55	6.80	34.02	3.11	15.53	2.77	13.87	2.95	14.74
Total Cyclopoida					**425.79**	**2,128.97**	**8.78**	**43.89**	**3.38**	**16.89**	**4.58**	**22.90**	**6.91**	**34.56**
CRCO	Crustacea Copepoda Cyclopoida		Cyclopoida indet.	Nauplius	8.54	42.70	1.25	6.26	0.64	3.21	0.07	0.34	0.12	0.60
Total Copepoda Nauplii					**8.54**	**42.70**	**1.25**	**6.26**	**0.64**	**3.21**	**0.07**	**0.34**	**0.12**	**0.60**
Total Crustacean Zooplankton					**434.33**	**2,171.66**	**10.03**	**50.16**	**4.02**	**20.10**	**4.65**	**23.25**	**7.03**	**35.16**
ROTI	Rotifera	Brachionidae	Kellicottia sp.	Individual	1.44	14.40	0.02	0.24	0.05	0.50	0.07	0.68	0.03	0.33
ROTI	Rotifera	Brachionidae	Keratella sp. 1	Individual	6.65	66.55	0.07	0.74	0.40	4.05	0.21	2.11	0.25	2.47
ROTI	Rotifera	Conochilidae	Conochilus sp.	Individual	0.21	2.09	0.00	0.02	0.00	0.04			0.00	0.01
ROTI	Rotifera	Synchaetidae	Polyarthra sp.	Individual	0.72	7.23	0.02	0.22	0.02	0.21	0.01	0.10	0.05	0.55
Total Rotifera					**9.03**	**90.27**	**0.12**	**1.21**	**0.48**	**4.80**	**0.29**	**2.89**	**0.34**	**3.35**
Total Zooplankton					**443.36**	**2,261.93**	**10.15**	**51.37**	**4.50**	**24.90**	**4.94**	**26.14**	**7.37**	**38.51**

ZOOPLANKTON TISSUE QUALITY

ALS Laboratory Report VA24B6519
(Finalized July 31, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B6519**	Page	: 1 of 8
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 09-Jul-2024 12:15
PO	: 5590017616	Date Analysis Commenced	: 26-Jul-2024
C-O-C number	: ----	Issue Date	: 31-Jul-2024 17:23
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLIS	*Detection Limit Adjusted due to insufficient sample.*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-06	MP_BOL-B2_ZOOT-1_2024-06	MP_QUL-ZOO-7_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6519-001	VA24B6519-002	VA24B6519-003	VA24B6519-004	VA24B6519-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		93.3	97.2	98.6	----	----
Moisture	----	E144-H/VA	2.0	%		----	----	----	69.5	65.3
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		9020	2220	1620	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	16.5	14.8
Aluminum	7429-90-5	E475A/VA	1.0	mg/kg wwt		608	61.2	22.7	----	----
Aluminum	7429-90-5	E472A/VA	1.0	mg/kg wwt		----	----	----	5.0	5.1
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	0.037	0.025
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.126	0.163	0.232	----	----
Antimony	7440-36-0	E472A/VA	0.0020	mg/kg wwt		----	----	----	0.0114	0.0086
Antimony	7440-36-0	E475A/VA	0.0040	mg/kg wwt		0.0085	0.0045	<0.0040	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.150	0.139
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		8.09	4.20	4.75	----	----
Arsenic	7440-38-2	E472A/VA	0.0060	mg/kg wwt		----	----	----	0.0458	0.0482
Arsenic	7440-38-2	E475A/VA	0.010	mg/kg wwt		0.545	0.116	0.067	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		122	77.8	32.9	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.687	0.575
Barium	7440-39-3	E475A/VA	0.010	mg/kg wwt		8.24	2.14	0.464	----	----
Barium	7440-39-3	E472A/VA	0.010	mg/kg wwt		----	----	----	0.209	0.199
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.302	0.087	0.059	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Beryllium	7440-41-7	E475A/VA	0.0020	mg/kg wwt		0.0203	0.0024	<0.0020	----	----
Beryllium	7440-41-7	E472A/VA	0.0020	mg/kg wwt		----	----	----	<0.0020	<0.0020
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		0.041	0.024	0.029	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Bismuth	7440-69-9	E475A/VA	0.0020	mg/kg wwt		0.0028	<0.0020	<0.0020	----	----
Bismuth	7440-69-9	E472A/VA	0.0020	mg/kg wwt		----	----	----	<0.0020	<0.0020
Boron	7440-42-8	E475/VA	1.0	mg/kg		4.5	5.6	2.1	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-06	MP_BOL-B2_ZOOT-1_2024-06	MP_QUL-ZOO-7_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6519-001	VA24B6519-002	VA24B6519-003	VA24B6519-004	VA24B6519-005
						Result	Result	Result	Result	Result
Metals										
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	<1.0
Boron	7440-42-8	E475A/VA	0.20	mg/kg wwt		0.30	<0.20	<0.20	----	----
Boron	7440-42-8	E472A/VA	0.20	mg/kg wwt		----	----	----	<0.20	<0.20
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.369	0.334	1.66	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.063	0.060
Cadmium	7440-43-9	E475A/VA	0.0020	mg/kg wwt		0.0249	0.0092	0.0234	----	----
Cadmium	7440-43-9	E472A/VA	0.0020	mg/kg wwt		----	----	----	0.0192	0.0209
Calcium	7440-70-2	E475/VA	20	mg/kg		26000	38800	4600	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	157	148
Calcium	7440-70-2	E475A/VA	4.0	mg/kg wwt		1750	1070	64.8	----	----
Calcium	7440-70-2	E472A/VA	4.0	mg/kg wwt		----	----	----	48.0	51.2
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.866	0.262	0.233	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	<0.0050	<0.0050
Cesium	7440-46-2	E475A/VA	0.0010	mg/kg wwt		0.0584	0.0072	0.0033	----	----
Cesium	7440-46-2	E472A/VA	0.0010	mg/kg wwt		----	----	----	<0.0010	0.0010
Chromium	7440-47-3	E475/VA	0.20	mg/kg		25.7	6.51	9.56	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Chromium	7440-47-3	E475A/VA	0.040	mg/kg wwt		1.73	0.179	0.134	----	----
Chromium	7440-47-3	E472A/VA	0.040	mg/kg wwt		----	----	----	<0.040	<0.040
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		10.7	1.88	2.74	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.033	0.029
Cobalt	7440-48-4	E475A/VA	0.0040	mg/kg wwt		0.719	0.0519	0.0386	----	----
Cobalt	7440-48-4	E472A/VA	0.0040	mg/kg wwt		----	----	----	0.0101	0.0102
Copper	7440-50-8	E475/VA	0.20	mg/kg		1130	87.4	37.3	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	1.10	0.99
Copper	7440-50-8	E475A/VA	0.040	mg/kg wwt		76.4	2.41	0.524	----	----
Copper	7440-50-8	E472A/VA	0.040	mg/kg wwt		----	----	----	0.334	0.345
Iron	7439-89-6	E475/VA	5.0	mg/kg		18000	4060	3600	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	37.5	32.4

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-06	MP_BOL-B2_ZOOT-1_2024-06	MP_QUL-ZOO-7_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6519-001	VA24B6519-002	VA24B6519-003	VA24B6519-004	VA24B6519-005
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E475A/VA	1.0	mg/kg wwt		1210	112	50.7	----	----
Iron	7439-89-6	E472A/VA	1.0	mg/kg wwt		----	----	----	11.4	11.2
Lead	7439-92-1	E475/VA	0.050	mg/kg		4.38	1.71	1.44	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	<0.050	<0.050
Lead	7439-92-1	E475A/VA	0.010	mg/kg wwt		0.296	0.047	0.020	----	----
Lead	7439-92-1	E472A/VA	0.010	mg/kg wwt		----	----	----	0.012	0.012
Lithium	7439-93-2	E475/VA	0.50	mg/kg		6.67	1.46	1.89	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	<0.50
Lithium	7439-93-2	E475A/VA	0.10	mg/kg wwt		0.45	<0.10	<0.10	----	----
Lithium	7439-93-2	E472A/VA	0.10	mg/kg wwt		----	----	----	<0.10	<0.10
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		5900	2520	2360	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	63.1	57.4
Magnesium	7439-95-4	E475A/VA	0.40	mg/kg wwt		397	69.4	33.3	----	----
Magnesium	7439-95-4	E472A/VA	0.40	mg/kg wwt		----	----	----	19.2	19.9
Manganese	7439-96-5	E475/VA	0.050	mg/kg		435	1090	281	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	3.37	3.08
Manganese	7439-96-5	E475A/VA	0.010	mg/kg wwt		29.3	30.0	3.95	----	----
Manganese	7439-96-5	E472A/VA	0.010	mg/kg wwt		----	----	----	1.03	1.07
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	<0.0050	<0.0050
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.062	0.072	0.055	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	<0.0010	<0.0010
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0042	<0.0020	<0.0020	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		5.18	1.27	0.883	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	<0.040	<0.040
Molybdenum	7439-98-7	E475A/VA	0.0080	mg/kg wwt		0.349	0.0350	0.0124	----	----
Molybdenum	7439-98-7	E472A/VA	0.0080	mg/kg wwt		----	----	----	<0.0080	<0.0080
Nickel	7440-02-0	E475/VA	0.20	mg/kg		18.1	4.53	10.2	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Nickel	7440-02-0	E475A/VA	0.040	mg/kg wwt		1.22	0.125	0.143	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-06	MP_BOL-B2_ZOOT-1_2024-06	MP_QUL-ZOO-7_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6519-001	VA24B6519-002	VA24B6519-003	VA24B6519-004	VA24B6519-005
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E472A/VA	0.040	mg/kg wwt		----	----	----	0.048	0.055
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	540	490
Phosphorus	7723-14-0	E475/VA	20	mg/kg		9570	16200	14900	----	----
Phosphorus	7723-14-0	E472A/VA	2.0	mg/kg wwt		----	----	----	165	170
Phosphorus	7723-14-0	E475A/VA	4.0	mg/kg wwt		645	447	210	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		5810	11900	12600	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	458	411
Potassium	7440-09-7	E475A/VA	4.0	mg/kg wwt		391	329	177	----	----
Potassium	7440-09-7	E472A/VA	4.0	mg/kg wwt		----	----	----	140	142
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		8.74	12.6	24.0	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	0.821	0.742
Rubidium	7440-17-7	E475A/VA	0.010	mg/kg wwt		0.589	0.347	0.338	----	----
Rubidium	7440-17-7	E472A/VA	0.010	mg/kg wwt		----	----	----	0.250	0.257
Selenium	7782-49-2	E475/VA	0.10	mg/kg		4.75	2.80	2.63	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	<0.10	<0.10
Selenium	7782-49-2	E475A/VA	0.020	mg/kg wwt		0.320	0.077	0.037	----	----
Selenium	7782-49-2	E472A/VA	0.020	mg/kg wwt		----	----	----	0.030	0.033
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.264	0.0894	0.146	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	<0.0050	<0.0050
Sodium	7440-23-5	E475/VA	20	mg/kg		3900	8370	5230	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	201	179
Sodium	7440-23-5	E475A/VA	4.0	mg/kg wwt		263	231	73.6	----	----
Sodium	7440-23-5	E472A/VA	4.0	mg/kg wwt		----	----	----	61.2	62.0
Strontium	7440-24-6	E475/VA	0.10	mg/kg		148	239	30.3	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	1.09	0.99
Strontium	7440-24-6	E475A/VA	0.020	mg/kg wwt		10.0	6.59	0.427	----	----
Strontium	7440-24-6	E472A/VA	0.020	mg/kg wwt		----	----	----	0.333	0.342
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		0.063	<0.020	<0.022 DLIS	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	<0.020

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-06	MP_BOL-B2_ZOOT-1_2024-06	MP_QUL-ZOO-7_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1_2024-06	MP_QUL-ZOO-1_ZOOT-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6519-001	VA24B6519-002	VA24B6519-003	VA24B6519-004	VA24B6519-005
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E475A/VA	0.0040	mg/kg wwt		0.0042	<0.0040	<0.0040	----	----
Tellurium	13494-80-9	E472A/VA	0.0040	mg/kg wwt		----	----	----	<0.0040	<0.0040
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0180	0.0227	0.0377	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	<0.0020	<0.0020
Thallium	7440-28-0	E475A/VA	0.00040	mg/kg wwt		0.00121	0.00063	0.00053	----	----
Thallium	7440-28-0	E472A/VA	0.00040	mg/kg wwt		----	----	----	<0.00040	<0.00040
Tin	7440-31-5	E475/VA	0.10	mg/kg		0.98	0.86	0.22	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	<0.10
Tin	7440-31-5	E475A/VA	0.020	mg/kg wwt		0.066	0.024	<0.020	----	----
Tin	7440-31-5	E472A/VA	0.020	mg/kg wwt		----	----	----	<0.020	<0.020
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		764	100	119	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	1.10	0.93
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.412	0.365	0.347	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0040	0.0037
Uranium	7440-61-1	E475A/VA	0.00040	mg/kg wwt		0.0278	0.0100	0.00489	----	----
Uranium	7440-61-1	E472A/VA	0.00040	mg/kg wwt		----	----	----	0.00122	0.00127
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		55.7	9.08	11.2	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	0.22	0.21
Vanadium	7440-62-2	E475A/VA	0.020	mg/kg wwt		3.75	0.250	0.158	----	----
Vanadium	7440-62-2	E472A/VA	0.020	mg/kg wwt		----	----	----	0.067	0.073
Zinc	7440-66-6	E475/VA	1.0	mg/kg		127	103	119	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	4.1	4.0
Zinc	7440-66-6	E475A/VA	0.20	mg/kg wwt		8.58	2.85	1.67	----	----
Zinc	7440-66-6	E472A/VA	0.20	mg/kg wwt		----	----	----	1.26	1.38
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		6.05	2.28	<2.00 DLM	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Zirconium	7440-67-7	E475A/VA	0.040	mg/kg wwt		0.408	0.063	<0.400 DLM	----	----
Zirconium	7440-67-7	E472A/VA	0.040	mg/kg wwt		----	----	----	<0.040	<0.040

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B6519**	Page	: 1 of 12
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 09-Jul-2024 12:15
PO	: 5590017616	Issue Date	: 31-Jul-2024 17:22
C-O-C number	: ----		
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E512	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-06	E512	19-Jun-2024	29-Jul-2024	365 days	40 days	✓	31-Jul-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-06	E512	19-Jun-2024	29-Jul-2024	365 days	40 days	✓	31-Jul-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-06	E511	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1X_2024-06	E511	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E512A	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-06	E512A	19-Jun-2024	29-Jul-2024	365 days	40 days	✓	31-Jul-2024	365 days	43 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-06	E512A	19-Jun-2024	29-Jul-2024	365 days	40 days	✓	31-Jul-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-06	E511A	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1X_2024-06	E511A	20-Jun-2024	29-Jul-2024	365 days	39 days	✓	31-Jul-2024	365 days	42 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E475	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-06	E475	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-06	E475	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-06	E472	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1X_2024-06	E472	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Metals in Biota by CRC ICPMS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E475A	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (WET units, Biopsy)										
LDPE bag										
MP_BOL-B2_ZOOT-1_2024-06	E475A	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (WET units, Biopsy)										
LDPE bag										
MP_POL-P2_ZOOT-1_2024-06	E475A	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (WET units, Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-1_2024-06	E472A	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Metals in Biota by CRC ICPMS (WET units, Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-1X_2024-06	E472A	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-1_2024-06	E475.Ag	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_BOL-B2_ZOOT-1_2024-06	E475.Ag	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_POL-P2_ZOOT-1_2024-06	E475.Ag	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-1_2024-06	E472.Ag	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-1X_2024-06	E472.Ag	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E475.Ti	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-06	E475.Ti	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-06	E475.Ti	19-Jun-2024	29-Jul-2024	730 days	40 days	✓	30-Jul-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-06	E472.Ti	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1X_2024-06	E472.Ti	20-Jun-2024	29-Jul-2024	730 days	39 days	✓	30-Jul-2024	730 days	41 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-06	E144A	20-Jun-2024	----	----	----		26-Jul-2024	----	37 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-06	E144A	19-Jun-2024	----	----	----		26-Jul-2024	----	38 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-06	E144A	19-Jun-2024	----	----	----		26-Jul-2024	----	38 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-06	E144-H	20-Jun-2024	----	----	----		26-Jul-2024	----	37 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-1X_2024-06	E144-H	20-Jun-2024	----	----	----		26-Jul-2024	----	37 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✘ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1566826	0	2	0.0	5.0	✘
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1566827	0	2	0.0	5.0	✘
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1566823	0	2	0.0	5.0	✘
Metals in Biota by CRC ICPMS (WET units, Micro)	E472A	1566825	0	2	0.0	5.0	✘
Moisture Content by Gravimetry (Micro)	E144-H	1566818	0	2	0.0	5.0	✘
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1566828	0	2	0.0	5.0	✘
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1566824	0	2	0.0	5.0	✘
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1566770	2	3	66.6	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1566826	2	2	100.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1566771	2	3	66.6	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1566827	2	2	100.0	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1566768	2	3	66.6	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1566823	2	2	100.0	10.0	✓
Metals in Biota by CRC ICPMS (WET units, Biopsy)	E475A	1566767	2	3	66.6	10.0	✓
Metals in Biota by CRC ICPMS (WET units, Micro)	E472A	1566825	2	2	100.0	10.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1566740	1	3	33.3	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1566818	1	2	50.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1566769	2	3	66.6	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1566828	2	2	100.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1566772	2	3	66.6	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1566824	2	2	100.0	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1566770	1	3	33.3	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1566826	1	2	50.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1566771	1	3	33.3	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1566827	1	2	50.0	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1566768	1	3	33.3	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1566823	1	2	50.0	5.0	✓
Metals in Biota by CRC ICPMS (WET units, Biopsy)	E475A	1566767	1	3	33.3	5.0	✓
Metals in Biota by CRC ICPMS (WET units, Micro)	E472A	1566825	1	2	50.0	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1566740	1	3	33.3	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1566818	1	2	50.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1566769	1	3	33.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1566828	1	2	50.0	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1566772	1	3	33.3	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1566824	1	2	50.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of soil, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (WET units, Micro)	E472A ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (WET units, Biopsy)	E475A ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

QUALITY CONTROL REPORT

Work Order	: **VA24B6519**	Page	: 1 of 16
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 09-Jul-2024 12:15
PO	: 5590017616	Date Analysis Commenced	: 26-Jul-2024
C-O-C number	: ----	Issue Date	: 31-Jul-2024 17:24
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1566740)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1566818)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1566767)						
Aluminum	7429-90-5	E475A	1	mg/kg wwt	<1.0	----
Antimony	7440-36-0	E475A	0.004	mg/kg wwt	<0.0040	----
Arsenic	7440-38-2	E475A	0.01	mg/kg wwt	<0.010	----
Barium	7440-39-3	E475A	0.01	mg/kg wwt	<0.010	----
Beryllium	7440-41-7	E475A	0.002	mg/kg wwt	<0.0020	----
Bismuth	7440-69-9	E475A	0.002	mg/kg wwt	<0.0020	----
Boron	7440-42-8	E475A	0.2	mg/kg wwt	<0.20	----
Cadmium	7440-43-9	E475A	0.002	mg/kg wwt	<0.0020	----
Calcium	7440-70-2	E475A	4	mg/kg wwt	<4.0	----
Cesium	7440-46-2	E475A	0.001	mg/kg wwt	<0.0010	----
Chromium	7440-47-3	E475A	0.04	mg/kg wwt	<0.040	----
Cobalt	7440-48-4	E475A	0.004	mg/kg wwt	<0.0040	----
Copper	7440-50-8	E475A	0.04	mg/kg wwt	<0.040	----
Iron	7439-89-6	E475A	1	mg/kg wwt	<1.0	----
Lead	7439-92-1	E475A	0.01	mg/kg wwt	<0.010	----
Lithium	7439-93-2	E475A	0.1	mg/kg wwt	<0.10	----
Magnesium	7439-95-4	E475A	0.4	mg/kg wwt	<0.40	----
Manganese	7439-96-5	E475A	0.01	mg/kg wwt	<0.010	----
Molybdenum	7439-98-7	E475A	0.008	mg/kg wwt	<0.0080	----
Nickel	7440-02-0	E475A	0.04	mg/kg wwt	<0.040	----
Phosphorus	7723-14-0	E475A	4	mg/kg wwt	<4.0	----
Potassium	7440-09-7	E475A	4	mg/kg wwt	<4.0	----
Rubidium	7440-17-7	E475A	0.01	mg/kg wwt	<0.010	----
Selenium	7782-49-2	E475A	0.02	mg/kg wwt	<0.020	----
Sodium	7440-23-5	E475A	4	mg/kg wwt	<4.0	----
Strontium	7440-24-6	E475A	0.02	mg/kg wwt	<0.020	----
Tellurium	13494-80-9	E475A	0.004	mg/kg wwt	<0.0040	----
Thallium	7440-28-0	E475A	0.0004	mg/kg wwt	<0.00040	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1566767) - continued						
Tin	7440-31-5	E475A	0.02	mg/kg wwt	<0.020	----
Uranium	7440-61-1	E475A	0.0004	mg/kg wwt	<0.00040	----
Vanadium	7440-62-2	E475A	0.02	mg/kg wwt	<0.020	----
Zinc	7440-66-6	E475A	0.2	mg/kg wwt	<0.20	----
Zirconium	7440-67-7	E475A	0.04	mg/kg wwt	<0.040	----
Metals (QCLot: 1566768)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1566768) - continued						
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1566769)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1566770)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1566771)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1566772)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1566823)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1566823) - continued						
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1566824)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1566825)						
Aluminum	7429-90-5	E472A	1	mg/kg wwt	<1.0	----
Antimony	7440-36-0	E472A	0.002	mg/kg wwt	<0.0020	----
Arsenic	7440-38-2	E472A	0.006	mg/kg wwt	<0.0060	----
Barium	7440-39-3	E472A	0.01	mg/kg wwt	<0.010	----
Beryllium	7440-41-7	E472A	0.002	mg/kg wwt	<0.0020	----
Bismuth	7440-69-9	E472A	0.002	mg/kg wwt	<0.0020	----
Boron	7440-42-8	E472A	0.2	mg/kg wwt	<0.20	----
Cadmium	7440-43-9	E472A	0.002	mg/kg wwt	<0.0020	----
Calcium	7440-70-2	E472A	4	mg/kg wwt	<4.0	----
Cesium	7440-46-2	E472A	0.001	mg/kg wwt	<0.0010	----
Chromium	7440-47-3	E472A	0.04	mg/kg wwt	<0.040	----
Cobalt	7440-48-4	E472A	0.004	mg/kg wwt	<0.0040	----
Copper	7440-50-8	E472A	0.04	mg/kg wwt	<0.040	----
Iron	7439-89-6	E472A	1	mg/kg wwt	<1.0	----
Lead	7439-92-1	E472A	0.01	mg/kg wwt	<0.010	----
Lithium	7439-93-2	E472A	0.1	mg/kg wwt	<0.10	----
Magnesium	7439-95-4	E472A	0.4	mg/kg wwt	<0.40	----
Manganese	7439-96-5	E472A	0.01	mg/kg wwt	<0.010	----
Molybdenum	7439-98-7	E472A	0.008	mg/kg wwt	<0.0080	----
Nickel	7440-02-0	E472A	0.04	mg/kg wwt	<0.040	----
Phosphorus	7723-14-0	E472A	2	mg/kg wwt	<2.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1566825) - continued						
Potassium	7440-09-7	E472A	4	mg/kg wwt	<4.0	----
Rubidium	7440-17-7	E472A	0.01	mg/kg wwt	<0.010	----
Selenium	7782-49-2	E472A	0.02	mg/kg wwt	<0.020	----
Sodium	7440-23-5	E472A	4	mg/kg wwt	<4.0	----
Strontium	7440-24-6	E472A	0.02	mg/kg wwt	<0.020	----
Tellurium	13494-80-9	E472A	0.004	mg/kg wwt	<0.0040	----
Thallium	7440-28-0	E472A	0.0004	mg/kg wwt	<0.00040	----
Tin	7440-31-5	E472A	0.02	mg/kg wwt	<0.020	----
Uranium	7440-61-1	E472A	0.0004	mg/kg wwt	<0.00040	----
Vanadium	7440-62-2	E472A	0.02	mg/kg wwt	<0.020	----
Zinc	7440-66-6	E472A	0.2	mg/kg wwt	<0.20	----
Zirconium	7440-67-7	E472A	0.04	mg/kg wwt	<0.040	----
Metals (QCLot: 1566826)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1566827)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1566828)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1566740)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1566818)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1566767)									
Aluminum	7429-90-5	E475A	1	mg/kg wwt	50 mg/kg wwt	109	80.0	120	----
Antimony	7440-36-0	E475A	0.004	mg/kg wwt	25 mg/kg wwt	100	80.0	120	----
Arsenic	7440-38-2	E475A	0.01	mg/kg wwt	25 mg/kg wwt	113	80.0	120	----
Barium	7440-39-3	E475A	0.01	mg/kg wwt	6.25 mg/kg wwt	115	80.0	120	----
Beryllium	7440-41-7	E475A	0.002	mg/kg wwt	2.5 mg/kg wwt	93.0	80.0	120	----
Bismuth	7440-69-9	E475A	0.002	mg/kg wwt	25 mg/kg wwt	95.8	80.0	120	----
Boron	7440-42-8	E475A	0.2	mg/kg wwt	25 mg/kg wwt	91.6	80.0	120	----
Cadmium	7440-43-9	E475A	0.002	mg/kg wwt	2.5 mg/kg wwt	99.0	80.0	120	----
Calcium	7440-70-2	E475A	4	mg/kg wwt	1250 mg/kg wwt	94.4	80.0	120	----
Cesium	7440-46-2	E475A	0.001	mg/kg wwt	1.25 mg/kg wwt	104	80.0	120	----
Chromium	7440-47-3	E475A	0.04	mg/kg wwt	6.25 mg/kg wwt	109	80.0	120	----
Cobalt	7440-48-4	E475A	0.004	mg/kg wwt	6.25 mg/kg wwt	105	80.0	120	----
Copper	7440-50-8	E475A	0.04	mg/kg wwt	6.25 mg/kg wwt	106	80.0	120	----
Iron	7439-89-6	E475A	1	mg/kg wwt	25 mg/kg wwt	107	80.0	120	----
Lead	7439-92-1	E475A	0.01	mg/kg wwt	12.5 mg/kg wwt	95.7	80.0	120	----
Lithium	7439-93-2	E475A	0.1	mg/kg wwt	6.25 mg/kg wwt	90.7	80.0	120	----
Magnesium	7439-95-4	E475A	0.4	mg/kg wwt	1250 mg/kg wwt	107	80.0	120	----
Manganese	7439-96-5	E475A	0.01	mg/kg wwt	6.25 mg/kg wwt	108	80.0	120	----
Molybdenum	7439-98-7	E475A	0.008	mg/kg wwt	6.25 mg/kg wwt	107	80.0	120	----
Nickel	7440-02-0	E475A	0.04	mg/kg wwt	12.5 mg/kg wwt	105	80.0	120	----
Phosphorus	7723-14-0	E475A	4	mg/kg wwt	250 mg/kg wwt	117	80.0	120	----
Potassium	7440-09-7	E475A	4	mg/kg wwt	1250 mg/kg wwt	109	80.0	120	----
Rubidium	7440-17-7	E475A	0.01	mg/kg wwt	2.5 mg/kg wwt	111	80.0	120	----
Selenium	7782-49-2	E475A	0.02	mg/kg wwt	25 mg/kg wwt	105	80.0	120	----
Sodium	7440-23-5	E475A	4	mg/kg wwt	1250 mg/kg wwt	113	80.0	120	----
Strontium	7440-24-6	E475A	0.02	mg/kg wwt	6.25 mg/kg wwt	99.8	80.0	120	----
Tellurium	13494-80-9	E475A	0.004	mg/kg wwt	2.5 mg/kg wwt	98.4	80.0	120	----
Thallium	7440-28-0	E475A	0.0004	mg/kg wwt	25 mg/kg wwt	93.7	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1566767) - continued									
Tin	7440-31-5	E475A	0.02	mg/kg wwt	12.5 mg/kg wwt	102	80.0	120	----
Uranium	7440-61-1	E475A	0.0004	mg/kg wwt	0.125 mg/kg wwt	99.2	80.0	120	----
Vanadium	7440-62-2	E475A	0.02	mg/kg wwt	12.5 mg/kg wwt	112	80.0	120	----
Zinc	7440-66-6	E475A	0.2	mg/kg wwt	12.5 mg/kg wwt	103	80.0	120	----
Zirconium	7440-67-7	E475A	0.04	mg/kg wwt	2.5 mg/kg wwt	104	80.0	120	----
Metals (QCLot: 1566768)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	109	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	113	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	115	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	93.0	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	95.8	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	91.6	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	99.0	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	94.4	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	109	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	105	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	106	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	107	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	95.7	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	90.7	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	107	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	108	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	107	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	105	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	117	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	109	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	111	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	105	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	113	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	99.8	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	98.4	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	93.7	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	99.2	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1566768) - continued									
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	112	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	103	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	104	80.0	120	----
Metals (QCLot: 1566769)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	86.4	80.0	120	----
Metals (QCLot: 1566770)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	98.2	80.0	120	----
Metals (QCLot: 1566771)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	98.2	80.0	120	----
Metals (QCLot: 1566772)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	109	80.0	120	----
Metals (QCLot: 1566823)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	96.6	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	92.7	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	102	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	87.0	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	90.5	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	86.7	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	94.9	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	87.1	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	95.7	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	97.4	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	95.2	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	94.8	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	96.3	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	89.4	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	86.7	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	95.4	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	96.8	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	101	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	94.9	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	106	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	98.2	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	99.9	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	96.2	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1566823) - continued									
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	99.6	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	91.9	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	91.8	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	86.4	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	96.4	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	92.4	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	99.9	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	92.9	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	96.8	80.0	120	----
Metals (QCLot: 1566824)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Metals (QCLot: 1566825)									
Aluminum	7429-90-5	E472A	1	mg/kg wwt	20 mg/kg wwt	96.6	80.0	120	----
Antimony	7440-36-0	E472A	0.002	mg/kg wwt	10 mg/kg wwt	92.7	80.0	120	----
Arsenic	7440-38-2	E472A	0.006	mg/kg wwt	10 mg/kg wwt	102	80.0	120	----
Barium	7440-39-3	E472A	0.01	mg/kg wwt	2.5 mg/kg wwt	101	80.0	120	----
Beryllium	7440-41-7	E472A	0.002	mg/kg wwt	1 mg/kg wwt	87.0	80.0	120	----
Bismuth	7440-69-9	E472A	0.002	mg/kg wwt	10 mg/kg wwt	90.5	80.0	120	----
Boron	7440-42-8	E472A	0.2	mg/kg wwt	10 mg/kg wwt	86.7	80.0	120	----
Cadmium	7440-43-9	E472A	0.002	mg/kg wwt	1 mg/kg wwt	94.9	80.0	120	----
Calcium	7440-70-2	E472A	4	mg/kg wwt	500 mg/kg wwt	87.1	80.0	120	----
Cesium	7440-46-2	E472A	0.001	mg/kg wwt	0.5 mg/kg wwt	95.7	80.0	120	----
Chromium	7440-47-3	E472A	0.04	mg/kg wwt	2.5 mg/kg wwt	97.4	80.0	120	----
Cobalt	7440-48-4	E472A	0.004	mg/kg wwt	2.5 mg/kg wwt	95.2	80.0	120	----
Copper	7440-50-8	E472A	0.04	mg/kg wwt	2.5 mg/kg wwt	94.8	80.0	120	----
Iron	7439-89-6	E472A	1	mg/kg wwt	10 mg/kg wwt	96.3	80.0	120	----
Lead	7439-92-1	E472A	0.01	mg/kg wwt	5 mg/kg wwt	89.4	80.0	120	----
Lithium	7439-93-2	E472A	0.1	mg/kg wwt	2.5 mg/kg wwt	86.7	80.0	120	----
Magnesium	7439-95-4	E472A	0.4	mg/kg wwt	500 mg/kg wwt	95.4	80.0	120	----
Manganese	7439-96-5	E472A	0.01	mg/kg wwt	2.5 mg/kg wwt	96.8	80.0	120	----
Molybdenum	7439-98-7	E472A	0.008	mg/kg wwt	2.5 mg/kg wwt	101	80.0	120	----
Nickel	7440-02-0	E472A	0.04	mg/kg wwt	5 mg/kg wwt	94.9	80.0	120	----
Phosphorus	7723-14-0	E472A	2	mg/kg wwt	100 mg/kg wwt	106	80.0	120	----
Potassium	7440-09-7	E472A	4	mg/kg wwt	500 mg/kg wwt	98.2	80.0	120	----
Rubidium	7440-17-7	E472A	0.01	mg/kg wwt	1 mg/kg wwt	99.9	80.0	120	----
Selenium	7782-49-2	E472A	0.02	mg/kg wwt	10 mg/kg wwt	96.2	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1566825) - continued									
Sodium	7440-23-5	E472A	4	mg/kg wwt	500 mg/kg wwt	99.6	80.0	120	----
Strontium	7440-24-6	E472A	0.02	mg/kg wwt	2.5 mg/kg wwt	91.9	80.0	120	----
Tellurium	13494-80-9	E472A	0.004	mg/kg wwt	1 mg/kg wwt	91.8	80.0	120	----
Thallium	7440-28-0	E472A	0.0004	mg/kg wwt	10 mg/kg wwt	86.4	80.0	120	----
Tin	7440-31-5	E472A	0.02	mg/kg wwt	5 mg/kg wwt	96.4	80.0	120	----
Uranium	7440-61-1	E472A	0.0004	mg/kg wwt	0.05 mg/kg wwt	92.4	80.0	120	----
Vanadium	7440-62-2	E472A	0.02	mg/kg wwt	5 mg/kg wwt	99.9	80.0	120	----
Zinc	7440-66-6	E472A	0.2	mg/kg wwt	5 mg/kg wwt	92.9	80.0	120	----
Zirconium	7440-67-7	E472A	0.04	mg/kg wwt	1 mg/kg wwt	96.8	80.0	120	----
Metals (QCLot: 1566826)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	89.6	80.0	120	----
Metals (QCLot: 1566827)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	89.6	80.0	120	----
Metals (QCLot: 1566828)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	81.7	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1566767)									
QC-1566767-003	RM	Aluminum	7429-90-5	E475A	147 mg/kg wwt	94.0	70.0	130	----
QC-1566767-003	RM	Arsenic	7440-38-2	E475A	14.5 mg/kg wwt	106	70.0	130	----
QC-1566767-003	RM	Barium	7440-39-3	E475A	0.352 mg/kg wwt	97.8	70.0	130	----
QC-1566767-003	RM	Boron	7440-42-8	E475A	3.47 mg/kg wwt	98.0	70.0	130	----
QC-1566767-003	RM	Cadmium	7440-43-9	E475A	0.153 mg/kg wwt	105	70.0	130	----
QC-1566767-003	RM	Calcium	7440-70-2	E475A	2010 mg/kg wwt	95.0	70.0	130	----
QC-1566767-003	RM	Cesium	7440-46-2	E475A	0.089 mg/kg wwt	104	70.0	130	----
QC-1566767-003	RM	Chromium	7440-47-3	E475A	0.453 mg/kg wwt	111	50.0	150	----
QC-1566767-003	RM	Cobalt	7440-48-4	E475A	0.057 mg/kg wwt	103	65.0	135	----
QC-1566767-003	RM	Copper	7440-50-8	E475A	3.3 mg/kg wwt	104	70.0	130	----
QC-1566767-003	RM	Iron	7439-89-6	E475A	102 mg/kg wwt	99.7	70.0	130	----
QC-1566767-003	RM	Lead	7439-92-1	E475A	0.058 mg/kg wwt	106	15.0	185	----
QC-1566767-003	RM	Magnesium	7439-95-4	E475A	899 mg/kg wwt	101	70.0	130	----
QC-1566767-003	RM	Manganese	7439-96-5	E475A	0.948 mg/kg wwt	102	70.0	130	----
QC-1566767-003	RM	Molybdenum	7439-98-7	E475A	0.134 mg/kg wwt	104	70.0	130	----
QC-1566767-003	RM	Nickel	7440-02-0	E475A	0.33 mg/kg wwt	104	40.0	160	----
QC-1566767-003	RM	Phosphorus	7723-14-0	E475A	6700 mg/kg wwt	110	70.0	130	----
QC-1566767-003	RM	Potassium	7440-09-7	E475A	11600 mg/kg wwt	110	70.0	130	----
QC-1566767-003	RM	Rubidium	7440-17-7	E475A	2.53 mg/kg wwt	106	70.0	130	----
QC-1566767-003	RM	Selenium	7782-49-2	E475A	2.48 mg/kg wwt	111	70.0	130	----
QC-1566767-003	RM	Sodium	7440-23-5	E475A	9620 mg/kg wwt	110	70.0	130	----
QC-1566767-003	RM	Strontium	7440-24-6	E475A	10.6 mg/kg wwt	96.9	70.0	130	----
QC-1566767-003	RM	Vanadium	7440-62-2	E475A	0.269 mg/kg wwt	101	70.0	130	----
QC-1566767-003	RM	Zinc	7440-66-6	E475A	28.7 mg/kg wwt	105	70.0	130	----
Metals (QCLot: 1566768)									
QC-1566768-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	94.0	70.0	130	----
QC-1566768-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	106	70.0	130	----
QC-1566768-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	97.8	70.0	130	----
QC-1566768-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	98.0	70.0	130	----
QC-1566768-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	105	70.0	130	----
QC-1566768-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	95.0	70.0	130	----
QC-1566768-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	104	70.0	130	----
QC-1566768-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	111	50.0	150	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1566768) - continued									
QC-1566768-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	103	65.0	135	----
QC-1566768-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	104	70.0	130	----
QC-1566768-003	RM	Iron	7439-89-6	E475	102 mg/kg	99.7	70.0	130	----
QC-1566768-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	106	15.0	185	----
QC-1566768-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	101	70.0	130	----
QC-1566768-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	102	70.0	130	----
QC-1566768-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	104	70.0	130	----
QC-1566768-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	104	40.0	160	----
QC-1566768-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	110	70.0	130	----
QC-1566768-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	110	70.0	130	----
QC-1566768-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	106	70.0	130	----
QC-1566768-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	111	70.0	130	----
QC-1566768-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	110	70.0	130	----
QC-1566768-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	96.9	70.0	130	----
QC-1566768-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	101	70.0	130	----
QC-1566768-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	105	70.0	130	----
Metals (QCLot: 1566769)									
QC-1566769-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	101	70.0	130	----
Metals (QCLot: 1566770)									
QC-1566770-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	98.9	70.0	130	----
Metals (QCLot: 1566771)									
QC-1566771-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	98.9	70.0	130	----
Metals (QCLot: 1566772)									
QC-1566772-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	90.3	70.0	130	----
Metals (QCLot: 1566823)									
QC-1566823-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	90.5	70.0	130	----
QC-1566823-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	104	70.0	130	----
QC-1566823-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	114	70.0	130	----
QC-1566823-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	96.6	70.0	130	----
QC-1566823-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	106	70.0	130	----
QC-1566823-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	111	70.0	130	----
QC-1566823-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	106	70.0	130	----
QC-1566823-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	142	50.0	150	----
QC-1566823-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	108	65.0	135	----
QC-1566823-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	102	70.0	130	----
QC-1566823-003	RM	Iron	7439-89-6	E472	102 mg/kg	97.4	70.0	130	----
QC-1566823-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	104	15.0	185	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1566823) - continued									
QC-1566823-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	99.2	70.0	130	----
QC-1566823-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	106	70.0	130	----
QC-1566823-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	103	70.0	130	----
QC-1566823-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	131	40.0	160	----
QC-1566823-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	110	70.0	130	----
QC-1566823-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	106	70.0	130	----
QC-1566823-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	110	70.0	130	----
QC-1566823-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	108	70.0	130	----
QC-1566823-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	107	70.0	130	----
QC-1566823-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	99.0	70.0	130	----
QC-1566823-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	97.5	70.0	130	----
QC-1566823-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	104	70.0	130	----
Metals (QCLot: 1566824)									
QC-1566824-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	91.6	70.0	130	----
Metals (QCLot: 1566825)									
QC-1566825-003	RM	Aluminum	7429-90-5	E472A	147 mg/kg wwt	90.5	70.0	130	----
QC-1566825-003	RM	Arsenic	7440-38-2	E472A	14.5 mg/kg wwt	104	70.0	130	----
QC-1566825-003	RM	Barium	7440-39-3	E472A	0.352 mg/kg wwt	114	70.0	130	----
QC-1566825-003	RM	Boron	7440-42-8	E472A	3.47 mg/kg wwt	96.6	70.0	130	----
QC-1566825-003	RM	Cadmium	7440-43-9	E472A	0.153 mg/kg wwt	106	70.0	130	----
QC-1566825-003	RM	Calcium	7440-70-2	E472A	2010 mg/kg wwt	111	70.0	130	----
QC-1566825-003	RM	Cesium	7440-46-2	E472A	0.089 mg/kg wwt	106	70.0	130	----
QC-1566825-003	RM	Chromium	7440-47-3	E472A	0.453 mg/kg wwt	142	50.0	150	----
QC-1566825-003	RM	Cobalt	7440-48-4	E472A	0.057 mg/kg wwt	108	65.0	135	----
QC-1566825-003	RM	Copper	7440-50-8	E472A	3.3 mg/kg wwt	102	70.0	130	----
QC-1566825-003	RM	Iron	7439-89-6	E472A	102 mg/kg wwt	97.4	70.0	130	----
QC-1566825-003	RM	Lead	7439-92-1	E472A	0.058 mg/kg wwt	104	15.0	185	----
QC-1566825-003	RM	Magnesium	7439-95-4	E472A	899 mg/kg wwt	99.2	70.0	130	----
QC-1566825-003	RM	Manganese	7439-96-5	E472A	0.948 mg/kg wwt	106	70.0	130	----
QC-1566825-003	RM	Molybdenum	7439-98-7	E472A	0.134 mg/kg wwt	103	70.0	130	----
QC-1566825-003	RM	Nickel	7440-02-0	E472A	0.33 mg/kg wwt	131	40.0	160	----
QC-1566825-003	RM	Phosphorus	7723-14-0	E472A	6700 mg/kg wwt	110	70.0	130	----
QC-1566825-003	RM	Potassium	7440-09-7	E472A	11600 mg/kg wwt	106	70.0	130	----
QC-1566825-003	RM	Rubidium	7440-17-7	E472A	2.53 mg/kg wwt	110	70.0	130	----
QC-1566825-003	RM	Selenium	7782-49-2	E472A	2.48 mg/kg wwt	108	70.0	130	----
QC-1566825-003	RM	Sodium	7440-23-5	E472A	9620 mg/kg wwt	107	70.0	130	----
QC-1566825-003	RM	Strontium	7440-24-6	E472A	10.6 mg/kg wwt	99.0	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1566825) - continued									
QC-1566825-003	RM	Vanadium	7440-62-2	E472A	0.269 mg/kg wwt	97.5	70.0	130	----
QC-1566825-003	RM	Zinc	7440-66-6	E472A	28.7 mg/kg wwt	104	70.0	130	----
Metals (QCLot: 1566826)									
QC-1566826-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	102	70.0	130	----
Metals (QCLot: 1566827)									
QC-1566827-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	102	70.0	130	----
Metals (QCLot: 1566828)									
QC-1566828-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	102	70.0	130	----

Chain of Custody (COC) / Analyt[illegible] Request Form

COC Number: 20 -

Page 1 of 1

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Vancouver
Work Order Reference
VA24B6519

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely. BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minir
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minir
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minir
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minir
☐ Same day [E2] if received by 10am M-S - 200% rush surcharg

Additional fees may apply to rush requests on weeke
Date and Time Required for all E&P TATs:
For all tests with rush TATs requested, pleas

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	24-04 Task 5
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang **Sampler:** SLA SJU

Analysis R

Indicate Filtered (F), Preserved (P) or Filtered a[illegible] below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_POL-P2_ZOOT-1_2024-06	19-Jun-24	N/A	Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-1_2024-06	19-Jun-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-7_ZOOT-1_2024-06	20-Jun-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-1_2024-06	20-Jun-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-1X_2024-06	20-Jun-24	N/A	Tissue	1	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				23	24	23	

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
S. Latimer	20-Jun-24	16:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	7/9/24	12:15 PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ZOOPLANKTON TISSUE QUALITY

ALS Laboratory Report VA24C0701
(Finalized October 2, 2024)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C0701**			
Amendment	:	**1**			
Client	:	**Mount Polley Mining Corporation**	Laboratory	:	ALS Environmental - Vancouver
Contact	:	Accounts Payable	Account Manager	:	Can Dang
Address	:	306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	:	8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	1-289-775-1547	Telephone	:	+1 604 253 4188
Project	:	24-04 Task 5	Date Samples Received	:	31-Jul-2024 08:20
PO	:	5590017616	Date Analysis Commenced	:	10-Sep-2024
C-O-C number	:	----	Issue Date	:	02-Oct-2024 12:37
Sampler	:	----			
Site	:	----			
Quote number	:	VA24-MPMC100-004 (Minnow/Mt. Polley)			
No. of samples received	:	21			
No. of samples analysed	:	21			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
%	percent

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

E475 - MP_POL-P2_ZOOT-4_2024-07, MP_POL-P2_ZOOT-5_2024-07, MP_BOL-B2_ZOOT-1_2024-07 and MP_BOL-B2_ZOOT-5_2024-07 (samples 4, 5, 6, 10) LCS results elevated due to mis-proportional amount on standard added. CRM passed well, thus showing the results should be unbiased. Not enough sample for re-digestion.
Amendment (02/10/2024): This report has been amended to remove the extra wet weight basis metals analysis data.

Qualifiers

Qualifier	Description
DLA	Detection Limit adjusted for required dilution.
DLHM	Detection Limit Adjusted: Sample has high moisture content.
DLIS	Detection Limit Adjusted due to insufficient sample.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-07	MP_POL-P2_ZOOT-2_2024-07	MP_POL-P2_ZOOT-3_2024-07	MP_POL-P2_ZOOT-4_2024-07	MP_POL-P2_ZOOT-5_2024-07
					Client sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
						VA24C0701-001	VA24C0701-002	VA24C0701-003	VA24C0701-004	VA24C0701-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	----	85.7	----	----
Moisture	----	E144A/VA	2.0	%		93.0	91.7	----	95.7	93.6
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	266	----	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		1510	3440	----	3140	1400
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	0.081	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.159	0.278	----	0.176	0.142
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	1.17	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		3.07	4.84	----	4.46	3.98
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	5.08	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		26.4	45.7	----	50.0	26.8
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.039	0.113	----	0.104	0.038
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	<0.010	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.024 DLHM	0.032	----	0.024	0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		4.3	6.3	----	8.8	4.8
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	0.092	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.319	0.390	----	0.459	0.404
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	4260	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		14800	22300	----	26200	22300

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-07	MP_POL-P2_ZOOT-2_2024-07	MP_POL-P2_ZOOT-3_2024-07	MP_POL-P2_ZOOT-4_2024-07	MP_POL-P2_ZOOT-5_2024-07
					Client sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
						VA24C0701-001	VA24C0701-002	VA24C0701-003	VA24C0701-004	VA24C0701-005
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	0.0301	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.146	0.393	----	0.318	0.122
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	0.69	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		3.22	9.60	----	6.61	2.76
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	0.257	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		1.03	2.88	----	2.41	1.27
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	17.6	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		65.8	163	----	115	88.8
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	435	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		1780	6000	----	4640	2010
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	0.181	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		0.944	1.78	----	1.76	0.828
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<1.22 DLHM	2.88	----	2.57	0.97
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	391	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		1280	2550	----	2590	1410
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	71.7	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		266	514	----	530	338
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	<0.0010	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		<0.0020	0.0035	----	0.0033	<0.0020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-07	MP_POL-P2_ZOOT-2_2024-07	MP_POL-P2_ZOOT-3_2024-07	MP_POL-P2_ZOOT-4_2024-07	MP_POL-P2_ZOOT-5_2024-07
					Client sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
						VA24C0701-001	VA24C0701-002	VA24C0701-003	VA24C0701-004	VA24C0701-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	0.0060	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.028	0.042	----	0.077	<0.027 DLA, DLIS
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	0.254	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.860	1.98	----	1.73	1.14
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	0.62	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		2.58	7.88	----	6.63	3.22
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	2320	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		6890	9990	----	10700	10100
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	1470	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		2990	2700	----	4540	3140
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	1.32	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		3.09	4.11	----	5.04	3.08
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	1.04	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		3.18	4.65	----	5.96	4.61
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	0.0070	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0372	0.0958	----	0.0998	0.0368
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	1010	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		2020	1550	----	2690	2210
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	22.0	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		73.0	123	----	138	106
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	<0.020	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-07	MP_POL-P2_ZOOT-2_2024-07	MP_POL-P2_ZOOT-3_2024-07	MP_POL-P2_ZOOT-4_2024-07	MP_POL-P2_ZOOT-5_2024-07
					Client sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
						VA24C0701-001	VA24C0701-002	VA24C0701-003	VA24C0701-004	VA24C0701-005
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.049 DLHM	<0.029 DLHM	----	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	<0.0020	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0091	0.0159	----	0.0177	0.0067
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	0.10	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		0.69	0.85	----	0.68	0.35
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	15.4	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		74.1	237	----	173	71.2
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	0.0276	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0940	0.269	----	0.253	0.117
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	1.41	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		6.00	20.6	----	13.2	6.34
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	21.4	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		76.9	103	----	116	99.5
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	0.24	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		1.44	2.86	----	3.24	1.30

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-1_2024-07	MP_BOL-B2_ZOOT-2_2024-07	MP_BOL-B2_ZOOT-3_2024-07	MP_BOL-B2_ZOOT-4_2024-07	MP_BOL-B2_ZOOT-5_2024-07
					Client sampling date / time	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00
						VA24C0701-006	VA24C0701-007	VA24C0701-008	VA24C0701-009	VA24C0701-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		94.8	93.6	94.4	93.5	95.8
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		3770	2280	2440	6560	2820
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.406	0.240	0.444	0.584	0.213
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		4.32	3.51	3.40	4.36	4.06
Barium	7440-39-3	E475/VA	0.050	mg/kg		124	73.3	91.4	98.7	119
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.139	0.081	0.087	0.175	0.128
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		0.046	<0.037 DLHM	0.041	0.054	0.032
Boron	7440-42-8	E475/VA	1.0	mg/kg		10.4	10.0	12.3	15.5	9.9
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.391	0.328	0.333	0.448	0.383
Calcium	7440-70-2	E475/VA	20	mg/kg		25800	22100	16500	27500	28400
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.387	0.283	0.249	0.637	0.302
Chromium	7440-47-3	E475/VA	0.20	mg/kg		10.6	8.28	6.45	16.6	6.08
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		3.03	1.75	1.86	3.99	2.03
Copper	7440-50-8	E475/VA	0.20	mg/kg		263	77.3	125	236	110
Iron	7439-89-6	E475/VA	5.0	mg/kg		8990	4990	4840	9310	6500
Lead	7439-92-1	E475/VA	0.050	mg/kg		2.47	1.46	1.94	3.72	1.88
Lithium	7439-93-2	E475/VA	0.50	mg/kg		2.69	<1.84 DLHM	1.59	3.52	1.99
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		2350	1700	1690	2840	1960
Manganese	7439-96-5	E475/VA	0.050	mg/kg		2680	1780	2070	1650	2660
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		<0.0033 DLIS	0.0066	<0.0088 DLIS	0.0080	0.0069

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-1_2024-07	MP_BOL-B2_ZOOT-2_2024-07	MP_BOL-B2_ZOOT-3_2024-07	MP_BOL-B2_ZOOT-4_2024-07	MP_BOL-B2_ZOOT-5_2024-07
					Client sampling date / time	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00
						VA24C0701-006	VA24C0701-007	VA24C0701-008	VA24C0701-009	VA24C0701-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		<0.063 DLIS	0.103	<0.158 DLIS	0.124	0.163
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.90	1.17	1.30	1.54	1.55
Nickel	7440-02-0	E475/VA	0.20	mg/kg		10.1	5.96	6.10	11.6	5.04
Phosphorus	7723-14-0	E475/VA	20	mg/kg		12600	9040	8410	10700	13900
Potassium	7440-09-7	E475/VA	20	mg/kg		3330	4720	3450	4100	3760
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		4.92	6.66	4.91	7.66	5.57
Selenium	7782-49-2	E475/VA	0.10	mg/kg		2.40	2.41	2.22	2.88	2.73
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.225	0.0741	0.100	0.162	0.0994
Sodium	7440-23-5	E475/VA	20	mg/kg		1630	2990	1650	1900	2300
Strontium	7440-24-6	E475/VA	0.10	mg/kg		182	144	107	176	198
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	<0.073 DLHM	<0.054 DLHM	<0.088 DLHM	<0.020
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0324	0.0313	0.0262	0.0616	0.0384
Tin	7440-31-5	E475/VA	0.10	mg/kg		0.91	1.20	1.46	1.15	0.99
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		200	113	145	276	114
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.445	0.253	0.282	0.539	0.464
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		20.4	9.02	11.6	21.4	12.6
Zinc	7440-66-6	E475/VA	1.0	mg/kg		153	110	117	158	129
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		2.69	2.37	2.68	5.61	2.33

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-5X_2024-07	MP_QUL-ZOO-7_ZOOT-1_2024-07	MP_QUL-ZOO-7_ZOOT-2_2024-07	MP_QUL-ZOO-7_ZOOT-3_2024-07	MP_QUL-ZOO-7_ZOOT-4_2024-07
					Client sampling date / time	25-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-011	VA24C0701-012	VA24C0701-013	VA24C0701-014	VA24C0701-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	64.0	76.2	70.5	75.2
Moisture	----	E144A/VA	2.0	%		96.2	----	----	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	79.9	208	155	235
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		3280	----	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	0.013	0.017	0.012	0.016
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.364	----	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.219	0.425	0.352	0.507
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		4.12	----	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	1.27	4.77	2.59	3.51
Barium	7440-39-3	E475/VA	0.050	mg/kg		111	----	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.123	----	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.058 DLHM	----	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	<1.0	<1.0	<1.0	<1.0
Boron	7440-42-8	E475/VA	1.0	mg/kg		17.8	----	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	0.180	0.470	0.505	0.652
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.459	----	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	763	2050	2160	2580
Calcium	7440-70-2	E475/VA	20	mg/kg		32600	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-5X_2024-07	MP_QUL-ZOO-7_ZOOT-1_2024-07	MP_QUL-ZOO-7_ZOOT-2_2024-07	MP_QUL-ZOO-7_ZOOT-3_2024-07	MP_QUL-ZOO-7_ZOOT-4_2024-07
					Client sampling date / time	25-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-011	VA24C0701-012	VA24C0701-013	VA24C0701-014	VA24C0701-015
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0089	0.0184	0.0162	0.0296
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.418	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	<0.20	0.92	0.53	0.46
Chromium	7440-47-3	E475/VA	0.20	mg/kg		9.64	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.089	0.182	0.145	0.189
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		2.39	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	11.8	9.67	8.26	15.8
Copper	7440-50-8	E475/VA	0.20	mg/kg		113	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	200	400	323	442
Iron	7439-89-6	E475/VA	5.0	mg/kg		6660	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	0.068	0.138	0.124	0.127
Lead	7439-92-1	E475/VA	0.050	mg/kg		2.27	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<2.90 DLHM	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	112	236	184	228
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		2040	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	7.80	20.1	21.9	23.9
Manganese	7439-96-5	E475/VA	0.050	mg/kg		2960	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0024	0.0032	0.0038	0.0034
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0036	----	----	----	----

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-5X_2024-07	MP_QUL-ZOO-7_ZOOT-1_2024-07	MP_QUL-ZOO-7_ZOOT-2_2024-07	MP_QUL-ZOO-7_ZOOT-3_2024-07	MP_QUL-ZOO-7_ZOOT-4_2024-07
					Client sampling date / time	25-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-011	VA24C0701-012	VA24C0701-013	VA24C0701-014	VA24C0701-015
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.0067	0.0135	0.0131	0.0136
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.094	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.075	0.104	0.092	0.102
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.66	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.24	0.75	0.51	0.54
Nickel	7440-02-0	E475/VA	0.20	mg/kg		8.06	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	855	1740	1500	1680
Phosphorus	7723-14-0	E475/VA	20	mg/kg		14400	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	581	994	794	936
Potassium	7440-09-7	E475/VA	20	mg/kg		3900	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	0.924	1.50	1.24	1.60
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		5.99	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	0.27	0.62	0.62	0.77
Selenium	7782-49-2	E475/VA	0.10	mg/kg		3.37	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.0114	0.0116	0.0126	0.0169
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.127	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	276	518	383	443
Sodium	7440-23-5	E475/VA	20	mg/kg		2220	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	4.26	10.7	10.4	12.2
Strontium	7440-24-6	E475/VA	0.10	mg/kg		214	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_BOL-B2_ZOOT-5X_2024-07	MP_QUL-ZOO-7_ZOOT-1_2024-07	MP_QUL-ZOO-7_ZOOT-2_2024-07	MP_QUL-ZOO-7_ZOOT-3_2024-07	MP_QUL-ZOO-7_ZOOT-4_2024-07
					Client sampling date / time	25-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-011	VA24C0701-012	VA24C0701-013	VA24C0701-014	VA24C0701-015
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.116 DLHM	----	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	<0.0020	0.0028	0.0030	0.0041
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0454	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E475/VA	0.10	mg/kg		1.52	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	4.65	10.4	7.33	11.7
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		159	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0078	0.0216	0.0187	0.0245
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.494	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.88	2.34	2.03	2.35
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		13.4	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	8.1	23.0	19.1	21.5
Zinc	7440-66-6	E475/VA	1.0	mg/kg		147	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		3.69	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-7_ZOOT-5_2024-07	MP_QUL-ZOO-1_ZOOT-1_2024-07	MP_QUL-ZOO-1_ZOOT-2_2024-07	MP_QUL-ZOO-1_ZOOT-3_2024-07	MP_QUL-ZOO-1_ZOOT-4_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-016	VA24C0701-017	VA24C0701-018	VA24C0701-019	VA24C0701-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	94.0	----	94.3	95.5
Moisture	----	E144-H/VA	2.0	%		87.6	----	57.4	----	----
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	1360	----	1770	1860
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		343	----	178	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	0.170	----	0.263	1.14
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.032	----	0.014	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	2.61	----	2.60	3.17
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.06	----	0.247	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	18.5	----	32.0	36.8
Barium	7440-39-3	E472/VA	0.050	mg/kg		6.75	----	2.22	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	0.062	----	0.066	0.084
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.016	----	<0.010	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	<0.022 DLHM	----	0.028	<0.036 DLHM
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	----	<0.010	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	3.6	----	4.5	4.9
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	----	<1.0	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	2.50	----	2.30	2.70
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.27	----	0.222	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	12100	----	10700	14400
Calcium	7440-70-2	E472/VA	20	mg/kg		5130	----	1140	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-7_ZOOT-5_2024-07	MP_QUL-ZOO-1_ZOOT-1_2024-07	MP_QUL-ZOO-1_ZOOT-2_2024-07	MP_QUL-ZOO-1_ZOOT-3_2024-07	MP_QUL-ZOO-1_ZOOT-4_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-016	VA24C0701-017	VA24C0701-018	VA24C0701-019	VA24C0701-020
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	0.129	----	0.176	0.159
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0352	----	0.0138	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	4.06	----	6.43	10.8
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.93	----	0.42	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	1.45	----	1.26	1.27
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.328	----	0.135	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	68.5	----	220	138
Copper	7440-50-8	E472/VA	0.20	mg/kg		19.6	----	15.3	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	2560	----	3170	2840
Iron	7439-89-6	E472/VA	5.0	mg/kg		672	----	318	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	1.12	----	1.30	2.08
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.285	----	0.105	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	<1.08 DLHM	----	<1.35 DLHM	<1.79 DLHM
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	----	<0.50	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	1270	----	1260	1430
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		447	----	146	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	94.2	----	111	137
Manganese	7439-96-5	E472/VA	0.050	mg/kg		45.8	----	11.4	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	0.0041	----	0.0037	0.0031
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0036	----	0.0022	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-7_ZOOT-5_2024-07	MP_QUL-ZOO-1_ZOOT-1_2024-07	MP_QUL-ZOO-1_ZOOT-2_2024-07	MP_QUL-ZOO-1_ZOOT-3_2024-07	MP_QUL-ZOO-1_ZOOT-4_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-016	VA24C0701-017	VA24C0701-018	VA24C0701-019	VA24C0701-020
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	0.069	----	0.065	0.069
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0291	----	0.0052	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	0.778	----	2.42	0.830
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.264	----	0.096	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	3.31	----	4.94	6.17
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.97	----	0.38	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	7140	----	5910	6860
Phosphorus	7723-14-0	E472/VA	10	mg/kg		3670	----	758	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	3950	----	2930	3240
Potassium	7440-09-7	E472/VA	20	mg/kg		2080	----	441	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	6.90	----	5.50	5.67
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.51	----	0.792	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	2.93	----	2.41	2.64
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.48	----	0.31	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	0.112	----	0.0849	0.0896
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0302	----	0.0078	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	1780	----	1220	1200
Sodium	7440-23-5	E472/VA	20	mg/kg		946	----	200	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	60.4	----	48.5	58.1
Strontium	7440-24-6	E472/VA	0.10	mg/kg		23.7	----	6.01	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	<0.043 DLHM	----	<0.054 DLHM	<0.072 DLHM

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-7_ZOOT-5_2024-07	MP_QUL-ZOO-1_ZOOT-1_2024-07	MP_QUL-ZOO-1_ZOOT-2_2024-07	MP_QUL-ZOO-1_ZOOT-3_2024-07	MP_QUL-ZOO-1_ZOOT-4_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24C0701-016	VA24C0701-017	VA24C0701-018	VA24C0701-019	VA24C0701-020
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	<0.020	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	0.0201	----	0.0183	0.0174
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0083	----	<0.0020	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	1.13	----	1.21	0.83
Tin	7440-31-5	E472/VA	0.10	mg/kg		0.20	----	<0.10	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	91.1	----	144	115
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		17.5	----	9.70	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	0.137	----	0.104	0.120
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0425	----	0.0128	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	14.8	----	16.6	20.9
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		3.62	----	1.95	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	109	----	117	128
Zinc	7440-66-6	E472/VA	1.0	mg/kg		47.2	----	11.1	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	1.17	----	2.22	1.90
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.36	----	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_ZOOT-5_2024-07	----	----	----	----
					Client sampling date / time	24-Jul-2024 00:00	----	----	----	----
						VA24C0701-021	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		49.1	----	----	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		65.6	----	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	----	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.098	----	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.13	----	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	----	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	----	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.112	----	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		494	----	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0053	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.31	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.055	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		7.26	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		135	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		55.8	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		4.48	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0028	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_ZOOT-5_2024-07	----	----	----	----
					Client sampling date / time	24-Jul-2024 00:00	----	----	----	----
						VA24C0701-021	----	----	----	----
						Result	----	----	----	----
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0056	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.086	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.20	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		295	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		173	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		0.278	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		0.13	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		76	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		2.38	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		4.11	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0058	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.80	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		5.2	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.
Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C0701**	Page	: 1 of 21
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 31-Jul-2024 08:20
PO	: 5590017616	Issue Date	: 02-Oct-2024 12:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	Barium	7440-39-3	E472	43.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Cadmium	7440-43-9	E472	55.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E512	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E512	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E512	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E512	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E512	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-2_2024-07	E512	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-4_2024-07	E512	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-5_2024-07	E512	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-2_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-5_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-2_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-3_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-4_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-5_2024-07	E511	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL-P2_ZOOT-3_2024-07	E511	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	12-Sep-2024	365 days	52 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E512A	25-Jul-2024	10-Sep-2024	365 days	48 days	✓	16-Sep-2024	365 days	54 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E512A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E512A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E512A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	16-Sep-2024	365 days	55 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E512A	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-2_2024-07	E512A	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-4_2024-07	E512A	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-5_2024-07	E512A	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	16-Sep-2024	365 days	56 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-2_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-5_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-2_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-3_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-4_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-5_2024-07	E511A	24-Jul-2024	10-Sep-2024	365 days	49 days	✓	12-Sep-2024	365 days	51 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL-P2_ZOOT-3_2024-07	E511A	23-Jul-2024	10-Sep-2024	365 days	50 days	✓	12-Sep-2024	365 days	52 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E475	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E475	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E475	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E475	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E475	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-2_2024-07	E475	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-4_2024-07	E475	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-5_2024-07	E475	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-2_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-5_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-2_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-3_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-4_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-5_2024-07	E472	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL-P2_ZOOT-3_2024-07	E472	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E475.Ag	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E475.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E475.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E475.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E475.Ag	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-2_2024-07	E475.Ag	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-4_2024-07	E475.Ag	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-5_2024-07	E475.Ag	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-2_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-5_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-2_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-3_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-4_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-5_2024-07	E472.Ag	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL-P2_ZOOT-3_2024-07	E472.Ag	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E475.Ti	25-Jul-2024	10-Sep-2024	730 days	48 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E475.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E475.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E475.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	50 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E475.Ti	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-2_2024-07	E475.Ti	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-4_2024-07	E475.Ti	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-5_2024-07	E475.Ti	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	51 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-2_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-1_ZOOT-5_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-2_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-3_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-4_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-ZOO-7_ZOOT-5_2024-07	E472.Ti	24-Jul-2024	10-Sep-2024	730 days	49 days	✓	11-Sep-2024	730 days	49 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL-P2_ZOOT-3_2024-07	E472.Ti	23-Jul-2024	10-Sep-2024	730 days	50 days	✓	11-Sep-2024	730 days	50 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-2_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-3_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-4_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL-B2_ZOOT-5X_2024-07	E144A	25-Jul-2024	----	----	----		10-Sep-2024	----	48 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-07	E144A	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-3_2024-07	E144A	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-4_2024-07	E144A	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-07	E144A	23-Jul-2024	----	----	----		10-Sep-2024	----	50 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag										
MP_POL-P2_ZOOT-2_2024-07	E144A	23-Jul-2024	----	----	----		10-Sep-2024	----	50 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag										
MP_POL-P2_ZOOT-4_2024-07	E144A	23-Jul-2024	----	----	----		10-Sep-2024	----	50 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag										
MP_POL-P2_ZOOT-5_2024-07	E144A	23-Jul-2024	----	----	----		10-Sep-2024	----	50 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-2_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-1_ZOOT-5_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-1_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-2_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-3_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-4_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-ZOO-7_ZOOT-5_2024-07	E144-H	24-Jul-2024	----	----	----		10-Sep-2024	----	49 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_POL-P2_ZOOT-3_2024-07	E144-H	23-Jul-2024	----	----	----		10-Sep-2024	----	50 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✗ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1642908	1	9	11.1	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1642911	1	9	11.1	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1642909	1	9	11.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1642947	1	9	11.1	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1642913	0	8	0.0	5.0	✗
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1642912	0	8	0.0	5.0	✗
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1642707	2	13	15.3	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1642908	2	9	22.2	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1642708	2	13	15.3	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1642911	2	9	22.2	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1642705	1	13	7.6	10.0	✗
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1642909	2	9	22.2	10.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1642926	1	13	7.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1642947	1	9	11.1	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1642706	1	13	7.6	10.0	✗
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1642913	2	8	25.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1642709	1	13	7.6	10.0	✗
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1642912	2	8	25.0	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1642707	1	13	7.6	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1642908	1	9	11.1	5.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1642708	1	13	7.6	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1642911	1	9	11.1	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1642705	0	13	0.0	5.0	✗
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1642909	1	9	11.1	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1642926	1	13	7.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1642947	1	9	11.1	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1642706	0	13	0.0	5.0	✗
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1642913	1	8	12.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1642709	0	13	0.0	5.0	✗
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1642912	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of soil, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

QUALITY CONTROL REPORT

Work Order	: **VA24C0701**	Page	: 1 of 10
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 31-Jul-2024 08:20
PO	: 5590017616	Date Analysis Commenced	: 10-Sep-2024
C-O-C number	: ----	Issue Date	: 02-Oct-2024 12:36
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1642947)											
VA24B7939-008	Anonymous	Moisture	----	E144-H	2.0	%	75.5	74.2	1.73%	20%	----
Metals (QC Lot: 1642908)											
VA24B7939-008	Anonymous	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0615	0.0465	27.8%	40%	----
Metals (QC Lot: 1642909)											
VA24B7939-008	Anonymous	Aluminum	7429-90-5	E472	5.0	mg/kg	214	198	7.57%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.013	0.018	0.006	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.511	0.661	25.6%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	6.89	10.8	43.7%	40%	DUP-H
		Beryllium	7440-41-7	E472	0.010	mg/kg	0.019	0.020	0.0004	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	1.4	0.4	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	2.14	3.77	55.0%	40%	DUP-H
		Calcium	7440-70-2	E472	20	mg/kg	26000	44700	53.1%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.351	0.328	6.98%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	<0.20	0.21	0.009	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.811	0.842	3.78%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	6.60	7.95	18.6%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	226	267	16.5%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	0.101	0.135	0.033	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1330	1370	2.63%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	28.2	32.8	15.2%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.143	0.207	0.064	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	2.84	2.91	2.46%	40%	----
		Phosphorus	7723-14-0	E472	10	mg/kg	25500	35900	33.6%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	13700	12900	6.58%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	18.6	16.6	11.5%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	6.11	5.90	3.57%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	4420	4370	1.23%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	21.8	38.3	55.2%	60%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1642909) - continued											
VA24B7939-008	Anonymous	Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0747	0.107	35.9%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	0.84	1.06	23.0%	40%	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.293	0.388	27.9%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.42	0.54	0.12	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	162	196	18.8%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1642911)											
VA24B7939-008	Anonymous	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0151	0.0114	27.8%	40%	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1642926)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1642947)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1642707)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1642708)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1642908)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1642909)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1642909) - continued						
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1642911)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1642912)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1642913)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1642926)									
Moisture	----	E144A	2	%	100 %	99.9	90.0	110	----
Physical Tests (QCLot: 1642947)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1642707)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	103	80.0	120	----
Metals (QCLot: 1642708)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	103	80.0	120	----
Metals (QCLot: 1642908)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	102	80.0	120	----
Metals (QCLot: 1642909)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	120	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	108	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	118	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	112	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	105	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	106	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	97.1	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	110	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	110	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	115	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	111	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	110	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	114	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	107	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	105	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	114	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	115	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	113	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	109	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	120	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1642909) - continued									
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	115	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	115	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	110	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	115	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	114	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	109	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	108	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	112	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	109	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	117	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	108	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	113	80.0	120	----
Metals (QCLot: 1642911)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	102	80.0	120	----
Metals (QCLot: 1642912)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	108	80.0	120	----
Metals (QCLot: 1642913)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	100	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1642705)									
QC-1642705-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	90.8	70.0	130	----
QC-1642705-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	99.1	70.0	130	----
QC-1642705-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	92.0	70.0	130	----
QC-1642705-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	97.6	70.0	130	----
QC-1642705-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	98.1	70.0	130	----
QC-1642705-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	91.9	70.0	130	----
QC-1642705-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	97.3	70.0	130	----
QC-1642705-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	93.3	50.0	150	----
QC-1642705-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	94.5	65.0	135	----
QC-1642705-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	95.6	70.0	130	----
QC-1642705-003	RM	Iron	7439-89-6	E475	102 mg/kg	90.4	70.0	130	----
QC-1642705-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	93.2	15.0	185	----
QC-1642705-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	93.8	70.0	130	----
QC-1642705-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	99.2	70.0	130	----
QC-1642705-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	110	70.0	130	----
QC-1642705-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	91.9	40.0	160	----
QC-1642705-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	97.8	70.0	130	----
QC-1642705-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	102	70.0	130	----
QC-1642705-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	96.9	70.0	130	----
QC-1642705-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	103	70.0	130	----
QC-1642705-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	100	70.0	130	----
QC-1642705-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	96.8	70.0	130	----
QC-1642705-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	91.9	70.0	130	----
QC-1642705-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	94.9	70.0	130	----
Metals (QCLot: 1642706)									
QC-1642706-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	99.2	70.0	130	----
Metals (QCLot: 1642707)									
QC-1642707-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	91.8	70.0	130	----
Metals (QCLot: 1642708)									
QC-1642708-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	91.8	70.0	130	----
Metals (QCLot: 1642709)									
QC-1642709-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	81.5	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1642908)									
QC-1642908-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	98.9	70.0	130	----
Metals (QCLot: 1642909)									
QC-1642909-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	95.8	70.0	130	----
QC-1642909-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	95.3	70.0	130	----
QC-1642909-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	97.0	70.0	130	----
QC-1642909-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	87.4	70.0	130	----
QC-1642909-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	94.8	70.0	130	----
QC-1642909-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	93.8	70.0	130	----
QC-1642909-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	95.2	70.0	130	----
QC-1642909-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	89.6	50.0	150	----
QC-1642909-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	92.0	65.0	135	----
QC-1642909-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	93.4	70.0	130	----
QC-1642909-003	RM	Iron	7439-89-6	E472	102 mg/kg	94.6	70.0	130	----
QC-1642909-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	97.0	15.0	185	----
QC-1642909-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	96.4	70.0	130	----
QC-1642909-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	98.3	70.0	130	----
QC-1642909-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	97.4	70.0	130	----
QC-1642909-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	89.5	40.0	160	----
QC-1642909-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	98.4	70.0	130	----
QC-1642909-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	101	70.0	130	----
QC-1642909-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	97.1	70.0	130	----
QC-1642909-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	97.9	70.0	130	----
QC-1642909-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	99.2	70.0	130	----
QC-1642909-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	95.2	70.0	130	----
QC-1642909-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	93.4	70.0	130	----
QC-1642909-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	96.4	70.0	130	----
Metals (QCLot: 1642911)									
QC-1642911-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	98.9	70.0	130	----
Metals (QCLot: 1642912)									
QC-1642912-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	83.6	70.0	130	----
Metals (QCLot: 1642913)									
QC-1642913-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	97.2	70.0	130	----

Chain of Custody (COC) / Analyt Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division
Vancouver
Work Order Reference
VA24C0701

Telephone : + 1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QC! Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked	☑ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	PO BOX 12	Email 1 or Fax gabriel.holmes@mountpolley.com; alalonde@dwb	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Likely, BC	Email 2 slatimer@minnow.ca;kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Postal Code:	V0L 1N0	Email 3 simone.derosemond@minnow.ca	Additional fees may apply to rush requests on weekends,
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please con
Company:		Email 1 or Fax On File	Analysis Requ
Contact:	On File	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 5	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	701	ALS Contact: Can Dang	Sampler:

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRE	SUSPECTED HAZARD (see note
	MP_POL-P2_ZOOT-1_2024-07	23-July-24		Tissue	1	R	R	R	R	R	R			
	MP_POL-P2_ZOOT-2_2024-07	23-July-24		Tissue	1	R	R	R	R	R	R			
	MP_POL-P2_ZOOT-3_2024-07	23-July-24		Tissue	1	R	R	R	R	R	R			
	MP_POL-P2_ZOOT-4_2024-07	23-July-24		Tissue	1	R	R	R	R	R	R			
	MP_POL-P2_ZOOT-5_2024-07	23-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-1_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-2_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-3_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-4_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-5_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			
	MP_BOL-B2_ZOOT-5X_2024-07	25-July-24		Tissue	1	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FI
Released by: S. Latimer	Date: 25-JUL-24	Time: 17:00	Received by:	Date:	Time:	Received by:

Rcvd jc 31Jul2024 820 pm

6,6 °C ice pk

COC pages 1 to 2

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report c

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca

Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;

Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	24-04 Task 5
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_QUL-ZOO-7_ZOOT-1_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-7_ZOOT-2_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-7_ZOOT-3_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-7_ZOOT-4_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-7_ZOOT-5_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-1_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-2_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-3_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-4_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	MP_QUL-ZOO-1_ZOOT-5_2024-07	24-July-24		Tissue	1	R	R	R	R	R	R			
	~~MP_ZOOT-X_2024-07~~	~~July-24~~		~~Tissue~~	1	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
S. Latimer	25-Jul-24	17:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ZOOPLANKTON TISSUE QUALITY

ALS Laboratory Report VA24C2311
(Finalized November 6, 2024)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C2311**			
Amendment	:	**1**			
Client	:	**Mount Polley Mining Corporation**	Laboratory	:	ALS Environmental - Vancouver
Contact	:	Accounts Payable	Account Manager	:	Can Dang
Address	:	306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	:	8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	1-289-775-1547	Telephone	:	+1 604 253 4188
Project	:	24-04 Task 5	Date Samples Received	:	28-Aug-2024 12:45
PO	:	5590017616	Date Analysis Commenced	:	04-Nov-2024
C-O-C number	:	----	Issue Date	:	06-Nov-2024 15:05
Sampler	:	----			
Site	:	----			
Quote number	:	VA24-MPMC100-004 (Minnow/Mt. Polley)			
No. of samples received	:	5			
No. of samples analysed	:	5			

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
%	percent

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (/MM/YYYY): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.

Amendment (06/11/2024): This report has been amended to remove the wet weight basis reporting unit analysis data for all metals except for mercury. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLIS	Detection Limit Adjusted due to insufficient sample.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-08	MP_BOL-B2_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1_2024-08	MP_QUL-ZOO-1_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1X_2024-08
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	25-Aug-2024 07:30	25-Aug-2024 13:30	25-Aug-2024 07:30
						VA24C2311-001	VA24C2311-002	VA24C2311-003	VA24C2311-004	VA24C2311-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	91.6	----	----	----
Moisture	----	E144A/VA	2.0	%		99.5	----	99.1	99.1	99.0
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	196	----	----	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		1060	----	1570	1050	1560
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	0.045	----	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.714	----	1.61	0.209	0.136
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.431	----	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		6.18	----	4.02	3.85	3.18
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	9.52	----	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		21.8	----	48.7	25.8	28.8
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	----	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.047	----	0.057	0.039	0.059
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	----	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.024 DLIS	----	0.028	0.011	0.012
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	1.5	----	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		10.4	----	2.6	1.8	2.1
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	0.046	----	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.621	----	1.82	2.14	1.62
Calcium	7440-70-2	E472/VA	20	mg/kg		----	4310	----	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		33000	----	38100	56800	43300

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-08	MP_BOL-B2_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1_2024-08	MP_QUL-ZOO-1_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1X_2024-08
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	25-Aug-2024 07:30	25-Aug-2024 13:30	25-Aug-2024 07:30
						VA24C2311-001	VA24C2311-002	VA24C2311-003	VA24C2311-004	VA24C2311-005
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0213	----	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.120	----	0.222	0.195	0.228
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	0.61	----	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		7.05	----	18.2	15.2	13.4
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.154	----	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		1.15	----	2.09	1.93	1.81
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	6.15	----	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		93.6	----	98.1	53.1	109
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	548	----	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		1770	----	2960	2060	3050
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	0.185	----	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		1.18	----	24.6	1.18	0.975
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	----	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		2.30	----	2.01	1.46	2.19
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	237	----	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		2890	----	2540	2580	2330
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	150	----	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		324	----	140	126	117
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	<0.0010	----	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		<0.0020	----	<0.0020	<0.0020	<0.0020

alsglobal.com

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-08	MP_BOL-B2_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1_2024-08	MP_QUL-ZOO-1_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1X_2024-08
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	25-Aug-2024 07:30	25-Aug-2024 13:30	25-Aug-2024 07:30
						VA24C2311-001	VA24C2311-002	VA24C2311-003	VA24C2311-004	VA24C2311-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.0064	----	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		<0.040 DLIS	----	0.071	0.100	0.074
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.118	----	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		2.20	----	0.728	0.720	0.762
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.55	----	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		4.88	----	6.90	5.30	4.75
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	1230	----	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		10700	----	12800	17000	12700
Potassium	7440-09-7	E472/VA	20	mg/kg		----	669	----	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		7720	----	8850	11600	8170
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	0.850	----	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		6.46	----	14.0	15.1	11.7
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	0.28	----	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		7.80	----	3.45	4.35	3.23
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.0085	----	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0383	----	0.0902	0.0822	0.0777
Sodium	7440-23-5	E472/VA	20	mg/kg		----	565	----	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		5940	----	5940	9840	6910
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	25.1	----	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		156	----	254	378	279
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	Client sample ID	MP_POL-P2_ZOOT-1_2024-08	MP_BOL-B2_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1_2024-08	MP_QUL-ZOO-1_ZOOT-1_2024-08	MP_QUL-ZOO-7_ZOOT-1X_2024-08
					Client sampling date / time	26-Aug-2024 13:15	26-Aug-2024 08:55	25-Aug-2024 07:30	25-Aug-2024 13:30	25-Aug-2024 07:30
						VA24C2311-001	VA24C2311-002	VA24C2311-003	VA24C2311-004	VA24C2311-005
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.048 DLIS	----	0.022	0.022	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0025	----	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0114	----	0.0275	0.0215	0.0243
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	----	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		0.74	----	0.43	0.48	0.94
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	10.7	----	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		69.2	----	108	69.6	114
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0198	----	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.126	----	0.178	0.134	0.135
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.98	----	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		9.24	----	8.26	7.22	9.77
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	9.8	----	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		104	----	118	128	95.0
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	0.22	----	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		1.18	----	0.99	1.69	1.50

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2311**	Page	: 1 of 9
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Issue Date	: 06-Nov-2024 16:07
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E512	26-Aug-2024	04-Nov-2024	365 days	70 days	✓	05-Nov-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E512	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E512	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E512	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E511	26-Aug-2024	04-Nov-2024	365 days	70 days	✓	04-Nov-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E512A	26-Aug-2024	04-Nov-2024	365 days	70 days	✓	05-Nov-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E512A	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E512A	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E512A	25-Aug-2024	04-Nov-2024	365 days	71 days	✓	05-Nov-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E511A	26-Aug-2024	04-Nov-2024	365 days	70 days	✓	04-Nov-2024	365 days	70 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E475	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	70 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E475	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E475	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E475	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E472	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E475.Ag	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E475.Ag	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E475.Ag	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E475.Ag	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E472.Ag	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E475.Ti	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E475.Ti	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E475.Ti	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E475.Ti	25-Aug-2024	04-Nov-2024	730 days	71 days	✓	04-Nov-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E472.Ti	26-Aug-2024	04-Nov-2024	730 days	70 days	✓	04-Nov-2024	730 days	71 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL-P2_ZOOT-1_2024-08	E144A	26-Aug-2024	----	----	----		04-Nov-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-1_ZOOT-1_2024-08	E144A	25-Aug-2024	----	----	----		04-Nov-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1_2024-08	E144A	25-Aug-2024	----	----	----		04-Nov-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-ZOO-7_ZOOT-1X_2024-08	E144A	25-Aug-2024	----	----	----		04-Nov-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_BOL-B2_ZOOT-1_2024-08	E144-H	26-Aug-2024	----	----	----		04-Nov-2024	----	70 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✘ = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1748969	0	4	0.0	5.0	✘
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1748970	0	4	0.0	5.0	✘
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1748966	0	4	0.0	5.0	✘
Moisture Content by Gravimetry (Micro)	E144-H	1749371	1	4	25.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1748971	0	4	0.0	5.0	✘
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1748967	0	4	0.0	5.0	✘
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1748954	2	10	20.0	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1748969	2	4	50.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1748955	2	10	20.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1748970	2	4	50.0	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1748952	2	10	20.0	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1748966	2	4	50.0	10.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1749240	1	10	10.0	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1749371	1	4	25.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1748953	2	10	20.0	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1748971	2	4	50.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1748956	2	10	20.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1748967	2	4	50.0	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1748954	1	10	10.0	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1748969	1	4	25.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1748955	1	10	10.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1748970	1	4	25.0	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1748952	1	10	10.0	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1748966	1	4	25.0	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1749240	1	10	10.0	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1749371	1	4	25.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1748953	1	10	10.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1748971	1	4	25.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1748956	1	10	10.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1748967	1	4	25.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C2311**	Page	: 1 of 10
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Date Analysis Commenced	: 04-Nov-2024
C-O-C number	: ----	Issue Date	: 06-Nov-2024 15:31
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1749371)											
VA24C3333-005	Anonymous	Moisture	----	E144-H	2.0	%	93.2	91.8	1.50%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1749240)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1749371)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1748952)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1748952) - continued						
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1748953)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1748954)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1748955)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1748956)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1748966)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1748966) - continued						
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1748967)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1748969)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1748970)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1748971)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1749240)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1749371)									
Moisture	----	E144-H	2	%	100 %	101	90.0	110	----
Metals (QCLot: 1748952)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	88.2	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	89.0	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	92.2	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	91.4	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	83.4	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	84.5	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	84.4	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	87.6	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	87.3	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	89.8	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	88.4	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	87.7	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	84.6	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	89.8	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	85.5	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	84.0	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	90.0	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	88.0	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	92.3	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	84.8	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	89.4	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	90.1	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	87.9	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	84.8	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	88.4	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	91.3	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	89.1	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	85.1	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1748952) - continued									
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	88.9	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	87.2	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	91.2	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	83.4	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	94.2	80.0	120	----
Metals (QCLot: 1748953)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	84.2	80.0	120	----
Metals (QCLot: 1748954)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	80.6	80.0	120	----
Metals (QCLot: 1748955)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	80.6	80.0	120	----
Metals (QCLot: 1748956)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	90.1	80.0	120	----
Metals (QCLot: 1748966)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	95.8	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	95.2	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	96.6	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	95.5	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	93.2	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	90.8	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	93.3	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	94.9	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.2	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	97.3	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	95.0	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	96.1	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	90.5	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	94.9	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	93.7	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	93.4	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	97.5	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	94.3	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	96.2	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	90.8	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	96.2	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	93.6	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1748966) - continued									
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	94.5	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	89.8	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	96.3	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	95.5	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	94.2	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	93.1	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	96.5	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	94.2	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	97.4	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	89.6	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	99.9	80.0	120	----
Metals (QCLot: 1748967)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	94.7	80.0	120	----
Metals (QCLot: 1748969)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	88.8	80.0	120	----
Metals (QCLot: 1748970)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	88.8	80.0	120	----
Metals (QCLot: 1748971)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	90.9	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1748952)									
QC-1748952-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	92.4	70.0	130	----
QC-1748952-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	93.0	70.0	130	----
QC-1748952-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	85.9	70.0	130	----
QC-1748952-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	91.0	70.0	130	----
QC-1748952-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	93.4	70.0	130	----
QC-1748952-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	87.7	70.0	130	----
QC-1748952-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	88.9	70.0	130	----
QC-1748952-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	96.8	50.0	150	----
QC-1748952-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	94.9	65.0	135	----
QC-1748952-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	91.5	70.0	130	----
QC-1748952-003	RM	Iron	7439-89-6	E475	102 mg/kg	90.7	70.0	130	----
QC-1748952-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	97.2	15.0	185	----
QC-1748952-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	97.4	70.0	130	----
QC-1748952-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	91.0	70.0	130	----
QC-1748952-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	107	70.0	130	----
QC-1748952-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	101	40.0	160	----
QC-1748952-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	92.3	70.0	130	----
QC-1748952-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	96.0	70.0	130	----
QC-1748952-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	91.4	70.0	130	----
QC-1748952-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	94.4	70.0	130	----
QC-1748952-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	94.3	70.0	130	----
QC-1748952-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	90.2	70.0	130	----
QC-1748952-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	91.9	70.0	130	----
QC-1748952-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	96.1	70.0	130	----
Metals (QCLot: 1748953)									
QC-1748953-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	90.5	70.0	130	----
Metals (QCLot: 1748954)									
QC-1748954-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	88.4	70.0	130	----
Metals (QCLot: 1748955)									
QC-1748955-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	88.4	70.0	130	----
Metals (QCLot: 1748956)									
QC-1748956-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	90.8	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1748966)									
QC-1748966-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	94.5	70.0	130	----
QC-1748966-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	96.6	70.0	130	----
QC-1748966-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	97.0	70.0	130	----
QC-1748966-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	99.8	70.0	130	----
QC-1748966-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	97.7	70.0	130	----
QC-1748966-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	95.3	70.0	130	----
QC-1748966-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	94.7	70.0	130	----
QC-1748966-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	100	50.0	150	----
QC-1748966-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	95.1	65.0	135	----
QC-1748966-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	93.1	70.0	130	----
QC-1748966-003	RM	Iron	7439-89-6	E472	102 mg/kg	92.6	70.0	130	----
QC-1748966-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	98.6	15.0	185	----
QC-1748966-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	100	70.0	130	----
QC-1748966-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	93.9	70.0	130	----
QC-1748966-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	98.0	70.0	130	----
QC-1748966-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	97.1	40.0	160	----
QC-1748966-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	96.7	70.0	130	----
QC-1748966-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	98.3	70.0	130	----
QC-1748966-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	95.5	70.0	130	----
QC-1748966-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	96.4	70.0	130	----
QC-1748966-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	97.7	70.0	130	----
QC-1748966-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	97.1	70.0	130	----
QC-1748966-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	96.5	70.0	130	----
QC-1748966-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	96.6	70.0	130	----
Metals (QCLot: 1748967)									
QC-1748967-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	94.5	70.0	130	----
Metals (QCLot: 1748969)									
QC-1748969-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	92.5	70.0	130	----
Metals (QCLot: 1748970)									
QC-1748970-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	92.5	70.0	130	----
Metals (QCLot: 1748971)									
QC-1748971-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	96.7	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Vancouver

Work Order Reference VA24C2311

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients		Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked		☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	PO BOX 12	Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Likely. BC	Email 2	slatimer@minnow.ca;kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Postal Code:	V0L 1N0	Email 3	simone.derosemond@minnow.ca	Additional fees may apply to rush requests on weekends, stat
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients		Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please contact y
Company:		Email 1 or Fax	On File	
Contact:	On File	Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 5	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	2311	ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti									SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_POL-P2_ZOOT-1_2024-08	26-Aug-24	13:15	Tissue	1	R	R	R	R	R	R											
	MP_BOL-B2_ZOOT-1_2024-08	26-Aug-24	8:55	Tissue	1	R	R	R	R	R	R											
	MP_QUL-ZOO-7_ZOOT-1_2024-08	25-Aug-24	7:30	Tissue	1	R	R	R	R	R	R											
	MP_QUL-ZOO-1_ZOOT-1_2024-08	25-Aug-24	13:30	Tissue	1	R	R	R	R	R	R											
	MP_QUL-ZOO-7_ZOOT-1X_2024-08	25-Aug-24	7:30	Tissue	1	R	R	R	R	R	R											

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date: Aug 26/24	Time:	Received by:	Date:	Time:	Received by: MT	Date: 8/28	Time: 12:45

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

PHYTOPLANKTON PRODUCTIVITY

ALS Laboratory Report VA24B6518
(Finalized July 19, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B6518**	Page	: 1 of 3
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-Jul-2024 11:06
PO	: 5590017616	Date Analysis Commenced	: 11-Jul-2024
C-O-C number	: ----	Issue Date	: 19-Jul-2024 15:42
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Paolo Obillo	Account Manager Assistant	Administration, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
µg/sample	micrograms per sample
L	litres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_CHLA-1_2024-06	MP_BOL-B2_CHLA-1_2024-06	MP_QUL-ZOO-7_CHLA-1_2024-06	MP_QUL-ZOO-1_CHLA-1_2024-06	MP_QUL-ZOO-1_CHLA-1X_2024-06
					Client sampling date / time	19-Jun-2024 00:00	19-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00
						VA24B6518-001	VA24B6518-002	VA24B6518-003	VA24B6518-004	VA24B6518-005
						Result	Result	Result	Result	Result
Field Tests										
Sampling volume, field	----	EF003/VA	0.010	L		0.250	0.250	0.230	0.250	0.235
Plant Pigments										
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L		1.04	1.67	0.848	0.796	0.885
Chlorophyll a	479-61-8	E870A/VA	0.0020	µg/sample		0.261	0.417	0.195	0.199	0.208

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B6518**	Page	: 1 of 6
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-Jul-2024 11:06
PO	: 5590017616	Issue Date	: 19-Jul-2024 15:47
C-O-C number	: ----		
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-06	EF003	20-Jun-2024	----	----	----		11-Jul-2024	----	22 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1X_2024-06	EF003	20-Jun-2024	----	----	----		11-Jul-2024	----	22 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1_2024-06	EF003	20-Jun-2024	----	----	----		11-Jul-2024	----	22 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-1_2024-06	EF003	19-Jun-2024	----	----	----		11-Jul-2024	----	23 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-1_2024-06	EF003	19-Jun-2024	----	----	----		11-Jul-2024	----	23 days	
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-06	E870A	20-Jun-2024	18-Jul-2024	28 days	28 days	✓	18-Jul-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1X_2024-06	E870A	20-Jun-2024	18-Jul-2024	28 days	28 days	✓	18-Jul-2024	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube										
MP_QUL-ZOO-7_CHLA-1_2024-06	E870A	20-Jun-2024	18-Jul-2024	28 days	28 days	✓	18-Jul-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube										
MP_BOL-B2_CHLA-1_2024-06	E870A	19-Jun-2024	18-Jul-2024	28 days	29 days	× EHT	18-Jul-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube										
MP_POL-P2_CHLA-1_2024-06	E870A	19-Jun-2024	18-Jul-2024	28 days	29 days	× EHT	18-Jul-2024	28 days	0 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1551873	1	5	20.0	5.0	✓
Method Blanks (MB)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1551873	1	5	20.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. Sampling volume not provided by client.
Chlorophyll-a by Fluorometry (Field Filtered µg/L)	EC870A ALS Environmental - Vancouver	Water	CALC	Convert results to sample concentration based on field information.
Field Volume (L)	EF003 ALS Environmental - Vancouver	Water		Field measurement of sampling volume provided by client and recorded on ALS report may affect the validity of results.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a Extraction (Field Filtered)	EP870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24B6518**	Page	: 1 of 3
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-Jul-2024 11:06
PO	: 5590017616	Date Analysis Commenced	: 11-Jul-2024
C-O-C number	: ----	Issue Date	: 19-Jul-2024 15:42
Sampler	: SJU, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Paolo Obillo	Account Manager Assistant	Vancouver Administration, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Plant Pigments (QCLot: 1551873)						
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	<0.0020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Plant Pigments (QCLot: 1551873)									
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	1 µg/sample	92.8	80.0	120	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Environmental Division Vancouver

Work Order Reference VA24B6518

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely. BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbc

Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;

Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mi

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge m

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge m

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge m

☐ Same day [E2] if received by 10am M-S - 200% rush surch

Additional fees may apply to rush requests on week

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, pleas

Project Information

ALS Account # / Quote #:	VA24-MPMC100-005
Job #:	
PO / AFE:	24-04 Task 5
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang

Sampler: SLA SJU

Analysis R

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	CHL-A by Fluorometry (E870A)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_POL-P2_CHLA-1_2024-06 (250 mL)	19-Jun-24	N/A	Water	1	R			
	MP_BOL-B2_CHLA-1_2024-06 (250 mL)	19-Jun-24	↓	Water	1	R			
	MP_QUL-ZOO-7_CHLA-1_2024-06 (230 mL)	20-Jun-24		Water	1	R			
	MP_QUL-ZOO-1_CHLA-1_2024-06 (250 mL)	20-Jun-24	↓	Water	1	R			
	MP_QUL-ZOO-1_CHLA-1X_2024-06 (235mL)	20-Jun-24	N/A	Water	1	R			

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Filtered + frozen. Sample volume in brackets.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				23,	24,	25	

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
S. Latimer	20-Jun-24	16:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
	7/9/24	1215PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2010 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

PHYTOPLANKTON PRODUCTIVITY

ALS Laboratory Report VA24B8959
(Finalized August 12, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B8959**	Page	: 1 of 5
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 31-Jul-2024 08:20
PO	: 5590017616	Date Analysis Commenced	: 01-Aug-2024
C-O-C number	: ----	Issue Date	: 12-Aug-2024 10:21
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Paolo Obillo	Account Manager Assistant	Administration, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
µg/sample	micrograms per sample
L	litres

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL-P2_C HLA-1_2024-07	MP_POL-P2_C HLA-2_2024-07	MP_POL-P2_C HLA-3_2024-07	MP_POL-P2_C HLA-4_2024-07	MP_POL-P2_C HLA-5_2024-07
					Client sampling date / time	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00	23-Jul-2024 00:00
						VA24B8959-001	VA24B8959-002	VA24B8959-003	VA24B8959-004	VA24B8959-005
						Result	Result	Result	Result	Result
Field Tests										
Sampling volume, field	----	EF003/VA	0.010	L		0.250	0.250	0.250	0.250	0.250
Plant Pigments										
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L		0.940	1.24	1.34	1.26	1.80
Chlorophyll a	479-61-8	E870A/VA	0.0100	µg/sample		0.235	0.309	0.334	0.315	0.449

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL-B2_C HLA-1_2024-07	MP_BOL-B2_C HLA-2_2024-07	MP_BOL-B2_C HLA-3_2024-07	MP_BOL-B2_C HLA-4_2024-07	MP_BOL-B2_C HLA-5_2024-07
					Client sampling date / time	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00	25-Jul-2024 00:00
						VA24B8959-006	VA24B8959-007	VA24B8959-008	VA24B8959-009	VA24B8959-010
						Result	Result	Result	Result	Result
Field Tests										
Sampling volume, field	----	EF003/VA	0.010	L		0.250	0.250	0.250	0.250	0.250
Plant Pigments										
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L		2.25	1.93	2.27	2.41	2.15
Chlorophyll a	479-61-8	E870A/VA	0.0100	µg/sample		0.562	0.482	0.568	0.602	0.537

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-ZOO-7_CHLA-1_2024-07	MP_QUL-ZOO-7_CHLA-2_2024-07	MP_QUL-ZOO-7_CHLA-3_2024-07	MP_QUL-ZOO-7_CHLA-4_2024-07	MP_QUL-ZOO-7_CHLA-5_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24B8959-011	VA24B8959-012	VA24B8959-013	VA24B8959-014	VA24B8959-015
						Result	Result	Result	Result	Result
Field Tests										
Sampling volume, field	----	EF003/VA	0.010	L		0.250	0.250	0.244	0.250	0.250
Plant Pigments										
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L		0.876	0.748	1.03	1.13	1.15
Chlorophyll a	479-61-8	E870A/VA	0.0100	µg/sample		0.219	0.187	0.251	0.283	0.287

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-ZOO-1_CHLA-1_2024-07	MP_QUL-ZOO-1_CHLA-2_2024-07	MP_QUL-ZOO-1_CHLA-3_2024-07	MP_QUL-ZOO-1_CHLA-4_2024-07	MP_QUL-ZOO-1_CHLA-5_2024-07
					Client sampling date / time	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00	24-Jul-2024 00:00
						VA24B8959-016	VA24B8959-017	VA24B8959-018	VA24B8959-019	VA24B8959-020
						Result	Result	Result	Result	Result
Field Tests										
Sampling volume, field	----	EF003/VA	0.010	L		0.250	0.250	0.250	0.250	0.250
Plant Pigments										
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L		1.12	1.09	1.01	1.00	1.13
Chlorophyll a	479-61-8	E870A/VA	0.0100	µg/sample		0.281	0.272	0.253	0.250	0.283

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_POL-P2_CHLA-2X_2024-07	----	----	----	----
					Client sampling date / time: 23-Jul-2024 00:00	----	----	----	----
					VA24B8959-021	--------	--------	--------	--------
					Result	----	----	----	----
Field Tests									
Sampling volume, field	----	EF003/VA	0.010	L	0.250	----	----	----	----
Plant Pigments									
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L	1.09	----	----	----	----
Chlorophyll a	479-61-8	E870A/VA	0.0100	µg/sample	0.273	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B8959**	Page	: 1 of 9
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 31-Jul-2024 08:20
PO	: 5590017616	Issue Date	: 12-Aug-2024 10:22
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-1_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-2_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-2X_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-3_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-4_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-5_2024-07	EF003	23-Jul-2024	----	----	----		01-Aug-2024	----	10 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-1_2024-07	EF003	25-Jul-2024	----	----	----		01-Aug-2024	----	8 days	

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-2_2024-07	EF003	25-Jul-2024	----	----	----		01-Aug-2024	----	8 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-3_2024-07	EF003	25-Jul-2024	----	----	----		01-Aug-2024	----	8 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-4_2024-07	EF003	25-Jul-2024	----	----	----		01-Aug-2024	----	8 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-5_2024-07	EF003	25-Jul-2024	----	----	----		01-Aug-2024	----	8 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-2_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-3_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-4_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-5_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-2_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-3_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-4_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-5_2024-07	EF003	24-Jul-2024	----	----	----		01-Aug-2024	----	9 days	
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-1_2024-07	E870A	25-Jul-2024	11-Aug-2024	28 days	18 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-2_2024-07	E870A	25-Jul-2024	11-Aug-2024	28 days	18 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-3_2024-07	E870A	25-Jul-2024	11-Aug-2024	28 days	18 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-4_2024-07	E870A	25-Jul-2024	11-Aug-2024	28 days	18 days	✓	11-Aug-2024	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-5_2024-07	E870A	25-Jul-2024	11-Aug-2024	28 days	18 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-2_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-3_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-4_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-5_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-2_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-3_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-4_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-5_2024-07	E870A	24-Jul-2024	11-Aug-2024	28 days	19 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-1_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-2_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-2X_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-3_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-4_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-5_2024-07	E870A	23-Jul-2024	11-Aug-2024	28 days	20 days	✓	11-Aug-2024	28 days	0 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1589814	2	33	6.0	5.0	✓
Method Blanks (MB)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1589814	2	33	6.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. Sampling volume not provided by client.
Chlorophyll-a by Fluorometry (Field Filtered µg/L)	EC870A ALS Environmental - Vancouver	Water	CALC	Convert results to sample concentration based on field information.
Field Volume (L)	EF003 ALS Environmental - Vancouver	Water		Field measurement of sampling volume provided by client and recorded on ALS report may affect the validity of results.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a Extraction (Field Filtered)	EP870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24B8959**	Page	: 1 of 3
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 31-Jul-2024 08:20
PO	: 5590017616	Date Analysis Commenced	: 01-Aug-2024
C-O-C number	: ----	Issue Date	: 12-Aug-2024 10:26
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Paolo Obillo	Account Manager Assistant	Vancouver Administration, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Plant Pigments (QCLot: 1589814)						
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	<0.0020	----
Plant Pigments (QCLot: 1589815)						
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	<0.0020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Plant Pigments (QCLot: 1589814)									
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	1 µg/sample	93.0	80.0	120	----
Plant Pigments (QCLot: 1589815)									
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	1 µg/sample	93.6	80.0	120	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	PO BOX 12	Email 1 or Fax gabriel.holmes@mountpolley.com; alalonde@dwbc	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Likely, BC	Email 2 slatimer@minnow.ca; kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Postal Code:	V0L 1N0	Email 3 simone.derosemond@minnow.ca	Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please contact your AM to confirm availability.
Company:		Email 1 or Fax On File	
Contact:	On File	Email 2	

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-005	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 5	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	B8959	ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	CHL-A by Fluorometry (EC870A)	F	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
1	MP_POL-P2_CHLA-1_2024-07 (250mL)	23-July-24	N/A	Water	1	R			
2	MP_POL-P2_CHLA-2_2024-07 (250mL)	23-July-24		Water	1	R			
3	MP_POL-P2_CHLA-3_2024-07 (250)	23-July-24		Water	1	R			
4	MP_POL-P2_CHLA-4_2024-07 (250)	23-July-24		Water	1	R			
5	MP_POL-P2_CHLA-5_2024-07 (250)	23-July-24		Water	1	R			
6	MP_BOL-B2_CHLA-1_2024-07 (250)	25-July-24		Water	1	R			
7	MP_BOL-B2_CHLA-2_2024-07 (250)	25-July-24		Water	1	R			
8	MP_BOL-B2_CHLA-3_2024-07 (250)	25-July-24		Water	1	R			
9	MP_BOL-B2_CHLA-4_2024-07 (250)	25-July-24		Water	1	R			
10	MP_BOL-B2_CHLA-5_2024-07 (250)	25-July-24		Water	1	R			
11	MP_QUL-ZOO-7_CHLA-1_2024-07 (250)	24-July-24		Water	1	R			
12	MP_QUL-ZOO-7_CHLA-2_2024-07 (250)	24-July-24		Water	1	R			

Environmental Division
Vancouver
Work Order Reference
VA24B8959

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	Field filtered chlorophyll-a samples. Each sample was 250 mL unless otherwise noted. Samples were frozen after filtration
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			
Released by: S. Latimer	Date: 25-JUL-24	Time: 17:00	Received by:	Date:	Time:	Received by:

Rcvd jc 31Jul2024 820 a.m

6, 6 °C ice pk

COC pages 1 to 2

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the whit

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #: VA24-MPMC100-005
Job #:
PO / AFE: 24-04 Task 5
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang Sampler:

Analysis Request

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	CHL-A by Fluorometry (EC870A)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below				F			
13	MP_QUL-ZOO-7_CHLA-3_2024-07 (1244 mL)	24-July-24	N/A	Water	1	R			
14	MP_QUL-ZOO-7_CHLA-4_2024-07 (250 mL)	24-July-24		Water	1	R			
15	MP_QUL-ZOO-7_CHLA-5_2024-07 (250 mL)	24-July-24		Water	1	R			
16	MP_QUL-ZOO-1_CHLA-1_2024-07 (250 mL)	24-July-24		Water	1	R			
17	MP_QUL-ZOO-1_CHLA-2_2024-07 (250)	24-July-24		Water	1	R			
18	MP_QUL-ZOO-1_CHLA-3_2024-07 (250)	24-July-24		Water	1	R			
19	MP_QUL-ZOO-1_CHLA-4_2024-07 (250)	24-July-24		Water	1	R			
20	MP_QUL-ZOO-1_CHLA-5_2024-07 (250)	24-July-24		Water	1	R			
21	MP_QUL-ZOO-P2_CHLA-2X_2024-07 (250)	23-July-24		Water	1	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human consumption/ use?
☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Field filtered chlorophyll-a samples. Each sample was 250 mL unless otherwise noted. Samples were frozen after filtration

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: S. Latimer	Date: 25-Jul-24	Time: 17:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

PHYTOPLANKTON PRODUCTIVITY

ALS Laboratory Report VA24C2323
(Finalized October 29, 2024)

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C2323**		
Amendment	: **2**		
Client	: **Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	: Accounts Payable	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Date Analysis Commenced	: 09-Sep-2024
C-O-C number	: ----	Issue Date	: 29-Oct-2024 15:16
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Daniela Ruiz	Account Manager Assistant	Administration, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
L	litres
µg/sample	micrograms per sample
µg/L	micrograms per litre

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

The tube for the sample, "MP_BOL-P2_CHLA-1_2024-08" was received empty.

Amendment (19/09/2024): This report has been amended as a result of misinterpretation of sample identification numbers (IDs). All analysis results are as per the previous report.

Amendment (29/10/2024): This report has been amended and re-released to allow the following modifications: Includes additional "Sampling Volume, Field" and Chlorophyll A in ug/L unit; and modified client sample id for VA24C2323-001 and -002.

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	CAS Number	Method/Lab/Accreditation	LOR	Unit	MP_BOL-B2_CHLA-1_2024-08	MP_POL-P2_CHLA-1_2024-08	MP_QUL-ZOO-7_CHLA-1_2024-08	MP_QUL-ZOO-1_CHLA-1_2024-08	MP_QUL-ZOO-7_CHLA-1X_2024-08
Client sample ID									
Client sampling date / time					26-Aug-2024 13:15	26-Aug-2024 08:55	25-Aug-2024 07:30	25-Aug-2024 13:30	25-Aug-2024 07:30
					VA24C2323-001	VA24C2323-002	VA24C2323-003	VA24C2323-004	VA24C2323-005
					Result	Result	Result	Result	Result
Field Tests									
Sampling volume, field	----	EF003/VA	0.010	L	0.250	0.250	0.250	0.250	0.250
Plant Pigments									
Chlorophyll a	479-61-8	EC870A/VA	0.010	µg/L	2.27	1.19	0.652	0.768	0.788
Chlorophyll a	479-61-8	E870A/VA	0.0020	µg/sample	0.568	0.297	0.163	0.192	0.197

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C2323**	Page	: 1 of 6
Amendment	: **2**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Issue Date	: 29-Oct-2024 15:16
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_BOL-B2_CHLA-1_2024-08	EF003	26-Aug-2024	----	----	----		29-Oct-2024	----	64 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_POL-P2_CHLA-1_2024-08	EF003	26-Aug-2024	----	----	----		29-Oct-2024	----	64 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-08	EF003	25-Aug-2024	----	----	----		29-Oct-2024	----	65 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1_2024-08	EF003	25-Aug-2024	----	----	----		29-Oct-2024	----	65 days	
Field Tests : Field Volume (L)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1X_2024-08	EF003	25-Aug-2024	----	----	----		29-Oct-2024	----	65 days	
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-1_CHLA-1_2024-08	E870A	25-Aug-2024	09-Sep-2024	28 days	15 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1_2024-08	E870A	25-Aug-2024	09-Sep-2024	28 days	15 days	✓	09-Sep-2024	28 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_QUL-ZOO-7_CHLA-1X_2024-08	E870A	25-Aug-2024	09-Sep-2024	28 days	15 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_BOL-B2_CHLA-1_2024-08	E870A	26-Aug-2024	16-Sep-2024	28 days	21 days	✓	16-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry (Field Filtered µg)										
Opaque HDPE tube MP_POL-P2_CHLA-1_2024-08	E870A	26-Aug-2024	16-Sep-2024	28 days	21 days	✓	16-Sep-2024	28 days	0 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1640188	2	5	40.0	5.0	✓
Method Blanks (MB)							
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A	1640188	2	5	40.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a by Fluorometry (Field Filtered µg)	E870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure. Sampling volume not provided by client.
Chlorophyll-a by Fluorometry (Field Filtered µg/L)	EC870A ALS Environmental - Vancouver	Water	CALC	Convert results to sample concentration based on field information.
Field Volume (L)	EF003 ALS Environmental - Vancouver	Water		Field measurement of sampling volume provided by client and recorded on ALS report may affect the validity of results.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a Extraction (Field Filtered)	EP870A ALS Environmental - Vancouver	Water	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

QUALITY CONTROL REPORT

Work Order	: **VA24C2323**	Page	: 1 of 3
Amendment	: **2**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 5	Date Samples Received	: 28-Aug-2024 12:45
PO	: 5590017616	Date Analysis Commenced	: 09-Sep-2024
C-O-C number	: ----	Issue Date	: 29-Oct-2024 15:16
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 5		
No. of samples analysed	: 5		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Daniela Ruiz	Account Manager Assistant	Vancouver Administration, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Plant Pigments (QCLot: 1640188)						
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	<0.0020	----
Plant Pigments (QCLot: 1654204)						
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	<0.0020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Plant Pigments (QCLot: 1640188)									
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	1 µg/sample	92.1	80.0	120	----
Plant Pigments (QCLot: 1654204)									
Chlorophyll a	479-61-8	E870A	0.002	µg/sample	1 µg/sample	102	80.0	120	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division
Vancouver
Work Order Reference
VA24C2323

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely. BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Additional fees may apply to rush requests on weekends, st
Date and Time Required for all E&P TATs:
For all tests with rush TATs requested, please contac

Project Information

ALS Account # / Quote #: VA24-MPMC100-005
Job #:
PO / AFE: 24-04 Task 5
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only): 2323

ALS Contact: Can Dang **Sampler:**

Analysis Reque

Indicate Filtered (F), Preserved (P) or Filtered and Pre

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	CHL-A by Fluorometry (EC870A)	F	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRE	SUSPECTED HAZARD (see notes
	MP_POL-P2_CHLA-1_2024-08	26-Aug-24	13:15	Water	1	R				
	MP_BOL-B2_CHLA-1_2024-08	26-Aug-24	8:55	Water	1	R				
	MP_QUL-ZOO-7_CHLA-1_2024-08	25-Aug-24	7:30	Water	1	R				
	MP_QUL-ZOO-1_CHLA-1_2024-08	25-Aug-24	13:30	Water	1	R				
	MP_QUL-ZOO-7_CHLA-1X_2024-08	25-Aug-24	7:30	Water	1	R				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7°			

SHIPMENT RELEASE (client use)

Released by: Kate Stunn Date: Aug 26/24 Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 8,28 Time: 12:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

PERIPHYTON COMMUNITY AND PRODUCTIVITY

Biologica Laboratory Reports pp24-169 Freshwater Periphyton

(Finalized November 15, 2024)

Freshwater Periphyton Enumeration and Identification Methods
Client: Minnow Environmental
Project: Mount Polley

Sample Inventory

Sample arrival: 19-Aug-24
Number of samples: 16
Number of jars: 16
Biologica project number: pp24-169

Upon arrival, samples were examined, and Lugols preservative was added (if needed) to ensure adequate preservation of samples. An inventory form was created and verified with the chain of custody (COC) to ensure that (1) all samples are accounted for, and (2) each sample had the appropriate number of jars as indicated on the COC. Any discrepancies were reported to the client and were resolved before further sample handling.

Sample Processing

Distilled water was added to the samples as needed to make their volumes uniform (23 mL). Samples were sonicated for 7 minutes using a CO-Z Digital Ultrasonic Cleaner (40 kHz), and sub-samples (0.1 - 0.2 mL) were dispensed into 10 mL Utermohl settling chambers, topped up with distilled water, and gravity settled for 3 hours. Sub-samples were then systematically scanned using a Zeiss Axio Vert A.1 inverted phase-contrast microscope at 400x magnification. All algal cells were counted in a series of randomly located fields of view (FOV) until a minimum of 300 algal units were enumerated, or until 80 FOV were scanned. Algal units represent single cells of all algal groups, as well as colonies or filaments of blue-green algae. Given that blue-green algal colonies/filaments may contain hundreds of cells, enumerating units, rather than individual cells, allows for a more equal representation of algal groups. The mean number of cells per unit (= 1 for single cells, >1 for all other algal forms) were estimated for all taxa and used to calculate total densities. Only “viable” cells (those that appeared to be alive at the time of collection) were identified and enumerated. Chrysophyte loricas were also counted (EPA, 2003).

Algae were identified to genus, where possible, following the most up-to-date taxonomic references and collaborations with international and local algal taxonomic experts. Species-level identifications were only given to identifiable taxa for which there are reliable taxonomic references available that encompass the species-level morphological diversity in North America. This approach ensures long-term consistency of data sets and is in accordance with the trend in algal taxonomic practice to be more conservative with delineation of species. Species-level identifications for some taxa are problematic due to widespread phenotypic plasticity that can artificially inflate species richness (Wehr *et al.* 2015). When applicable, terms “cf.” (*confertim*, possibly for species) and “sp.1” (a single undetermined species) were employed to distinguish between different species in the same genus.

Table 1. Summary of periphyton samples processed for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Rep	Date Sampled	Biologica Sample ID	Sub-sample Volume (mL)	Fields of View Scanned	Total Units Counted*
MP_HAC-R1-PERC-1_2024-08	1	15-Aug-24	pp24-169-049	0.2	23	343
MP_HAC-R1-PERC-2_2024-08	2	15-Aug-24	pp24-169-050	0.2	27	335
MP_HAC-R1-PERC-3_2024-08	3	15-Aug-24	pp24-169-051	0.2	30	310
MP_HAC-R1-PERC-4_2024-08	4	15-Aug-24	pp24-169-052	0.1	20	333
MP_HAC-R1-PERC-5_2024-08	5	14-Aug-24	pp24-169-053	0.2	20	359
MP_HAC-U-PERC-1_2024-08	1	13-Aug-24	pp24-169-054	0.2	15	318
MP_HAC-U-PERC-2_2024-08	2	13-Aug-24	pp24-169-055	0.2	27	334
MP_HAC-U-PERC-3_2024-08	3	13-Aug-24	pp24-169-056	0.1	17	325
MP_HAC-U-PERC-4_2024-08	4	12-Aug-24	pp24-169-057	0.1	27	323
MP_HAC-U-PERC-5_2024-08	5	12-Aug-24	pp24-169-058	0.2	20	318
MP_EDC-U-PERC-1_2024-08	1	13-Aug-24	pp24-169-059	0.1	7	339
MP_EDC-U-PERC-2_2024-08	2	13-Aug-24	pp24-169-060	0.1	15	333
MP_EDC-U-PERC-3_2024-08	3	11-Aug-24	pp24-169-061	0.1	13	323
MP_EDC-U-PERC-4_2024-08	4	11-Aug-24	pp24-169-062	0.1	23	320
MP_EDC-U-PERC-5_2024-08	5	11-Aug-24	pp24-169-063	0.1	10	359
MP_EDC-D-PERC-8_2024-08	8	10-Aug-24	pp24-169-064	0.1	17	318

*Algal units represent single cells, colonies, coenobia or filaments.

QA/QC

Ten percent of samples (n=3) were re-analyzed to assess the precision of enumeration (Table 2). Replicate samples are chosen at random and processed at different times to reduce counting and identification bias.

Table 2. Summary of enumeration QA/QC results for Minnow Environmental Mount Polley, 2024.

Client Sample ID	Biologica Sample ID	Original Density (cells/cm^2)	QA Density (cells/cm^2)	Percent Agreement
MP_HAC-U-PERC-2_2024-08	pp24-169-055	804,808	892,598	89.09
MP_EDC-U-PERC-2_2024-08	pp24-169-060	1,782,268	1,779,222	99.83
			Average:	**94.46**

Percent Agreement: [100- (difference in density between samples) / total density of the original sample)] %

Data Analysis

Algal densities, expressed as the number of per centimetre squared (cells/cm^2), were derived for each sample from the area scrapped, sub-sample volume, number of FOV assessed, number of units counted, and number of cells per unit.

Results were provided to the Minnow Environmental project manager in Excel spreadsheets via email.

Methodological and Taxonomic References

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Kelly, M. 2000. Identification of common benthic diatoms in rivers. Field Stud, 9, 583-700

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Taylor, J. C., Harding, W. R., & Archibald, C. G. M. 2007. An illustrated guide to some common diatom species from South Africa. Pretoria: Water Research Commission.

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biologica

Total Periphyton Density (cells/cm²) for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID							pp24-169-049	pp24-169-050	pp24-169-051	pp24-169-052	pp24-169-053	pp24-169-054	pp24-169-055	pp24-169-056	pp24-169-057
Client Sample ID							MP_HAC-R1-PERC-1_2024-08	MP_HAC-R1-PERC-2_2024-08	MP_HAC-R1-PERC-3_2024-08	MP_HAC-R1-PERC-4_2024-08	MP_HAC-R1-PERC-5_2024-08	MP_HAC-U-PERC-1_2024-08	MP_HAC-U-PERC-2_2024-08	MP_HAC-U-PERC-3_2024-08	MP_HAC-U-PERC-4_2024-08
Replicate							1	2	3	4	5	1	2	3	4
Date Sampled							15/Aug/24	15/Aug/24	15/Aug/24	15/Aug/24	14/Aug/24	13/Aug/24	13/Aug/24	13/Aug/24	12/Aug/24
					Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
Common Name	Phylum	Order	Family	Taxon	Unique Taxa	Density (cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	770			770						
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia acicularis/draveillensis	1	6,330									
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.		77,603	2,010	856	385	1,155			8,131	2,719	4,280
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium minutissimum	1	137,837			770					1,359	4,280
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.		789,232	3,517	2,568	1,541	2,311	3,466	5,392	428	8,156	15,406
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	2,719									
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	92,006	3,014	2,568	2,696	3,466	5,777	770	856	8,156	17,974
Diatoms	Bacillariophyta	Cymbellales	Cymbellaceae	Cymbella sp. (< 55 µm in length)	1	9,180				1,155				1,359	
Diatoms	Bacillariophyta	Cymbellales	Cymbellaceae	Cymbella sp. (> 55 µm in length)		81,981									
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	7,577		428						2,719	1,712
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonopsis sp.		0									
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonopsis cf. microcephala	1	5,478						4,622			856
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.		1,144,364	1,507	856	1,155		4,044	32,353	4,280	8,156	6,847
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema truncatum	1	1,005									
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Reimeria sp.	1	13,019									
Diatoms	Bacillariophyta	Cymbellales	Rhoicospheniaceae	Rhoicosphenia sp.	1	70,149			385		578				
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	2,719									
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		43,274			770		1,733	770			
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	29,504	3,014	1,284	1,541	2,311	5,777				1,712
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosirella sp.	1	32,972	3,014	3,424	3,852		2,311	2,311		2,719	5,991
Diatoms	Bacillariophyta	Licmophorales	Ulnariaceae	Ulnaria sp.	1	1,005									
Diatoms	Bacillariophyta	Melosirales	Melosiraceae	Melosira sp.	1	55,526									856
Diatoms	Bacillariophyta	Naviculales	Amphipleuraceae	Amphipleura pellucida	1	3,852									
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	65,565	4,019	3,424	3,466	1,155	4,622		428	2,719	3,424
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	1,359									
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia adnata	1	7,146	1,005	856	385	3,466	578				856
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia gibba	1	8,067	1,507					770		2,719	1,712
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sp.		14,109	4,521	1,284	385	4,622	578			2,719	
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia turgida	1	8,365	2,010			5,777	578				
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	182,879	26,626	8,559	34,279	40,441	32,931	10,014	1,712	16,313	10,271
Diatoms	Bacillariophyta	Surirellales	Surirellaceae	Surirella sp.	1	428		428							
Diatoms	Bacillariophyta			Pennate diatom		161,065	8,038	2,140	1,926	1,155	6,355	2,311		2,719	4,280
				Total Diatoms		**3,057,083**	**63,802**	**28,673**	**54,307**	**67,017**	**69,328**	**59,314**	**15,834**	**62,531**	**80,455**
Green Algae	Chlorophyta	Chaetophorales	Chaetophoraceae	Chaetophora sp.	1	175,892		17,118	2,311		5,200	2,311	13,694	4,078	
Green Algae	Chlorophyta	Oedogoniales	Oedogoniaceae	Bulbochaete sp.	1	25,612	1,005	3,424	385	20,798					
Green Algae	Chlorophyta	Oedogoniales	Oedogoniaceae	Oedogonium sp.	1	59,877			6,548						
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	385			385						
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Desmodesmus sp.	1	13,177	4,019				2,311				6,847
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.	1	17,703					4,622				7,703
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Ankistrodesmus sp.	1	3,014									
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	5,438									
Green Algae	Chlorophyta			Chlorophyte		199,154	2,512		3,466		3,466		1,284		
				Total Green Algae		**500,253**	**7,536**	**20,542**	**13,095**	**20,798**	**15,599**	**2,311**	**14,978**	**4,078**	**14,550**

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Total Periphyton Density (cells/cm²) for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID							pp24-169-049	pp24-169-050	pp24-169-051	pp24-169-052	pp24-169-053	pp24-169-054	pp24-169-055	pp24-169-056	pp24-169-057
Client Sample ID							MP_HAC-R1-PERC-1_2024-08	MP_HAC-R1-PERC-2_2024-08	MP_HAC-R1-PERC-3_2024-08	MP_HAC-R1-PERC-4_2024-08	MP_HAC-R1-PERC-5_2024-08	MP_HAC-U-PERC-1_2024-08	MP_HAC-U-PERC-2_2024-08	MP_HAC-U-PERC-3_2024-08	MP_HAC-U-PERC-4_2024-08
Replicate							1	2	3	4	5	1	2	3	4
Date Sampled							15/Aug/24	15/Aug/24	15/Aug/24	15/Aug/24	14/Aug/24	13/Aug/24	13/Aug/24	13/Aug/24	12/Aug/24
					Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
Common Name	Phylum	Order	Family	Taxon	Unique Taxa	Density (cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	258,483		258,483							
Blue-green Algae	Cyanophyta	Gomontiellales	Chamaesiphonaceae	Chamaesiphon sp. (colony)	1	721,095						16,947	1,712		
Blue-green Algae	Cyanophyta	Gomontiellales	Chamaesiphonaceae	Chamaesiphon sp. (single cell)		89,468						1,541			
Blue-green Algae	Cyanophyta	Nostocales	Rivulariaceae	Calothrix sp.	1	4,908,306	689,263	444,628	214,750	1,027,758	339,436			892,895	914,018
Blue-green Algae	Cyanophyta	Oscillatoriales	Oscillatoriaceae	Oscillatoria sp.	1	94,723									
Blue-green Algae	Cyanophyta	Oscillatoriales	Oscillatoriaceae	Phormidium sp.	1	91,278									
Blue-green Algae	Cyanophyta	Pleurocapsales	Hyellaceae	Pleurocapsa sp.	1	6,847									6,847
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	72,361									
Blue-green Algae	Cyanophyta	Synechococcales	Heteroleibleiniaceae	Heteroleibeinia sp.	1	13,721,004		17,546				261,722	706,807	130,500	9,415
Blue-green Algae	Cyanophyta	Synechococcales	Leptolyngbyaceae	Leptolyngbya sp.	1	642,441									
Blue-green Algae	Cyanophyta	Synechococcales	Leptolyngbyaceae	Tapinothrix sp.	1	708,987									
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		2,719									
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		79,366		2,140			10,399	32,353	1,712		7,703
Blue-green Algae	Cyanophyta			Cyanophyte (filament)		390,462	30,813	11,555	4,237						
				Total Blue-green Algae		**21,787,540**	**720,075**	**734,351**	**218,987**	**1,027,758**	**349,835**	**312,562**	**710,230**	**1,023,396**	**937,983**
Red Algae	Rhodophyta	Acrochaetiales	Acrochaetiaceae	Audouinella sp.	1	127,293									
				Total Red Algae		**127,293**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Brown Algae	Ochrophyta	Sphacelariales	Lithodermataceae	Bodanella sp.	1	1,137,753	70,835	50,070	35,049	214,917	96,482	152,522	63,765	304,500	117,259
				Total Brown Algae		**1,137,753**	**70,835**	**50,070**	**35,049**	**214,917**	**96,482**	**152,522**	**63,765**	**304,500**	**117,259**
				Total Periphyton		**26,609,923**	**862,248**	**833,636**	**321,439**	**1,330,491**	**531,244**	**526,709**	**804,808**	**1,394,505**	**1,150,247**
				Total Unique Taxa	**44**		**15**	**17**	**18**	**12**	**16**	**12**	**10**	**14**	**19**

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Total Periphyton Density (cells/cm²) for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID							pp24-169-058	pp24-169-059	pp24-169-060	pp24-169-061	pp24-169-062	pp24-169-063	pp24-169-064	pp24-169-055_QA	pp24-169-060_QA
Client Sample ID							MP_HAC-U-PERC-5_2024-08	MP_EDC-U-PERC-1_2024-08	MP_EDC-U-PERC-2_2024-08	MP_EDC-U-PERC-3_2024-08	MP_EDC-U-PERC-4_2024-08	MP_EDC-U-PERC-5_2024-08	MP_EDC-D-PERC-8_2024-08	MP_HAC-U-PERC-2_2024-08_QA	MP_EDC-U-PERC-2_2024-08_QA
Replicate							5	1	2	3	4	5	8	2	2
Date Sampled							12/Aug/24	13/Aug/24	13/Aug/24	11/Aug/24	11/Aug/24	11/Aug/24	10/Aug/24	13/Aug/24	13/Aug/24
					Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
Common Name	Phylum	Order	Family	Taxon	Unique Taxa	Density (cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)	(cells/cm^2)
Diatoms	Bacillariophyta	Aulacoseirales	Aulacoseiraceae	Aulacoseira sp.	1	770									
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia acicularis/draveillensis	1	6,330					4,019	2,311			
Diatoms	Bacillariophyta	Bacillariales	Bacillariaceae	Nitzschia sp.		77,603				8,888	2,010	25,420	21,750	6,847	1,541
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium minutissimum	1	137,837		59,424	10,784	23,109	6,029	18,488	13,594		23,109
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Achnanthidium sp.		789,232	578	277,313	49,300	175,987	73,347	115,547	54,375	428	49,300
Diatoms	Bacillariophyta	Cocconeidales	Achnanthidiaceae	Planothidium sp.	1	2,719							2,719		
Diatoms	Bacillariophyta	Cocconeidales	Cocconeidaceae	Cocconeis placentula	1	92,006	4,044		16,947	3,555	3,014	6,933	12,234	1,712	15,406
Diatoms	Bacillariophyta	Cymbellales	Cymbellaceae	Cymbella sp. (< 55 µm in length)	1	9,180	578				2,010		4,078		
Diatoms	Bacillariophyta	Cymbellales	Cymbellaceae	Cymbella sp. (> 55 µm in length)		81,981				1,778			80,203		
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonema sp.	1	7,577							2,719		
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonopsis sp.		0								428	
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Encyonopsis cf. microcephala	1	5,478									
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema sp.		1,144,364	30,620	455,585	257,285	62,218	25,119	168,699	85,641	5,991	331,235
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Gomphonema truncatum	1	1,005					1,005				
Diatoms	Bacillariophyta	Cymbellales	Gomphonemataceae	Reimeria sp.	1	13,019		3,301	1,541	3,555		4,622			
Diatoms	Bacillariophyta	Cymbellales	Rhoicospheniaceae	Rhoicosphenia sp.	1	70,149		3,301	21,569			41,597	2,719		30,813
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria crotonensis	1	2,719							2,719		
Diatoms	Bacillariophyta	Fragilariales	Fragilariaceae	Fragilaria sp.		43,274				1,778	3,014	16,177	19,031		1,541
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosira sp.	1	29,504						13,866			
Diatoms	Bacillariophyta	Fragilariales	Staurosiraceae	Staurosirella sp.	1	32,972					2,010	4,622	2,719		
Diatoms	Bacillariophyta	Licmophorales	Ulnariaceae	Ulnaria sp.	1	1,005					1,005				
Diatoms	Bacillariophyta	Melosirales	Melosiraceae	Melosira sp.	1	55,526					3,014		51,656		
Diatoms	Bacillariophyta	Naviculales	Amphipleuraceae	Amphipleura pellucida	1	3,852			1,541			2,311			
Diatoms	Bacillariophyta	Naviculales	Naviculaceae	Navicula sp.	1	65,565				5,333		13,866	23,109		1,541
Diatoms	Bacillariophyta	Rhabdonematales	Tabellariaceae	Diatoma sp.	1	1,359							1,359	428	
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia adnata	1	7,146									
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia gibba	1	8,067							1,359		
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sp.		14,109									
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia turgida	1	8,365									
Diatoms	Bacillariophyta	Rhopalodiales	Rhopalodiaceae	Epithemia sorex	1	182,879	1,733							2,568	
Diatoms	Bacillariophyta	Surirellales	Surirellaceae	Surirella sp.	1	428									
Diatoms	Bacillariophyta			Pennate diatom		161,065	1,733	46,219	10,784	24,887	10,048	20,798	17,672	1,284	3,081
				Total Diatoms		**3,057,083**	**39,286**	**845,144**	**369,750**	**311,088**	**135,642**	**455,255**	**399,657**	**19,686**	**457,566**
Green Algae	Chlorophyta	Chaetophorales	Chaetophoraceae	Chaetophora sp.	1	175,892	53,152	16,507		21,332	40,190			6,847	
Green Algae	Chlorophyta	Oedogoniales	Oedogoniaceae	Bulbochaete sp.	1	25,612									
Green Algae	Chlorophyta	Oedogoniales	Oedogoniaceae	Oedogonium sp.	1	59,877				53,329					
Green Algae	Chlorophyta	Sphaeropleales	Hydrodictyaceae	Tetraedron minimum	1	385									
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Desmodesmus sp.	1	13,177									
Green Algae	Chlorophyta	Sphaeropleales	Scenedesmaceae	Scenedesmus sp.	1	17,703					4,019		1,359		
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Ankistrodesmus sp.	1	3,014					3,014			1,284	
Green Algae	Chlorophyta	Sphaeropleales	Selenastraceae	Monoraphidium sp.	1	5,438							5,438		
Green Algae	Chlorophyta			Chlorophyte		199,154	12,132	29,712	1,541	83,549	52,247	9,244			4,622
				Total Green Algae		**500,253**	**65,284**	**46,219**	**1,541**	**158,210**	**99,471**	**9,244**	**6,797**	**8,131**	**4,622**

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Total Periphyton Density (cells/cm²) for Minnow Environmental Inc, Mount Polley, 2024

Biologica Sample ID							pp24-169-058	pp24-169-059	pp24-169-060	pp24-169-061	pp24-169-062	pp24-169-063	pp24-169-064	pp24-169-055_QA	pp24-169-060_QA
Client Sample ID							MP_HAC-U-PERC-5_2024-08	MP_EDC-U-PERC-1_2024-08	MP_EDC-U-PERC-2_2024-08	MP_EDC-U-PERC-3_2024-08	MP_EDC-U-PERC-4_2024-08	MP_EDC-U-PERC-5_2024-08	MP_EDC-D-PERC-8_2024-08	MP_HAC-U-PERC-2_2024-08_QA	MP_EDC-U-PERC-2_2024-08_QA
Replicate							5	1	2	3	4	5	8	2	2
Date Sampled							12/Aug/24	13/Aug/24	13/Aug/24	11/Aug/24	11/Aug/24	11/Aug/24	10/Aug/24	13/Aug/24	13/Aug/24
					Grand Total		Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density	Total Density
Common Name	Phylum	Order	Family	Taxon	Unique Taxa	Density (cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)	(cells/cm²)
Blue-green Algae	Cyanophyta	Chroococcales	Microcystaceae	Aphanothece sp.	1	258,483									
Blue-green Algae	Cyanophyta	Gomontiellales	Chamaesiphonaceae	Chamaesiphon sp. (colony)	1	721,095	4,622		159,277	78,216	42,953	414,649	2,719	5,135	58,544
Blue-green Algae	Cyanophyta	Gomontiellales	Chamaesiphonaceae	Chamaesiphon sp. (single cell)		89,468		9,904	23,109	14,221	6,029	34,664		428	18,488
Blue-green Algae	Cyanophyta	Nostocales	Rivulariaceae	Calothrix sp.	1	4,908,306	202,785	69,328		28,442	57,271	27,731		11,555	
Blue-green Algae	Cyanophyta	Oscillatoriales	Oscillatoriaceae	Oscillatoria sp.	1	94,723		62,725		31,998					
Blue-green Algae	Cyanophyta	Oscillatoriales	Oscillatoriaceae	Phormidium sp.	1	91,278				78,216	13,062				
Blue-green Algae	Cyanophyta	Pleurocapsales	Hyellaceae	Pleurocapsa sp.	1	6,847									
Blue-green Algae	Cyanophyta	Pseudanabaenales	Pseudanabaenaceae	Pseudanabaena sp.	1	72,361				53,329			19,031	9,415	
Blue-green Algae	Cyanophyta	Synechococcales	Heteroleibleiniaceae	Heteroleibeinia sp.	1	13,721,004	499,163	4,329,837	1,217,806	868,728	488,599	5,190,883		757,793	1,064,372
Blue-green Algae	Cyanophyta	Synechococcales	Leptolyngbyaceae	Leptolyngbya sp.	1	642,441						642,441			
Blue-green Algae	Cyanophyta	Synechococcales	Leptolyngbyaceae	Tapinothrix sp.	1	708,987				525,117	183,870				
Blue-green Algae	Cyanophyta			Cyanophyte (coccoid unicell)		2,719							2,719		
Blue-green Algae	Cyanophyta			Cyanophyte (colony)		79,366	6,355			10,666	8,038			6,419	
Blue-green Algae	Cyanophyta			Cyanophyte (filament)		390,462				229,316	114,542				158,685
				Total Blue-green Algae		**21,787,540**	**712,925**	**4,471,795**	**1,400,192**	**1,918,250**	**914,364**	**6,310,368**	**24,469**	**790,746**	**1,300,088**
Red Algae	Rhodophyta	Acrochaetiales	Acrochaetiaceae	Audouinella sp.	1	127,293		66,027	10,784	5,333	8,038	20,798	16,313		16,947
				Total Red Algae		**127,293**	**0**	**66,027**	**10,784**	**5,333**	**8,038**	**20,798**	**16,313**	**0**	**16,947**
Brown Algae	Ochrophyta	Sphacelariales	Lithodermataceae	Bodanella sp.	1	1,137,753	32,353							74,036	
				Total Brown Algae		**1,137,753**	**32,353**	**0**	**0**	**0**	**0**	**0**	**0**	**74,036**	**0**
				Total Periphyton		**26,609,923**	**849,848**	**5,429,184**	**1,782,268**	**2,392,881**	**1,157,515**	**6,795,666**	**447,235**	**892,598**	**1,779,222**
				Total Unique Taxa	**44**		**10**	**10**	**10**	**18**	**18**	**17**	**19**	**14**	**11**

PERIPHYTON PRODUCTIVITY

ALS Laboratory Report VA24C1399

(Finalized September 10, 2024)

ALS Canada Ltd.

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CERTIFICATE OF ANALYSIS

Work Order	: **VA24C1399**	Page	: 1 of 7
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 04-Sep-2024
C-O-C number	: ----	Issue Date	: 10-Sep-2024 15:20
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 50		
No. of samples analysed	: 50		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Monica Ko	Lab Assistant	Inorganics, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg	micrograms
g/sample	grams per sample

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_CHLA-1_2024-08	MP_FPC-R3_CHLA-2_2024-08	MP_FPC-R3_CHLA-3_2024-08	MP_FPC-R3_CHLA-4_2024-08	MP_FPC-R3_CHLA-5_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1399-001	VA24C1399-002	VA24C1399-003	VA24C1399-004	VA24C1399-005
						Result	Result	Result	Result	Result
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg		53.1	68.6	70.2	56.7	59.1

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_CHLA-1_2024-08	MP_HAC-R1_CHLA-2_2024-08	MP_HAC-R1_CHLA-3_2024-08	MP_HAC-R1_CHLA-4_2024-08	MP_HAC-R1_CHLA-5_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1399-006	VA24C1399-007	VA24C1399-008	VA24C1399-009	VA24C1399-010
						Result	Result	Result	Result	Result
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg		86.6	150	61.1	113	59.3

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_CHLA-1_2024-08	MP_HAC-U_CHLA-2_2024-08	MP_HAC-U_CHLA-3_2024-08	MP_HAC-U_CHLA-4_2024-08	MP_HAC-U_CHLA-5_2024-08
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1399-011	VA24C1399-012	VA24C1399-013	VA24C1399-014	VA24C1399-015
						Result	Result	Result	Result	Result
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg		9.18	12.6	79.1	74.6	28.7

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_CHLA-1_2024-08	MP_EDC-U_CHLA-2_2024-08	MP_EDC-U_CHLA-3_2024-08	MP_EDC-U_CHLA-4_2024-08	MP_EDC-U_CHLA-5_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1399-016	VA24C1399-017	VA24C1399-018	VA24C1399-019	VA24C1399-020
						Result	Result	Result	Result	Result
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg		33.2	11.1	38.0	20.7	24.5

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R3_CHLA-1_2024-08	MP_HAC-R3_CHLA-2_2024-08	MP_HAC-R3_CHLA-3_2024-08	MP_HAC-R3_CHLA-4_2024-08	MP_HAC-R3_CHLA-5_2024-08
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1399-021	VA24C1399-022	VA24C1399-023	VA24C1399-024	VA24C1399-025
						Result	Result	Result	Result	Result
Plant Pigments										
Chlorophyll a	479-61-8	E870/VA	0.010	µg		13.3	44.7	32.1	26.6	43.3

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R3_AF DM-1_2024-08	MP_FPC-R3_AF DM-2_2024-08	MP_FPC-R3_AF DM-3_2024-08	MP_FPC-R3_AF DM-4_2024-08	MP_FPC-R3_AF DM-5_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1399-026	VA24C1399-027	VA24C1399-028	VA24C1399-029	VA24C1399-030
						Result	Result	Result	Result	Result
Physical Tests										
Ash free dry weight	----	E137/VA	0.0010	g/sample		0.0220	0.0270	0.0128	0.0240	0.0116
Ash weight	----	E137/VA	0.0010	g/sample		0.0789	0.0913	0.0233	0.0821	0.0280
Weight, dry	----	E137/VA	0.0010	g/sample		0.101	0.118	0.0361	0.106	0.0396

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_AF DM-1_2024-08	MP_HAC-R1_AF DM-2_2024-08	MP_HAC-R1_AF DM-3_2024-08	MP_HAC-R1_AF DM-4_2024-08	MP_HAC-R1_AF DM-5_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1399-031	VA24C1399-032	VA24C1399-033	VA24C1399-034	VA24C1399-035
						Result	Result	Result	Result	Result
Physical Tests										
Ash free dry weight	----	E137/VA	0.0010	g/sample		0.161	0.0932	0.142	0.104	0.189
Ash weight	----	E137/VA	0.0010	g/sample		0.292	0.170	0.280	0.224	0.369
Weight, dry	----	E137/VA	0.0010	g/sample		0.454	0.263	0.422	0.327	0.558

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_AFDM-1_2024-08	MP_HAC-U_AFDM-2_2024-08	MP_HAC-U_AFDM-3_2024-08	MP_HAC-U_AFDM-4_2024-08	MP_HAC-U_AFDM-5_2024-08
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1399-036	VA24C1399-037	VA24C1399-038	VA24C1399-039	VA24C1399-040
						Result	Result	Result	Result	Result
Physical Tests										
Ash free dry weight	----	E137/VA	0.0010	g/sample		0.123	0.0645	0.313	0.199	0.0453
Ash weight	----	E137/VA	0.0010	g/sample		0.253	0.139	0.575	0.459	0.138
Weight, dry	----	E137/VA	0.0010	g/sample		0.376	0.204	0.887	0.658	0.184

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_AFDM-1_2024-08	MP_EDC-U_AFDM-2_2024-08	MP_EDC-U_AFDM-3_2024-08	MP_EDC-U_AFDM-4_2024-08	MP_EDC-U_AFDM-5_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1399-041	VA24C1399-042	VA24C1399-043	VA24C1399-044	VA24C1399-045
						Result	Result	Result	Result	Result
Physical Tests										
Ash free dry weight	----	E137/VA	0.0010	g/sample		0.0249	0.0321	0.0365	0.0368	0.0201
Ash weight	----	E137/VA	0.0010	g/sample		0.0140	0.0220	0.0767	0.0139	0.0179
Weight, dry	----	E137/VA	0.0010	g/sample		0.0389	0.0540	0.113	0.0507	0.0380

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID: MP_HAC-R3_AFDM-1_2024-08	MP_HAC-R3_AFDM-2_2024-08	MP_HAC-R3_AFDM-3_2024-08	MP_HAC-R3_AFDM-4_2024-08	MP_HAC-R3_AFDM-5_2024-08
					Client sampling date / time: 13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
					VA24C1399-046	VA24C1399-047	VA24C1399-048	VA24C1399-049	VA24C1399-050
					Result	Result	Result	Result	Result
Physical Tests									
Ash free dry weight	----	E137/VA	0.0010	g/sample	0.389	0.0421	0.122	0.0488	0.199
Ash weight	----	E137/VA	0.0010	g/sample	0.849	0.105	0.398	0.172	0.586
Weight, dry	----	E137/VA	0.0010	g/sample	1.24	0.148	0.520	0.221	0.785

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C1399**	Page	: 1 of 10
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Issue Date	: 10-Sep-2024 15:19
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 50		
No. of samples analysed	: 50		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R1_AFDM-1_2024-08	E137	15-Aug-2024	----	----	----		04-Sep-2024	180 days	20 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R1_AFDM-2_2024-08	E137	15-Aug-2024	----	----	----		04-Sep-2024	180 days	20 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R1_AFDM-3_2024-08	E137	15-Aug-2024	----	----	----		04-Sep-2024	180 days	20 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R1_AFDM-4_2024-08	E137	15-Aug-2024	----	----	----		04-Sep-2024	180 days	20 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_FPC-R3_AFDM-1_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_FPC-R3_AFDM-2_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_FPC-R3_AFDM-3_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_FPC-R3_AFDM-4_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_FPC-R3_AFDM-5_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R1_AFDM-5_2024-08	E137	14-Aug-2024	----	----	----		04-Sep-2024	180 days	21 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R3_AFDM-1_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R3_AFDM-2_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R3_AFDM-3_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R3_AFDM-4_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-R3_AFDM-5_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-U_AFDM-1_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-U_AFDM-2_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-U_AFDM-3_2024-08	E137	13-Aug-2024	----	----	----		04-Sep-2024	180 days	22 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_EDC-U_AFDM-1_2024-08	E137	12-Aug-2024	----	----	----		04-Sep-2024	180 days	23 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_EDC-U_AFDM-2_2024-08	E137	12-Aug-2024	----	----	----		04-Sep-2024	180 days	23 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-U_AFDM-4_2024-08	E137	12-Aug-2024	----	----	----		04-Sep-2024	180 days	23 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_HAC-U_AFDM-5_2024-08	E137	12-Aug-2024	----	----	----		04-Sep-2024	180 days	23 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_EDC-U_AFDM-3_2024-08	E137	11-Aug-2024	----	----	----		04-Sep-2024	180 days	24 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_EDC-U_AFDM-4_2024-08	E137	11-Aug-2024	----	----	----		04-Sep-2024	180 days	24 days	✓
Physical Tests : Ash-free Dry Weight by Gravimetry										
LDPE bag MP_EDC-U_AFDM-5_2024-08	E137	11-Aug-2024	----	----	----		04-Sep-2024	180 days	24 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R1_CHLA-1_2024-08	E870	15-Aug-2024	09-Sep-2024	28 days	25 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R1_CHLA-2_2024-08	E870	15-Aug-2024	09-Sep-2024	28 days	25 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R1_CHLA-3_2024-08	E870	15-Aug-2024	09-Sep-2024	28 days	25 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R1_CHLA-4_2024-08	E870	15-Aug-2024	09-Sep-2024	28 days	25 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_FPC-R3_CHLA-1_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_FPC-R3_CHLA-2_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_FPC-R3_CHLA-3_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_FPC-R3_CHLA-4_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_FPC-R3_CHLA-5_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R1_CHLA-5_2024-08	E870	14-Aug-2024	09-Sep-2024	28 days	26 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R3_CHLA-1_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R3_CHLA-2_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R3_CHLA-3_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R3_CHLA-4_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-R3_CHLA-5_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-U_CHLA-1_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-U_CHLA-2_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-U_CHLA-3_2024-08	E870	13-Aug-2024	09-Sep-2024	28 days	27 days	✓	09-Sep-2024	28 days	0 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / **Container / Client Sample ID(s)**	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_EDC-U_CHLA-1_2024-08	E870	12-Aug-2024	09-Sep-2024	28 days	28 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_EDC-U_CHLA-2_2024-08	E870	12-Aug-2024	09-Sep-2024	28 days	28 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-U_CHLA-4_2024-08	E870	12-Aug-2024	09-Sep-2024	28 days	28 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_HAC-U_CHLA-5_2024-08	E870	12-Aug-2024	09-Sep-2024	28 days	28 days	✓	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_EDC-U_CHLA-3_2024-08	E870	11-Aug-2024	09-Sep-2024	28 days	29 days	× EHT	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_EDC-U_CHLA-4_2024-08	E870	11-Aug-2024	09-Sep-2024	28 days	29 days	× EHT	09-Sep-2024	28 days	0 days	✓
Plant Pigments : Chlorophyll-a by Fluorometry										
Opaque HDPE tube MP_EDC-U_CHLA-5_2024-08	E870	11-Aug-2024	09-Sep-2024	28 days	29 days	× EHT	09-Sep-2024	28 days	0 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS)							
Ash-free Dry Weight by Gravimetry	E137	1632295	2	28	7.1	5.0	✓
Chlorophyll-a by Fluorometry	E870	1640203	2	25	8.0	5.0	✓
Method Blanks (MB)							
Ash-free Dry Weight by Gravimetry	E137	1632295	2	28	7.1	5.0	✓
Chlorophyll-a by Fluorometry	E870	1640203	2	25	8.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ash-free Dry Weight by Gravimetry	E137 ALS Environmental - Vancouver	Biota	APHA 10200 I (mod)	"Ash-free dry weight is determined gravimetrically after drying the submitted sample at 105°C. The residue is then ignited at 500°C and the ash rewetted to restore water of hydration to clays and other minerals. The ash weight is determined gravimetrically after bringing the rewetted ash to constant weight at 104°. The ash-free dry weight is the difference between the dry weight and the ash weight.
Chlorophyll-a by Fluorometry	E870 ALS Environmental - Vancouver	Biota	EPA 445.0 (mod)	Chlorophyll-a is determined by solvent extraction followed with analysis by fluorometry using the non-acidification procedure.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chlorophyll-a Extraction	EP870 ALS Environmental - Vancouver	Biota	EPA 445.0 (mod)	Chlorophyll-a solvent extraction.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C1399**	Page	: 1 of 3
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 600	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 04-Sep-2024
C-O-C number	: ----	Issue Date	: 10-Sep-2024 15:27
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-005 (Minnow/Mt. Polley)		
No. of samples received	: 50		
No. of samples analysed	: 50		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Monica Ko	Lab Assistant	Vancouver Inorganics, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1632295)						
Ash free dry weight	----	E137	0.001	g/sample	<0.0010	----
Ash weight	----	E137	0.001	g/sample	<0.0010	----
Weight, dry	----	E137	0.001	g/sample	<0.0010	----
Physical Tests (QCLot: 1632296)						
Ash free dry weight	----	E137	0.001	g/sample	<0.0010	----
Ash weight	----	E137	0.001	g/sample	<0.0010	----
Weight, dry	----	E137	0.001	g/sample	<0.0010	----
Plant Pigments (QCLot: 1640203)						
Chlorophyll a	479-61-8	E870	0.01	µg	<0.010	----
Plant Pigments (QCLot: 1640204)						
Chlorophyll a	479-61-8	E870	0.01	µg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1632295)									
Ash free dry weight	----	E137	0.001	g/sample	0.04 g/sample	95.1	70.0	130	----
Ash weight	----	E137	0.001	g/sample	0.074 g/sample	106	70.0	130	----
Weight, dry	----	E137	0.001	g/sample	0.115 g/sample	102	70.0	130	----
Physical Tests (QCLot: 1632296)									
Ash free dry weight	----	E137	0.001	g/sample	0.04 g/sample	99.8	70.0	130	----
Ash weight	----	E137	0.001	g/sample	0.074 g/sample	104	70.0	130	----
Weight, dry	----	E137	0.001	g/sample	0.115 g/sample	103	70.0	130	----
Plant Pigments (QCLot: 1640203)									
Chlorophyll a	479-61-8	E870	0.01	µg	1 µg	90.8	80.0	120	----
Plant Pigments (QCLot: 1640204)									
Chlorophyll a	479-61-8	E870	0.01	µg	1 µg	94.1	80.0	120	----

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com, alalonde@dwb
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-005	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): C1399 **ALS Contact:** Can Dang **Sampler:** KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a by Fluorometry (E870)	Ash-free Dry Weight by Gravimetry (E137)	Number of Containers
	MP_FPC-R3_CHLA-1_2024-08	14-Aug-24	—	Tissue	R		1
	MP_FPC-R3_CHLA-2_2024-08	14-Aug-24	—	Tissue	R		1
	MP_FPC-R3_CHLA-3_2024-08	14-Aug-24	—	Tissue	R		1
	MP_FPC-R3_CHLA-4_2024-08	14-Aug-24	—	Tissue	R		1
	MP_FPC-R3_CHLA-5_2024-08	14-Aug-24	—	Tissue	R		1
	MP_HAC-R1_CHLA-1_2024-08	15-Aug-24	—	Tissue	R		1
	MP_HAC-R1_CHLA-2_2024-08	15-Aug-24	—	Tissue	R		1
	MP_HAC-R1_CHLA-3_2024-08	15-Aug-24	—	Tissue	R		1
	MP_HAC-R1_CHLA-4_2024-08	15-Aug-24	—	Tissue	R		1
	MP_HAC-R1_CHLA-5_2024-08	14-Aug-24	—	Tissue	R		1
	MP_HAC-U_CHLA-1_2024-08	13-Aug-24	—	Tissue	R		1
	MP_HAC-U_CHLA-2_2024-08	13-Aug-24	—	Tissue	R		1

Environmental Division
Vancouver
Work Order Reference
VA24C1399

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ ☐

Are samples for human drinking water use? ☐ ☐

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			6, 7, 8, 9	7	5, 5

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by: JC	Date: 21-8-24	Time: 945am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

COC page 1 to 5

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com, alalonde@dwbc

Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-005	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a by Fluorometry (E870)	Ash-free Dry Weight by Gravimetry (E137)	Number of Containers
	MP_HAC-U_CHLA-3_2024-08	13-Aug-24	—	Tissue	R		1
	MP_HAC-U_CHLA-4_2024-08	12-Aug-24	—	Tissue	R		1
	MP_HAC-U_CHLA-5_2024-08	12-Aug-24	—	Tissue	R		1
	MP_EDC-U_CHLA-1_2024-08	12-Aug-24	—	Tissue	R		1
	MP_EDC-U_CHLA-2_2024-08	12-Aug-24	—	Tissue	R		1
	MP_EDC-U_CHLA-3_2024-08	11-Aug-24	—	Tissue	R		1
	MP_EDC-U_CHLA-4_2024-08	11-Aug-24	—	Tissue	R		1
	MP_EDC-U_CHLA-5_2024-08	11-Aug-24	—	Tissue	R		1
	MP_HAC-R3_CHLA-1_2024-08	13-Aug-24	—	Tissue	R		1
	MP_HAC-R3_CHLA-2_2024-08	13-Aug-24	—	Tissue	R		1
	MP_HAC-R3_CHLA-3_2024-08	13-Aug-24	—	Tissue	R		1
	MP_HAC-R3_CHLA-4_2024-08	13-Aug-24	—	Tissue	R		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ ☑

Are samples for human drinking water use? ☐ ☑

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To [✓] YES [ ] NO
	Copy of Invoice with Report [ ] YES [ ] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [✓] [✓] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [✓] [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box

Select Distribution: [✓] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com, alalonde@dwb

Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: [✓] EMAIL [✓] MAIL [ ] FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] [✓] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] [ ] | 3 day [P3] [ ] | 2 day [P2] [ ]

EMERGENCY: 1 Business day [E1] [ ] | Same Day, Weekend or Statutory holiday [E0] [ ]

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-005	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler: KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a by Fluorometry (E870)	Ash-free Dry Weight by Gravimetry (E137)	Number of Containers
	MP_HAC-R3_CHLA-5_2024-08	13-Aug-24	—	Tissue	R		1
	MP_FPC-R3_AFDM-1_2024-08	14-Aug-24	—	Tissue		R	1
	MP_FPC-R3_AFDM-2_2024-08	14-Aug-24	—	Tissue		R	1
	MP_FPC-R3_AFDM-3_2024-08	14-Aug-24	—	Tissue		R	1
	MP_FPC-R3_AFDM-4_2024-08	14-Aug-24	—	Tissue		R	1
	MP_FPC-R3_AFDM-5_2024-08	14-Aug-24	—	Tissue		R	1
	MP_HAC-R1_AFDM-1_2024-08	15-Aug-24	—	Tissue		R	1
	MP_HAC-R1_AFDM-2_2024-08	15-Aug-24	—	Tissue		R	1
	MP_HAC-R1_AFDM-3_2024-08	15-Aug-24	—	Tissue		R	1
	MP_HAC-R1_AFDM-4_2024-08	15-Aug-24	—	Tissue		R	1
	MP_HAC-R1_AFDM-5_2024-08	14-Aug-24	—	Tissue		R	1
	MP_HAC-U_AFDM-1_2024-08	13-Aug-24	—	Tissue		R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] [✓]

Are samples for human drinking water use? [ ] [✓]

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To [✓] YES [ ] NO
	Copy of Invoice with Report [ ] YES [ ] NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: [✓] [✓] EXCEL [✓] EDD (DIGITAL)

Quality Control (QC) Report with Report [✓] [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box

Select Distribution: [✓] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com, alalonde@dwb

Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: [✓] EMAIL [✓] MAIL [ ] FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] [✓] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] [ ] | 3 day [P3] [ ] | 2 day [P2] [ ]

EMERGENCY: 1 Business day [E1] [ ] | Same Day, Weekend or Statutory holiday [E0] [ ]

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-005
Job #:	
PO / AFE:	24-04 Task 600
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:** KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a by Fluorometry (E870)	Ash free Dry Weight by Gravimetry (E137)	Number of Containers
	MP_HAC-U_AFDM-2_2024-08	13-Aug-24	—	Tissue		R	1
	MP_HAC-U_AFDM-3_2024-08	13-Aug-24	—	Tissue		R	1
	MP_HAC-U_AFDM-4_2024-08	12-Aug-24	—	Tissue		R	1
	MP_HAC-U_AFDM-5_2024-08	12-Aug-24	—	Tissue		R	1
	MP_EDC-U_AFDM-1_2024-08	12-Aug-24	—	Tissue		R	
	MP_EDC-U_AFDM-2_2024-08	12-Aug-24	—	Tissue		R	1
	MP_EDC-U_AFDM-3_2024-08	11-Aug-24	—	Tissue		R	1
	MP_EDC-U_AFDM-4_2024-08	11-Aug-24	—	Tissue		R	1
	MP_EDC-U_AFDM-5_2024-08	11-Aug-24	—	Tissue		R	1
	MP_HAC-R3_AFDM-1_2024-08	13-Aug-24	—	Tissue		R	1
	MP_HAC-R3_AFDM-2_2024-08	13-Aug-24	—	Tissue		R	1
	MP_HAC-R3_AFDM-3_2024-08	13-Aug-24	—	Tissue		R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ]

Are samples for human drinking water use? [✓]

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [ ] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ | | NO
☐ Compare Results to Criteria on Report - provide details below if box
Select Distribution: ☑ EMAIL | | MAIL | | FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com, alalonde@dwb
Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-005	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 600	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Chlorophyll-a by Fluorometry (E870)	Ash-free Dry Weight by Gravimetry (E137)	Number of Containers
	MP_HAC-R3_AFDM-4_2024-08	13-Aug-24	—	Tissue		R	1
	MP_HAC-R3_AFDM-5_2024-08	13-Aug-24	—	Tissue		R	1
							1
							1
							1
							1
							1
							1
							1
							1
							1
							1
							1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ ☑

Are samples for human drinking water use? | | ☑

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

BENTHIC INVERTEBRATE COMMUNITY

Cordillera Methods, QC Report, and Results 24-04-1

(Finalized November 12, 2024)

Methods and QC Report 2024

Project ID: 24-04-1 (MPMC Hazeltine)

Client: Minnow Environmental

Prepared by:

Cordillera Consulting Inc.
Summerland, BC
© 2024

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Sample Reception

On August 22, 2024, Cordillera Consulting received 10 benthic samples from Minnow Environmental. When samples arrived to Cordillera Consulting, exterior packaging was initially inspected for damage or wet spots that would have indicated damage to the interior containers.

Samples were logged into a proprietary software database (INSTAR1) where the clients assigned sample name was recorded along with a Cordillera Consulting (CC) number for cross-reference. Each sample was checked to ensure that all sites and replicates recorded on field sheets or packing lists were delivered intact and with adequate preservative. Any missing, mislabelled or extra samples were reported to the client immediately to confirm the total numbers and correct names on the sample jars. The client representative was notified of the arrival of the shipment and provided a sample inventory once intake was completed.
See table below for sample inventory:

Table 1: Summary of sample information including Cordillera Consulting (CC) number

Sample	CC#	Date	Size	# of Jars
MP_FPC-R3_SURB-1_2024-08	CC250303	08/14/2024	250 µM	1
MP_FPC-R3_SURB-2_2024-08	CC250304	08/14/2024	250 µM	1
MP_FPC-R3_SURB-3_2024-08	CC250305	08/14/2024	250 µM	1
MP_FPC-R3_SURB-4_2024-08	CC250306	08/14/2024	250 µM	1
MP_FPC-R3_SURB-5_2024-08	CC250307	08/14/2024	250 µM	1
MP_HAC-R3_HESS-1_2024-08	CC250308	08/13/2024	250 µM	1
MP_HAC-R3_HESS-2_2024-08	CC250309	08/13/2024	250 µM	1
MP_HAC-R3_HESS-3_2024-08	CC250310	08/13/2024	250 µM	1
MP_HAC-R3_HESS-4_2024-08	CC250311	08/13/2024	250 µM	1
MP_HAC-R3_HESS-5_2024-08	CC250312	08/13/2024	250 µM	1

Sample Sorting

- Using a gridded Petri dish, fine forceps and a low power stereo-microscope (Olympus, Nikon, Leica) the sorting technicians removed the invertebrates and sorted them into family/orders.
- The sorting technician kept a running tally of total numbers excluding organisms from Porifera, Nemata, Platyhelminthes, Ostracoda, Copepoda, Cladocera and

terrestrial drop-ins such as aphids. These organisms were marked for their presence (given a value of 1) only and left in the sample. They were not included towards the 300-organism subsample count.

- Where specimens are broken or damaged, only heads were counted.
- Subsampling was conducted with the use of a Marchant Box.
- When using the Marchant box, cells were extracted at the same time in the order indicated by a random number table. If the 300th organism was found part way into sorting a cell then the balance of that cell was sorted. If the organism count had not reached 300 by the 50th cell then the entire sample was sorted.
- The total number of cells sorted and the number of organisms removed were recorded manually on a bench sheet and then recorded into INSTAR1
- Organisms were stored in vials containing 80% ethanol and an interior label indicating the site names, date of sampling, site code numbers and portion subsampled. This information was also recorded on the laboratory bench sheet and on INSTAR1.
- The sorted portion of the debris was preserved and labeled separately from the unsorted portion and was tested for sorting efficiency (Sorting Quality Control – Sorting Efficiency). The unsorted portion was also labeled and preserved in separate jars.

Percent sub-sampled and total countable invertebrates pulled from the samples were summarized in the table below.

Table 2: Percent sub-sample and invertebrate count for each sample

Sample	Date	CC#	250 micron fraction	
			% Sampled	# Invertebrates
MP_FPC-R3_SURB-1_2024-08	14-Aug-24	CC250303	5%	425
MP_FPC-R3_SURB-2_2024-08	14-Aug-24	CC250304	7%	327
MP_FPC-R3_SURB-3_2024-08	14-Aug-24	CC250305	6%	348
MP_FPC-R3_SURB-4_2024-08	14-Aug-24	CC250306	7%	327
MP_FPC-R3_SURB-5_2024-08	14-Aug-24	CC250307	17%	344
MP_HAC-R3_HESS-1_2024-08	13-Aug-24	CC250308	9%	324
MP_HAC-R3_HESS-2_2024-08	13-Aug-24	CC250309	6%	313
MP_HAC-R3_HESS-3_2024-08	13-Aug-24	CC250310	20%	451
MP_HAC-R3_HESS-4_2024-08	13-Aug-24	CC250311	14%	313
MP_HAC-R3_HESS-5_2024-08	13-Aug-24	CC250312	22%	329

Sorting Quality Control - Sorting Efficiency

As a part of Cordillera's laboratory policy, all projects undergo sorting efficiency checks.

- As sorting progresses, 10% of samples were randomly chosen by senior members of the sorting team for resorting.
- All sorters working on a project had at least 1 sample resorted by another sorter.
- An efficiency of 90 % was expected (95% for CABIN samples).
- If 90/95% efficiency was not met, samples from that sorter were resorted.
- To calculated sorting efficiency the following formula was used:

$$\frac{\#OrganismsMissed}{TotalOrganismsFound} * 100 = \%OM$$

Table 3 Summary of sorting efficiency

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 1, CC# - CC250306, Percent sampled = 12%, Sieve size = 250			
Plecoptera	2		
Trombidiformes	1		
Coleoptera	1		
Total:	**4**	327	98.78%

Sorting Quality Control - Sub-Sampling QC

Certain Provincial and Mining projects require additional sorting checks in the form of sub-sampling QC, (Environmental Effects Monitoring (EEM) protocol). This ensured that any fraction of the total sample that was examined was actually an accurate representation of the number of total organisms. Organisms from the additional sub-samples were not identified; rather total organism count only was compared.

Sub-Sampling efficiency was measured on 10% of the number of sub-sampled samples in the project. Ex. In a project where 50 of 100 total samples were processed through subsampling using a Marchant box, then 10% of 50; or 5 samples were used for sub sampling efficiency.

Sub-Sampling efficiency was performed by fractioning the entire sample into sub-sample percentages. On each sub-sampled portion, a total organism count was recorded and compared to the rest of the sub-samples. In order to pass, all fractions were required to be within 20% of total organism count.

Example: If 300 organisms are found in 10% of the sample, the sorter will continue to sample in 10% fractions until the entire sample is separated. They will then count the total number of organisms in each of the 10 fractions of 10% and compare the organism count.

When divergence is >20% the sorting manager examines for the source of the problem and takes steps to correct it. With the Marchant box, the problem typically rested with how the box is flipped back to the upright position. For this reason, subsampling was performed by experienced employees only. Another common source of error would be the type of debris in the sample. Samples with algae or heavy with periphyton have a higher incident of failure due to clumping than clear samples.

Table 4 Summary of Sub Sample efficiency

Station ID		Organisms in Subsample																			Sorter		Actual Total	Precision		Accuracy	
CC#	Sample Name	1	2	3	4	5															By	Time		Percent Range		Min	Max
250310 (20%)	MP_HAC-R3_HESS-3_2024-08	451	436	462	463	480															MP	335	2292	0.22	9.17	0.79	4.89

Taxonomic Effort

The next procedure was the identification to genus-species level where possible of all the organisms in the sample.

- Identifications were made at the genus/species level for all insect organisms found including Chironomidae (Based on CABIN protocol).
- Non-insect organisms (except those not included in CABIN count) were identified to genus/species where possible and to a minimum of family level with intact and mature specimens.
- The Standard Taxonomic Effort lists compiled by the CABIN manual[1], SAFIT[2] , and PNAMP[3] were used as a guide line for what level of identification to achieve where the condition and maturity of the organism enabled.
- Organisms from the same families/order were kept in separate vials with 80% ethanol and an interior label of printed laser paper.
- Chironomidae was identified to genus/species level where possible and was aided by slide mounts. CMC-10 was used to clear and mount the slide.
- Oligochaetes was identified to family/genus level with the aid of slide mounts. CMC-10 was used to clear and mount the slide.
- Other Annelida (leeches, polychaetes) were identified to the family/genus/species level with undamaged, mature specimens.
- Mollusca was identified to family and genus/species where possible
- Decapoda, Amphipoda and Isopoda were identified at family/genus/species level where possible.
- Bryozoans and Nemata remained at the phylum level
- Hydrachnidae and Cnidaria were identified at the family/genus level where possible.
- When requested, reference collections were made containing at least one individual from each taxa listed. Organisms represented will have been identified to the lowest practical level.
- Reference collection specimens were stored in 55 mm glass vials with screw-cap lids with polyseal inserts (museum quality). They were labeled with taxa name, site code, date identified and taxonomist name. The same information was applied to labels on the slide mounts.

Taxonomists

The taxonomists for this project were certified by the Society of Freshwater Science (SFS) Taxonomic Certification Program at level 2 which is the required certification for CABIN projects:

Scott Finlayson: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae (East/West); Group 4 Oligochaeta

Adam Bliss: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae
Rita Avery: Group 1 General Arthropods (East/West); Group 2 EPT (East/West)
Garret Naish: Group 2 EPT (East/West)

Taxonomic QC

Taxonomic QC was performed in house by someone other than the original taxonomist.

- Quality control protocol involved complete, blind re-identification and re-enumeration of at least 10% of samples by a second SFS-certified taxonomist.
- Samples for taxonomic quality control were randomly selected and quality control procedures were conducted as the project progresses through the laboratories.

- The second (QC) taxonomist will calculate and record four types of errors:
    1. Misidentification error
    2. Enumeration error
    3. Questionable taxonomic resolution error
    4. Insufficient taxonomic resolution error

The QC coordinator then calculates the following estimates of taxonomic precision.

1. The percent total identification error rate is calculated as:

$$\frac{Sum\ of\ incorrect\ identifications}{total\ organisms\ counted\ in\ audit} * (100)$$

The average total identification error rate of audited samples did not exceed 5%. All samples that exceed a 5% error rate were re-evaluated to determine whether repeated errors or patterns in error contributed.

2. The percent difference in enumeration (PDE) to quantify the consistency of specimen counts.

$$PDE = \frac{|n_1 - n_2|}{n_1 + n_2} x100$$

3. The percent taxonomic disagreement (PTD) to quantify the shared precision between two sets of identifications.

$$PTD = \left(1 - \left[\frac{a}{N}\right]\right) x100$$

4. Bray Curtis dissimilarity Index to quantify the differences in identifications.

$$BC_{ij} = 1 - \frac{2C_{ij}}{S_j + S_i}$$

Error Summary

All samples report errors within the acceptable limits for CABIN Laboratory methods (less than 5% error).

Table 5 Summary of taxonomic error following QC

Site	Taxa Identified	% Error	PDE	PTD	Bray - Curtis Dissimilarity index
Site - 2024, Sample - MP_FPC-R3_SURB-3_2024-08, CC# - CC250305, Percent sampled = 6%, Sieve size = 250	346	0.00	0.28818444	1.43678161	0.01152738

There will always be disagreements between taxonomists regarding the degree of taxonomic resolution in immature specimens and when laboratories make use of different keys for certain groups (Mollusks is an especially disputed group). It is always possible that some taxa found by the original taxonomist were overlooked in QC.

All of the Taxonomic QC samples that were observed passed testing according to the CABIN misidentification protocols. See the tables below for results from taxonomic QC audit.

Error Rationale

Site - 2024, Sample - MP_FPC-R3_SURB-3_2024-08, CC# - CC250305, Percent sampled = 6%, Sieve size = 250	Laboratory Count	QC Audit Count	Agreement	Misidentification	Questionable Taxonomic Resolution	Enumeration	Insufficient Taxonomic Resolution	Comments
Ablabesmyia	3	3						
Aturus	3	3						
Baetidae	67	64	No			X		
Baetis	13	15	No			X		

Brillia	4	4						
Capniidae	10	11	No			X		
Chironomidae	1	1						
Chloroperlidae	2	2						
Collembola	1	1						
Corynoneura	3	3						
Dicosmoecus	5	5						
Elmidae	12	12						
Eukiefferiella	6	6						
Heptageniidae	55	53	No			X		
Heterlimnius	4	4						
Hydropsyche	1	1						
Hydropsychidae	6	6						
Hydrozetidae	1	1						
Isoperla	2	2						
Lepidoptera	1	1						
Leptophlebiidae	43	43						
Malenka	5	5						
Metriocnemus	1	1						
Micropsectra	7	7						
Nemouridae	26	26						
Neoleptophlebia	1	1						
Oribatida	1	1						
Orthocladius complex	1	1						
Perlodidae	7	7						
Pisidiidae	10	10						
Pisidium	1	1						
Plecoptera	4	4						
Rhyacodrilus	1	1						
Simulium	3	3						
Sperchon	1	1						
Staphylinidae	1	1						
Sweltsa	2	2						
Synorthocladius	1	1						
Tanypodinae	1	1						
Thienemanniella	13	13						
Trichoptera	5	5						
Trichoptera	5	5						
Trombidiformes	3	3						
Tvetenia	3	3						
Wormaldia	2	2						

Total:	**348**	**346**						
					0	**4**	**0**	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.00	**Pass**				

Dry Biomass

Dry biomass is measured on an analytical balance down to the microgram. The first step is the preparation of glass fiber filter circles with a diameter of 5.5cm. The glass fiber filters are first labelled and then dried in an oven at 150°F for 4 hours. After drying they are stored in zip lock bags until use. Just before use, the filters are weighed to obtain a subtraction value and that value is placed in an EXCEL spreadsheet. After identification, the organisms are put onto the filters in a pre-determined category for weighing. When all organisms have been put on to filters and all weights of the dry filters have been recorded, everything is put into an oven at 150°F for another 4 hours. As soon as the 4 hours is up, the organisms are removed from the oven and allowed to cool for a few minutes to avoid heat affecting the analytical balance. Filters are then weighed one at a time and that weight is entered into the spreadsheet where formulas are used to derive the actual dry biomass of the organisms.

Wet Biomass

Wet biomass is measure on an analytical balance down to the microgram. A very fine mesh is used to do all of the weighing of the organisms. First, the mesh is weighed on the balance and recorded into an EXCEL spreadsheet. The identified organisms are then split into predetermined groupings for weighing. The organisms are placed onto the mesh and blotted dry with paper towel to remove any excess liquid that clings to the organisms. The mesh is then weighed again and recorded into the spreadsheet where formulas are used to derive the wet biomass of the organisms. The organisms are then removed from the mesh under a dissecting microscope to ensure that it is completely clean. The organisms are then stored back in ethanol.

References

[1] McDermott, H., Paull, T., Strachan, S. (May 2014). Laboratory Methods: Processing, Taxonomy, and Quality Control of Benthic Macroinvertebrate Samples, Environment Canada. ISBN: 978-1-100-25417-3

[2] Southwest Association of Freshwater Invertebrate Taxonomists. (2015). www.safit.org

[3] Pacific Northwest Aquatic Monitoring Partnership (Accessed 2015). www.pnamp.org

Taxonomic Keys

Below is a reference list of taxonomic keys utilized by taxonomists at Cordillera Consulting. Cordillera taxonomists routinely seek out new literature to ensure the most accurate identification keys are being utilized. This is not reflective of the exhaustive list of resources that we use for identification. A more complete list of taxonomic resources can be found at Southwest Association of Freshwater Invertebrate Taxonomists. (2015).
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Trond Andersen, Peter S. Cranston & John H. Epler (Eds) (2013) Chironomidae of the Holarctic Region: Keys and DIagnoses. Part 1. Larvae. *Insect Systematics and Evolution Supplements* 66: 1-571.

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Dytiscidae	0	0	0	0	0	0	0	0	0	0
| Subfamily: Hydroporinae	0	0	0	0	0	0	0	20	7	0
| Family: Elmidae	20	43	200	229	147	1,711	933	565	636	477
Heterlimnius	0	0	67	71	82	0	0	0	0	10
Optioservus	0	14	0	29	0	266	200	25	78	109
| Family: Staphylinidae	0	0	17	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Ameletidae	0	0	0	0	0	0	0	0	0	0
Ameletus	0	0	0	0	0	0	0	15	7	9
| Family: Baetidae	120	414	1,117	386	188	22	33	65	50	68
Baetis	40	129	217	14	35	0	0	10	64	41
Diphetor hageni	0	0	0	0	0	0	0	20	0	0
Procloeon	0	0	0	0	0	0	0	0	14	0
| Family: Ephemerellidae	0	0	0	0	0	11	17	135	71	23
Drunella spinifera	0	0	0	0	0	0	0	5	0	0
Ephemerella	0	0	0	0	6	0	0	0	0	0
| Family: Heptageniidae	20	171	917	1,614	706	289	1,117	165	100	77
| Family: Leptophlebiidae	1,140	1,543	717	629	165	133	667	80	79	91
Neoleptophlebia	100	0	17	0	0	0	0	0	0	0
Paraleptophlebia	0	0	0	0	0	0	0	0	7	0
| Order: Plecoptera	0	57	67	29	41	22	0	0	0	0
| Family: Capniidae	240	71	167	229	65	11	17	20	14	0
| Family: Chloroperlidae	0	0	33	214	135	0	0	0	0	0
Sweltsa	0	0	33	86	35	0	0	0	0	0
| Family: Leuctridae	0	0	0	14	0	0	0	0	0	0
| Family: Nemouridae	40	14	433	43	24	0	17	0	0	0
Malenka	60	100	83	14	0	0	0	0	0	0
Zapada cinctipes	0	0	0	0	0	0	17	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Family: Perlodidae	0	114	117	43	129	11	67	0	0	5
Isoperla	0	29	33	14	6	0	0	5	0	0
| Order: Trichoptera	20	14	166	43	12	33	133	25	107	5
| Family: Apataniidae	0	0	0	0	0	0	0	0	0	0
Apatania	0	14	0	14	6	0	0	0	0	0
| Family: Glossosomatidae	0	0	0	0	0	0	0	10	7	0
| Family: Hydropsychidae	280	600	100	0	12	0	17	35	57	0
Cheumatopsyche	100	143	0	0	0	0	50	10	7	5
Hydropsyche	0	0	17	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	65	21	0
Hydroptila	0	0	0	0	0	0	17	10	14	0
| Family: Leptoceridae	0	0	0	0	0	0	17	5	0	0
Oecetis	0	0	0	0	0	0	0	5	0	0
| Family: Limnephilidae	0	0	0	0	0	0	0	0	7	0
Dicosmoecus	0	14	83	29	0	0	0	0	0	0
| Family: Philopotamidae	0	0	0	0	0	0	0	0	0	0
Wormaldia	0	0	33	0	0	0	0	0	0	0
| Family: Polycentropodidae	0	14	0	0	0	11	17	120	186	245
Polycentropus	0	0	0	0	0	0	0	25	7	55
| Family: Rhyacophilidae	0	0	0	0	0	0	0	0	0	0
Rhyacophila	0	0	0	14	18	11	0	0	0	0
Rhyacophila arnaudi	0	0	0	0	0	0	0	15	7	9
Rhyacophila brunnea/vemna group	0	0	0	0	6	0	0	10	7	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	20	0	0	14	12	11	0	0	0	0
Mallochohelea	0	0	0	29	0	11	33	0	14	0
| Family: Chironomidae	20	14	17	14	0	44	67	25	7	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	44	17	30	21	0
Paralauterborniella nigrohalterale	40	0	0	0	0	0	0	0	0	0
Polypedilum	40	0	0	0	6	0	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Micropsectra	500	14	117	29	18	67	333	120	14	5
Rheotanytarsus	0	0	0	0	0	89	233	65	100	0
Stempellinella	0	0	0	0	6	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	20	0	0	0	0	0	0	0	0	0
Pagastia	0	29	0	0	6	11	0	15	21	9
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	60	43	67	14	0	0	0	0	0	0
Corynoneura	460	114	50	14	0	22	17	10	21	0
Eukiefferiella	120	86	100	171	18	0	33	5	7	5
Heterotrissocladius	0	0	0	14	0	11	0	5	7	9
Limnophyes	20	0	0	0	0	0	0	0	0	0
Metriocnemus	0	0	17	0	0	0	0	0	0	0
Nanocladius	0	0	0	14	0	0	0	0	0	0
Orthocladius complex	140	14	17	29	0	44	33	95	29	0
Orthocladius lignicola	0	0	0	0	6	0	0	0	0	0
Parametriocnemus	20	0	0	0	0	11	17	10	14	9
Paraphaenocladius	0	14	0	0	0	0	0	0	0	0
Rheocricotopus	0	0	0	29	12	0	17	5	0	14
Synorthocladius	120	0	17	14	0	0	17	15	0	0
Thienemanniella	100	100	217	114	18	0	0	25	0	0
Tvetenia	40	43	50	0	6	0	0	10	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Prodiamesa	0	14	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	40	0	17	0	0	0	0	0	0	0
Ablabesmyia	120	57	50	14	0	22	17	0	0	18
Nilotanypus	0	0	0	0	0	22	0	0	0	5
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Pentaneura	0	0	0	0	0	0	0	25	36	5
Thienemannimyia group	140	0	0	0	6	56	233	140	164	55

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
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250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Family: Empididae	40	0	0	0	0	0	0	0	0	5
Roederiodes	0	0	0	0	0	0	0	5	7	0
| Family: Simuliidae	20	0	0	0	0	0	0	0	0	0
Simulium	140	0	50	0	0	22	0	0	0	0
| Family: Tabanidae	0	0	0	0	0	0	0	0	0	0
Chrysops	0	0	0	0	0	22	0	10	0	0
| Family: Tipulidae	0	0	0	0	0	0	17	5	0	0
Dicranota	20	29	0	0	6	0	0	0	0	0
| Order: Hemiptera	0	0	0	14	0	0	0	0	0	0
| Family: Corixidae	0	0	0	0	0	0	0	0	7	0
| Order: Lepidoptera	0	0	17	0	0	0	0	0	0	0
| Order: Odonata	0	0	0	0	0	0	0	0	0	0
| Family: Corduliidae	0	0	0	0	0	0	0	0	0	0
Somatochlora cingulata	20	0	0	0	0	0	0	0	0	0
| Order: Collembola	20	0	17	29	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	17	0	12	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	29	17	0	0	11	0	0	0	0
| Order: Trombidiformes	0	57	50	114	24	0	17	5	0	0
| Family: Aturidae	0	0	0	0	0	0	0	0	0	0
Aturus	0	29	50	57	18	0	0	5	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0	0	0	5
Atractides	0	57	0	71	6	11	33	0	0	5
Hygrobates	0	43	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	14	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	120	43	17	0	0	0	0	0	0	0
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
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250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Lumbriculus	20	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0	0	0	0
Enchytraeus	80	0	0	0	0	0	0	10	0	32
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Nais	40	0	0	0	0	67	33	0	7	0
Pristina	0	29	0	0	0	0	100	0	29	0
Rhyacodrilus	20	0	17	0	0	0	0	0	0	5
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	20	0	0	0	0	78	33	5	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	3,200	257	167	114	24	0	0	0	0	0
Pisidium	520	29	17	0	6	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	178	333	95	114	9
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	30	0	5
Fossaria	0	0	0	0	0	133	0	5	57	59
| Family: Physidae	0	0	0	0	0	0	0	5	0	5
Physella	0	0	0	0	0	0	33	10	0	9
| Family: Planorbidae	20	14	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	78	217	0	0	0
Totals:	**8,500**	**4,670**	**5,806**	**4,670**	**2,028**	**3,596**	**5,219**	**2,255**	**2,230**	**1,502**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	20	14	17	14	0	11	17	5	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	20	0	0	14	0	0	17	5	0	5
| Class: Ostracoda	20	0	17	14	6	11	17	5	7	0
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbricidae	0	86	17	86	0	0	33	0	0	0
Phylum: Nemata	0	0	0	0	0	0	0	5	7	5
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	11	0	0	0	0
Totals:	**60**	**100**	**51**	**128**	**6**	**33**	**84**	**20**	**14**	**10**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Dytiscidae	0	0	0	0	0	0	0	0	0	0
| Subfamily: Hydroporinae	0	0	0	0	0	0	0	66.7	23.3	0
| Family: Elmidae	71.7	154	717	821	527	5,703	3,110	1,883	2,120	1,590
Heterlimnius	0	0	240	254	294	0	0	0	0	33.3
Optioservus	0	50.2	0	104	0	887	667	83.3	260	363
| Family: Staphylinidae	0	0	60.9	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Ameletidae	0	0	0	0	0	0	0	0	0	0
Ameletus	0	0	0	0	0	0	0	50.0	23.3	30.0
| Family: Baetidae	430	1,484	4,004	1,384	674	73.3	110	217	167	227
Baetis	143	462	778	50.2	125	0	0	33.3	213	137
Diphetor hageni	0	0	0	0	0	0	0	66.7	0	0
Procloeon	0	0	0	0	0	0	0	0	46.7	0
| Family: Ephemerellidae	0	0	0	0	0	36.7	56.7	450	237	76.7
Drunella spinifera	0	0	0	0	0	0	0	16.7	0	0
Ephemerella	0	0	0	0	21.5	0	0	0	0	0
| Family: Heptageniidae	71.7	613	3,287	5,785	2,530	963	3,723	550	333	257
| Family: Leptophlebiidae	4,086	5,530	2,570	2,254	591	443	2,223	267	263	303
Neoleptophlebia	358	0	60.9	0	0	0	0	0	0	0
Paraleptophlebia	0	0	0	0	0	0	0	0	23.3	0
| Order: Plecoptera	0	204	240	104	147	73.3	0	0	0	0
| Family: Capniidae	860	254	599	821	233	36.7	56.7	66.7	46.7	0
| Family: Chloroperlidae	0	0	118	767	484	0	0	0	0	0
Sweltsa	0	0	118	308	125	0	0	0	0	0
| Family: Leuctridae	0	0	0	50.2	0	0	0	0	0	0
| Family: Nemouridae	143	50.2	1,552	154	86.0	0	56.7	0	0	0
Malenka	215	358	297	50.2	0	0	0	0	0	0
Zapada cinctipes	0	0	0	0	0	0	56.7	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Family: Perlodidae	0	409	419	154	462	36.7	223	0	0	16.7
Isoperla	0	104	118	50.2	21.5	0	0	16.7	0	0
| Order: Trichoptera	71.7	50.2	595	154	43.0	110	443	83.3	357	16.7
| Family: Apataniidae	0	0	0	0	0	0	0	0	0	0
Apatania	0	50.2	0	50.2	21.5	0	0	0	0	0
| Family: Glossosomatidae	0	0	0	0	0	0	0	33.3	23.3	0
| Family: Hydropsychidae	1,004	2,151	358	0	43.0	0	56.7	117	190	0
Cheumatopsyche	358	513	0	0	0	0	167	33.3	23.3	16.7
Hydropsyche	0	0	60.9	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	217	70.0	0
Hydroptila	0	0	0	0	0	0	56.7	33.3	46.7	0
| Family: Leptoceridae	0	0	0	0	0	0	56.7	16.7	0	0
Oecetis	0	0	0	0	0	0	0	16.7	0	0
| Family: Limnephilidae	0	0	0	0	0	0	0	0	23.3	0
Dicosmoecus	0	50.2	297	104	0	0	0	0	0	0
| Family: Philopotamidae	0	0	0	0	0	0	0	0	0	0
Wormaldia	0	0	118	0	0	0	0	0	0	0
| Family: Polycentropodidae	0	50.2	0	0	0	36.7	56.7	400	620	817
Polycentropus	0	0	0	0	0	0	0	83.3	23.3	183
| Family: Rhyacophilidae	0	0	0	0	0	0	0	0	0	0
Rhyacophila	0	0	0	50.2	64.5	36.7	0	0	0	0
Rhyacophila arnaudi	0	0	0	0	0	0	0	50.0	23.3	30.0
Rhyacophila brunnea/vemna group	0	0	0	0	21.5	0	0	33.3	23.3	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	71.7	0	0	50.2	43.0	36.7	0	0	0	0
Mallochohelea	0	0	0	104	0	36.7	110	0	46.7	0
| Family: Chironomidae	71.7	50.2	60.9	50.2	0	147	223	83.3	23.3	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	147	56.7	100	70.0	0
Paralauterborniella nigrohalterale	143	0	0	0	0	0	0	0	0	0
Polypedilum	143	0	0	0	21.5	0	0	0	0	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Micropsectra	1,792	50.2	419	104	64.5	223	1,110	400	46.7	16.7
Rheotanytarsus	0	0	0	0	0	297	777	217	333	0
Stempellinella	0	0	0	0	21.5	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	71.7	0	0	0	0	0	0	0	0	0
Pagastia	0	104	0	0	21.5	36.7	0	50.0	70.0	30.0
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	215	154	240	50.2	0	0	0	0	0	0
Corynoneura	1,649	409	179	50.2	0	73.3	56.7	33.3	70.0	0
Eukiefferiella	430	308	358	613	64.5	0	110	16.7	23.3	16.7
Heterotrissocladius	0	0	0	50.2	0	36.7	0	16.7	23.3	30.0
Limnophyes	71.7	0	0	0	0	0	0	0	0	0
Metriocnemus	0	0	60.9	0	0	0	0	0	0	0
Nanocladius	0	0	0	50.2	0	0	0	0	0	0
Orthocladius complex	502	50.2	60.9	104	0	147	110	317	96.7	0
Orthocladius lignicola	0	0	0	0	21.5	0	0	0	0	0
Parametriocnemus	71.7	0	0	0	0	36.7	56.7	33.3	46.7	30.0
Paraphaenocladius	0	50.2	0	0	0	0	0	0	0	0
Rheocricotopus	0	0	0	104	43.0	0	56.7	16.7	0	46.7
Synorthocladius	430	0	60.9	50.2	0	0	56.7	50.0	0	0
Thienemanniella	358	358	778	409	64.5	0	0	83.3	0	0
Tvetenia	143	154	179	0	21.5	0	0	33.3	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Prodiamesa	0	50.2	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	143	0	60.9	0	0	0	0	0	0	0
Ablabesmyia	430	204	179	50.2	0	73.3	56.7	0	0	60.0
Nilotanypus	0	0	0	0	0	73.3	0	0	0	16.7
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Pentaneura	0	0	0	0	0	0	0	83.3	120	16.7
Thienemannimyia group	502	0	0	0	21.5	187	777	467	547	183

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Family: Empididae	143	0	0	0	0	0	0	0	0	16.7
Roederiodes	0	0	0	0	0	0	0	16.7	23.3	0
| Family: Simuliidae	71.7	0	0	0	0	0	0	0	0	0
Simulium	502	0	179	0	0	73.3	0	0	0	0
| Family: Tabanidae	0	0	0	0	0	0	0	0	0	0
Chrysops	0	0	0	0	0	73.3	0	33.3	0	0
| Family: Tipulidae	0	0	0	0	0	0	56.7	16.7	0	0
Dicranota	71.7	104	0	0	21.5	0	0	0	0	0
| Order: Hemiptera	0	0	0	50.2	0	0	0	0	0	0
| Family: Corixidae	0	0	0	0	0	0	0	0	23.3	0
| Order: Lepidoptera	0	0	60.9	0	0	0	0	0	0	0
| Order: Odonata	0	0	0	0	0	0	0	0	0	0
| Family: Corduliidae	0	0	0	0	0	0	0	0	0	0
Somatochlora cingulata	71.7	0	0	0	0	0	0	0	0	0
| Order: Collembola	71.7	0	60.9	104	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	60.9	0	43.0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	104	60.9	0	0	36.7	0	0	0	0
| Order: Trombidiformes	0	204	179	409	86.0	0	56.7	16.7	0	0
| Family: Aturidae	0	0	0	0	0	0	0	0	0	0
Aturus	0	104	179	204	64.5	0	0	16.7	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0	0	0	16.7
Atractides	0	204	0	254	21.5	36.7	110	0	0	16.7
Hygrobates	0	154	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	50.2	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	430	154	60.9	0	0	0	0	0	0	0
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Lumbriculus	71.7	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0	0	0	0
Enchytraeus	287	0	0	0	0	0	0	33.3	0	107
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Nais	143	0	0	0	0	223	110	0	23.3	0
Pristina	0	104	0	0	0	0	333	0	96.7	0
Rhyacodrilus	71.7	0	60.9	0	0	0	0	0	0	16.7
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	71.7	0	0	0	0	260	110	16.7	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	11,470	921	599	409	86.0	0	0	0	0	0
Pisidium	1,864	104	60.9	0	21.5	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	593	1,110	317	380	30.0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	100	0	16.7
Fossaria	0	0	0	0	0	443	0	16.7	190	197
| Family: Physidae	0	0	0	0	0	0	0	16.7	0	16.7
Physella	0	0	0	0	0	0	110	33.3	0	30.0
| Family: Planorbidae	71.7	50.2	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	260	723	0	0	0
Totals:	**30,466**	**16,738**	**20,810**	**16,738**	**7,269**	**11,987**	**17,397**	**7,517**	**7,433**	**5,007**

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	FPC-R3	FPC-R3	FPC-R3	FPC-R3	FPC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3	HAC-R3
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250303	CC250304	CC250305	CC250306	CC250307	CC250308	CC250309	CC250310	CC250311	CC250312
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	71.7	50.2	60.9	50.2	0	36.7	56.7	16.7	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	71.7	0	0	50.2	0	0	56.7	16.7	0	16.7
| Class: Ostracoda	71.7	0	60.9	50.2	21.5	36.7	56.7	16.7	23.3	0
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbricidae	0	308	60.9	308	0	0	110	0	0	0
Phylum: Nemata	0	0	0	0	0	0	0	16.7	23.3	16.7
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	36.7	0	0	0	0
Totals:	**215**	**358**	**183**	**459**	**21.5**	**110**	**280**	**66.7**	**46.7**	**33.3**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Biomass Results (g), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow Environmental (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	MP_FPC-R3	MP_FPC-R3	MP_FPC-R3	MP_FPC-R3	MP_FPC-R3
Sample:	SURB-1_2024-08	SURB-2_2024-08	SURB-3_2024-08	SURB-4_2024-08	SURB-5_2024-09
Sample Collection Date:	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24	14-Aug-24
CC#:	CC250303	CC250304	CC250305	CC250306	CC250307
Dry Biomass analysis (g)					
Sample Total Dry Weight					
All organisms	1.2300	2.6429	3.7300	2.3257	0.2612
Raw Dry Weight					
All organisms	0.0615	0.1850	0.2238	0.1628	0.0444
Measured Weight					
All organisms	0.2012	0.3246	0.3634	0.3031	0.1828
Mesh Weight	0				
All organisms	0.1397	0.1396	0.1396	0.1403	0.1384
Wet Biomass Analysis (g)					
Sample Total Wet Weight (g)					
All organisms	0.4501	0.7825	1.3036	0.7755	0.1476
Mesh Weight					
Corrected Wet Weight					
All organisms	9.0020	11.1786	21.7267	11.0786	0.8682
Raw Wet Weight					
All organisms	1.1967	1.5291	2.0406	1.5127	0.8848

Raw Benthic Invertebrate Biomass Results (g), Mount Polley Mine

Project: 24-04-1 (MPMC Hazeltine)
Minnow Environmental (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	MP_HAC-R3	MP_HAC-R3	MP_HAC-R3	MP_HAC-R3	MP_HAC-R3
Sample:	HESS-1_2024-08	HESS-2_2024-08	HESS-3_2024-08	HESS-4_2024-08	HESS-5_2024-08
Sample Collection Date:	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC#:	CC250308	CC250309	CC250310	CC250311	CC250312
Dry Biomass analysis (g)					
Sample Total Dry Weight					
All organisms	0.4267	0.6083	0.2880	0.2679	0.1232
Raw Dry Weight					
All organisms	0.0384	0.0365	0.0576	0.0375	0.0271
Measured Weight					
All organisms	0.179	0.1762	0.1975	0.1763	0.1659
Mesh Weight					
All organisms	0.1406	0.1397	0.1399	0.1388	0.1388
Wet Biomass Analysis (g)					
Sample Total Wet Weight (g)					
All organisms	0.1448	0.1453	0.2454	0.1504	0.1350
Mesh Weight					
Corrected Wet Weight					
All organisms	1.6089	2.4217	1.2270	1.0743	0.6136
Raw Wet Weight					
All organisms	0.8914	0.8903	0.9898	0.895	0.8648

BENTHIC INVERTEBRATE COMMUNITY

Cordillera Methods, QC Report, and Results 24-01-6

(Finalized November 12, 2024)

Methods and QC Report 2024

Project ID: 24-01-6 MPMC Creek CEMP

Client: Minnow Environmental

Prepared by:
Cordillera Consulting Inc.
Summerland, BC
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Sample Reception

On August 22, 2024, Cordillera Consulting received 15 benthic samples from Minnow Environmental. When samples arrived to Cordillera Consulting, exterior packaging was initially inspected for damage or wet spots that would have indicated damage to the interior containers.

Samples were logged into a proprietary software database (INSTAR1) where the clients assigned sample name was recorded along with a Cordillera Consulting (CC) number for cross-reference. Each sample was checked to ensure that all sites and replicates recorded on field sheets or packing lists were delivered intact and with adequate preservative. Any missing, mislabelled or extra samples were reported to the client immediately to confirm the total numbers and correct names on the sample jars. The client representative was notified of the arrival of the shipment and provided a sample inventory once intake was completed.
See table below for sample inventory:

Table 1: Summary of sample information including Cordillera Consulting (CC) number

Sample	CC#	Date	Size	# of Jars
MP_HAC-R1_HESS-1_2024-08	CC250313	08/15/2024	250 µM	1
MP_HAC-R1_HESS-2_2024-08	CC250314	08/15/2024	250 µM	1
MP_HAC-R1_HESS-3_2024-08	CC250315	08/15/2024	250 µM	1
MP_HAC-R1_HESS-4_2024-08	CC250316	08/15/2024	250 µM	1
MP_HAC-R1_HESS-5_2024-08	CC250317	08/15/2024	250 µM	1
MP_HAC-U_HESS-1_2024-08	CC250318	08/13/2024	250 µM	1
MP_HAC-U_HESS-2_2024-08	CC250319	08/13/2024	250 µM	1
MP_HAC-U_HESS-3_2024-08	CC250320	08/13/2024	250 µM	1
MP_HAC-U_HESS-4_2024-08	CC250321	08/12/2024	250 µM	1
MP_HAC-U_HESS-5_2024-08	CC250322	08/12/2024	250 µM	1
MP_EDC-U_SURB-1_2024-08	CC250323	08/12/2024	250 µM	1
MP_EDC-U_SURB-2_2024-08	CC250324	08/12/2024	250 µM	1
MP_EDC-U_SURB-3_2024-08	CC250325	08/11/2024	250 µM	1
MP_EDC-U_SURB-4_2024-08	CC250326	08/11/2024	250 µM	1
MP_EDC-U_SURB-5_2024-08	CC250327	08/11/2024	250 µM	1

Sample Sorting

- Using a gridded Petri dish, fine forceps and a low power stereo-microscope (Olympus, Nikon, Leica) the sorting technicians removed the invertebrates and sorted them into family/orders.
- The sorting technician kept a running tally of total numbers excluding organisms from Porifera, Nemata, Platyhelminthes, Ostracoda, Copepoda, Cladocera and terrestrial drop-ins such as aphids. These organisms were marked for their presence (given a value of 1) only and left in the sample. They were not included towards the 300-organism subsample count.
- Where specimens are broken or damaged, only heads were counted.
- Subsampling was conducted with the use of a Marchant Box.
- When using the Marchant box, cells were extracted at the same time in the order indicated by a random number table. If the 300th organism was found part way into sorting a cell then the balance of that cell was sorted. If the organism count had not reached 300 by the 50th cell then the entire sample was sorted.
- The total number of cells sorted and the number of organisms removed were recorded manually on a bench sheet and then recorded into INSTAR1
- Organisms were stored in vials containing 80% ethanol and an interior label indicating the site names, date of sampling, site code numbers and portion subsampled. This information was also recorded on the laboratory bench sheet and on INSTAR1.
- The sorted portion of the debris was preserved and labeled separately from the unsorted portion and was tested for sorting efficiency (Sorting Quality Control – Sorting Efficiency). The unsorted portion was also labeled and preserved in separate jars.

Percent sub-sampled and total countable invertebrates pulled from the samples were summarized in the table below.

Table 2: Percent sub-sample and invertebrate count for each sample

Sample	Date	CC#	250 micron fraction	
			% Sampled	# Invertebrates
MP_HAC-R1_HESS-1_2024-08	15-Aug-24	CC250313	20%	315
MP_HAC-R1_HESS-2_2024-08	15-Aug-24	CC250314	14%	331
MP_HAC-R1_HESS-3_2024-08	15-Aug-24	CC250315	11%	372
MP_HAC-R1_HESS-4_2024-08	15-Aug-24	CC250316	7%	369
MP_HAC-R1_HESS-5_2024-08	15-Aug-24	CC250317	7%	338
MP_HAC-U_HESS-1_2024-08	13-Aug-24	CC250318	10%	317
MP_HAC-U_HESS-2_2024-08	13-Aug-24	CC250319	8%	319
MP_HAC-U_HESS-3_2024-08	13-Aug-24	CC250320	5%	456

MP_HAC-U_HESS-4_2024-08	12-Aug-24	CC250321	5%	543
MP_HAC-U_HESS-5_2024-08	12-Aug-24	CC250322	5%	418
MP_EDC-U_SURB-1_2024-08	12-Aug-24	CC250323	5%	373
MP_EDC-U_SURB-2_2024-08	12-Aug-24	CC250324	20%	416
MP_EDC-U_SURB-3_2024-08	11-Aug-24	CC250325	18%	381
MP_EDC-U_SURB-4_2024-08	11-Aug-24	CC250326	13%	377
MP_EDC-U_SURB-5_2024-08	11-Aug-24	CC250327	29%	327

Sorting Quality Control - Sorting Efficiency

As a part of Cordillera's laboratory policy, all projects undergo sorting efficiency checks.

- As sorting progresses, 10% of samples were randomly chosen by senior members of the sorting team for resorting.
- All sorters working on a project had at least 1 sample resorted by another sorter.
- An efficiency of 90 % was expected (95% for CABIN samples).
- If 90/95% efficiency was not met, samples from that sorter were resorted.
- To calculated sorting efficiency the following formula was used:

$$\frac{\#OrganismsMissed}{TotalOrganismsFound} * 100 = \%OM$$

Table 3 Summary of sorting efficiency

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 1, CC# - CC250316, Percent sampled = 7%, Sieve size = 250			
Chironomidae	7		
Trichoptera	2		
Trombidiformes	1		
Total:	**10**	369	97.29%

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 2, CC# - CC250318, Percent sampled = 10%, Sieve size = 250			
Coleoptera	2		

Trichoptera	1		
Diptera	1		
Total:	**4**	317	98.74%

Sorting Quality Control - Sub-Sampling QC

Certain Provincial and Mining projects require additional sorting checks in the form of sub-sampling QC, (Environmental Effects Monitoring (EEM) protocol). This ensured that any fraction of the total sample that was examined was actually an accurate representation of the number of total organisms. Organisms from the additional sub-samples were not identified; rather total organism count only was compared.

Sub-Sampling efficiency was measured on 10% of the number of sub-sampled samples in the project. Ex. In a project where 50 of 100 total samples were processed through subsampling using a Marchant box, then 10% of 50; or 5 samples were used for sub sampling efficiency.

Sub-Sampling efficiency was performed by fractioning the entire sample into sub-sample percentages. On each sub-sampled portion, a total organism count was recorded and compared to the rest of the sub-samples. In order to pass, all fractions were required to be within 20% of total organism count.

Example: If 300 organisms are found in 10% of the sample, the sorter will continue to sample in 10% fractions until the entire sample is separated. They will then count the total number of organisms in each of the 10 fractions of 10% and compare the organism count.

When divergence is >20% the sorting manager examines for the source of the problem and takes steps to correct it. With the Marchant box, the problem typically rested with how the box is flipped back to the upright position. For this reason, subsampling was performed by experienced employees only. Another common source of error would be the type of debris in the sample. Samples with algae or heavy with periphyton have a higher incident of failure due to clumping than clear samples.

Table 4 Summary of Sub Sample efficiency

Station ID		Organisms in Subsample																			Sorter		Actual Total	Precision		Accuracy	
CC#	Sample Name	1	2	3	4	5															By	Time		Percent Range		Min	Max
250324 (20%)	MP_EDC-U_SURB-2_2024-08	425	441	448	457	444															MP	345	2215	0.68	7.00	0.23	4.06
250313 (20%)	MP_HAC-R1_HESS-1_2024-08	328	360	302	307	366															RR	500	1663	1.63	17.49	1.38	10.04

Taxonomic Effort

The next procedure was the identification to genus-species level where possible of all the organisms in the sample.

- Identifications were made at the genus/species level for all insect organisms found including Chironomidae (Based on CABIN protocol).
- Non-insect organisms (except those not included in CABIN count) were identified to genus/species where possible and to a minimum of family level with intact and mature specimens.
- The Standard Taxonomic Effort lists compiled by the CABIN manual[1], SAFIT[2] , and PNAMP[3] were used as a guide line for what level of identification to achieve where the condition and maturity of the organism enabled.
- Organisms from the same families/order were kept in separate vials with 80% ethanol and an interior label of printed laser paper.
- Chironomidae was identified to genus/species level where possible and was aided by slide mounts. CMC-10 was used to clear and mount the slide.
- Oligochaetes was identified to family/genus level with the aid of slide mounts. CMC-10 was used to clear and mount the slide.
- Other Annelida (leeches, polychaetes) were identified to the family/genus/species level with undamaged, mature specimens.
- Mollusca was identified to family and genus/species where possible
- Decapoda, Amphipoda and Isopoda were identified at family/genus/species level where possible.
- Bryozoans and Nemata remained at the phylum level
- Hydrachnidae and Cnidaria were identified at the family/genus level where possible.
- When requested, reference collections were made containing at least one individual from each taxa listed. Organisms represented will have been identified to the lowest practical level.
- Reference collection specimens were stored in 55 mm glass vials with screw-cap lids with polyseal inserts (museum quality). They were labeled with taxa name, site code, date identified and taxonomist name. The same information was applied to labels on the slide mounts.

Taxonomists

The taxonomists for this project were certified by the Society of Freshwater Science (SFS) Taxonomic Certification Program at level 2 which is the required certification for CABIN projects:

Scott Finlayson: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae (East/West); Group 4 Oligochaeta

Adam Bliss: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae
Rita Avery: Group 1 General Arthropods (East/West); Group 2 EPT (East/West)
Garret Naish: Group 2 EPT (East/West)

Taxonomic QC

Taxonomic QC was performed in house by someone other than the original taxonomist.

- Quality control protocol involved complete, blind re-identification and re-enumeration of at least 10% of samples by a second SFS-certified taxonomist.
- Samples for taxonomic quality control were randomly selected and quality control procedures were conducted as the project progresses through the laboratories.

- The second (QC) taxonomist will calculate and record four types of errors:
    1. Misidentification error
    2. Enumeration error
    3. Questionable taxonomic resolution error
    4. Insufficient taxonomic resolution error

The QC coordinator then calculates the following estimates of taxonomic precision.

1. The percent total identification error rate is calculated as:

$$\frac{Sum\ of\ incorrect\ identifications}{total\ organisms\ counted\ in\ audit} * (100)$$

The average total identification error rate of audited samples did not exceed 5%. All samples that exceed a 5% error rate were re-evaluated to determine whether repeated errors or patterns in error contributed.

2. The percent difference in enumeration (PDE) to quantify the consistency of specimen counts.

$$PDE = \frac{|n_1 - n_2|}{n_1 + n_2} x100$$

3. The percent taxonomic disagreement (PTD) to quantify the shared precision between two sets of identifications.

$$PTD = \left(1 - \left[\frac{a}{N}\right]\right) x100$$

4. Bray Curtis dissimilarity Index to quantify the differences in identifications.

$$BC_{ij} = 1 - \frac{2C_{ij}}{S_j + S_i}$$

Error Summary

All samples report errors within the acceptable limits for CABIN Laboratory methods (less than 5% error).

Table 5 Summary of taxonomic error following QC

Site	Taxa Identified	% Error	PDE	PTD	Bray - Curtis Dissimilarity index
Site - 2024, Sample - MP_HAC-R1_HESS-2_2024-08, CC# - CC250314, Percent sampled = 14%, Sieve size = 250	332	0.00	0.15082956	0.60240964	0.00452489
Site - 2024, Sample - MP_EDC-U_SURB-1_2024-08, CC# - CC250323, Percent sampled = 5%, Sieve size = 250	373	0.00	0	0.26809651	0.00268097

There will always be disagreements between taxonomists regarding the degree of taxonomic resolution in immature specimens and when laboratories make use of different keys for certain groups (Mollusks is an especially disputed group). It is always possible that some taxa found by the original taxonomist were overlooked in QC.

All of the Taxonomic QC samples that were observed passed testing according to the CABIN misidentification protocols. See the tables below for results from taxonomic QC audit.

Error Rationale

Site - 2024, Sample - MP_HAC-R1_HESS-2_2024-08, CC# - CC250314, Percent sampled = 14%, Sieve size = 250	Laboratory Count	QC Audit Count	Agreement	Misidentification	Questionable Taxonomic Resolution	Enumeration	Insufficient Taxonomic Resolution	Comments
Amphipoda	8	8						

Antocha	4	4						
Ceraclea	1	1						
Chaetogaster	1	1						
Cheumatopsyche	5	5						
Chironomidae	2	2						
Chironomidae	4	4						
Chironomini	4	4						
Corduliidae	1	1						
Corynoneura	1	1						
Elmidae	31	31						
Enchytraeus	14	13	No			X		
Fossaria	3	3						
Gammarus	6	6						
Gastropoda	44	45	No			X		
Gyraulus	3	3						
Hemerodromia	4	4						
Hydropsychidae	2	2						
Hydroptila	1	1						
Hydrozetidae	7	7						
Lebertia	3	3						
Leptophlebiidae	8	8						
Lymnaeidae	18	18						
Micropsectra	2	2						
Microtendipes	3	3						
Nais	4	4						
Optioservus	14	14						
Oribatida	13	13						
Orthocladiinae	7	7						
Orthocladius complex	4	4						
Paramerina	1	1						
Parametriocnemus	3	3						
Planorbidae	4	4						
Rheotanytarsus	22	23	No			X		
Sperchon	1	1						
Synorthocladius	20	20						
Tanypodinae	1	1						
Tanytarsus	8	8						
Thienemanniella	1	1						
Thienemannimyia group	45	45						
Tricorythodes	2	2						
Tvetenia	1	1						

Total:	**331**	**332**						
					0	3	0	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.00	**Pass**				
Site - 2024, Sample - MP_EDC-U_SURB-1_2024-08, CC# - CC250323, Percent sampled = 5%, Sieve size = 250	Laboratory Count	QC Audit Count	Agreement	Misidentification	Questionable Taxonomic Resolution	Enumeration	Insufficient Taxonomic Resolution	Comments
Ameletus	1	1						
Atractides	1	1						
Brillia	2	2						
Capniidae	11	11						
Ceratopogonidae	2	2						
Chironomidae	1	1						
Chloroperlidae	5	5						
Corynoneura	17	17						
Elmidae	8	8						
Enchytraeus	2	2						
Eukiefferiella	7	7						
Heptageniidae	1	1						
Hydrodroma	1	1						
Hydrozetidae	1	1						
Hygrobates	1	1						
Lepidostoma	1	1						
Leptophlebiidae	6	6						
Ljania	1	1						
Micropsectra	17	17						
Microtendipes	1	1						
Narpus	1	1						
Neoplasta	2	2						
Optioservus	2	2						
Oribatida	67	66	No			X		
Orthocladiinae	11	11						
Orthocladius complex	4	4						
Pagastia	1	1						
Polycentropodidae	1	1						
Procladius	1	1						

Rheocricotopus	9	9						
Sialis	1	1						
Stictochironomus	2	2						
Sweltsa	1	1						
Tanypodinae	15	15						
Tanytarsini	7	7						
Telmatopelopia	5	5						
Thienemannimyia group	1	1						
Trichoptera	2	2						
Trichoptera	151	152	No			X		
Trombidiformes	2	2						
Total:	**373**	**373**						
					0	2	0	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.00	**Pass**				

Dry Biomass

Dry biomass is measured on an analytical balance down to the microgram. The first step is the preparation of glass fiber filter circles with a diameter of 5.5cm. The glass fiber filters are first labelled and then dried in an oven at 150^{o}F for 4 hours. After drying they are stored in zip lock bags until use. Just before use, the filters are weighed to obtain a subtraction value and that value is placed in an EXCEL spreadsheet. After identification, the organisms are put onto the filters in a pre-determined category for weighing. When all organisms have been put on to filters and all weights of the dry filters have been recorded, everything is put into an oven at 150^{o}F for another 4 hours. As soon as the 4 hours is up, the organisms are removed from the oven and allowed to cool for a few minutes to avoid heat affecting the analytical balance. Filters are then weighed one at a time and that weight is entered into the spreadsheet where formulas are used to derive the actual dry biomass of the organisms.

Wet Biomass

Wet biomass is measure on an analytical balance down to the microgram. A very fine mesh is used to do all of the weighing of the organisms. First, the mesh is weighed on the balance and recorded into an EXCEL spreadsheet. The identified organisms are then split into predetermined groupings for weighing. The organisms are placed onto the mesh and blotted dry with paper towel to remove any excess liquid that clings to the organisms. The mesh is then weighed again and recorded into the spreadsheet where formulas are used to derive the wet biomass of the organisms. The organisms are then

removed from the mesh under a dissecting microscope to ensure that it is completely clean. The organisms are then stored back in ethanol.

References

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[2] Southwest Association of Freshwater Invertebrate Taxonomists. (2015). www.safit.org

[3] Pacific Northwest Aquatic Monitoring Partnership (Accessed 2015). www.pnamp.org

Taxonomic Keys

Below is a reference list of taxonomic keys utilized by taxonomists at Cordillera Consulting. Cordillera taxonomists routinely seek out new literature to ensure the most accurate identification keys are being utilized. This is not reflective of the exhaustive list of resources that we use for identification. A more complete list of taxonomic resources can be found at Southwest Association of Freshwater Invertebrate Taxonomists. (2015).
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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Phylum: Arthropoda	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0
| Family: Elmidae	115	221	291	243	143	500	1,200	1,840
Heterlimnius	0	0	0	0	0	0	0	0
Narpus	0	0	0	0	0	0	0	0
Optioservus	40	100	0	57	129	230	288	660
| Order: Ephemeroptera	0	0	0	0	0	0	0	0
| Family: Ameletidae	0	0	0	0	0	0	0	0
Ameletus	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	14	14	0	0	40
Diphetor hageni	0	0	0	0	0	0	0	20
Procloeon	0	0	0	0	14	0	13	0
| Family: Ephemerellidae	0	0	0	0	0	0	0	0
Drunella grandis group	0	0	0	0	0	0	0	0
Ephemerella	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0
Epeorus	0	0	18	0	14	10	0	20
| Family: Leptohyphidae	0	0	0	0	0	0	0	0
Tricorythodes	10	14	0	0	0	0	0	0
| Family: Leptophlebiidae	70	57	55	43	43	10	225	100
Neoleptophlebia	0	0	0	0	0	0	0	0
Paraleptophlebia	0	0	9	14	29	0	50	0
| Order: Plecoptera	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0
| Family: Perlodidae	0	0	0	0	0	0	0	0
Isoperla	0	0	0	0	0	0	0	0
Skwala	0	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Order: Trichoptera	0	0	0	14	0	0	0	0
| Family: Apataniidae	0	0	0	0	0	0	0	0
Apatania	0	0	0	0	0	0	0	0
| Family: Hydropsychidae	20	14	18	57	0	20	0	20
Cheumatopsyche	15	36	55	57	0	40	0	20
Hydropsyche	0	0	0	0	0	30	0	0
| Family: Hydroptilidae	0	0	0	29	0	10	0	0
Hydroptila	0	7	0	171	29	0	0	20
| Family: Lepidostomatidae	0	0	0	0	0	0	0	0
Lepidostoma	10	0	0	14	14	20	13	40
| Family: Leptoceridae	5	0	0	43	43	0	25	20
Ceraclea	10	7	0	0	0	0	0	0
| Family: Limnephilidae	0	0	0	14	0	0	0	0
Onocosmoecus	0	0	9	0	0	10	0	0
Psychoglypha	0	0	0	0	0	0	0	0
| Family: Phryganeidae	0	0	0	0	0	0	0	0
| Family: Polycentropodidae	0	0	0	0	0	0	0	0
Polycentropus	0	0	0	0	0	0	0	0
| Family: Rhyacophilidae	0	0	0	0	0	0	0	0
Rhyacophila	0	0	0	0	0	0	0	0
Rhyacophila arnaudi	0	0	0	0	0	0	0	60
| Order: Diptera	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	0	0	0	0	0	20
Dasyhelea	0	0	0	0	0	0	0	0
Mallochohelea	0	0	0	0	0	0	0	0
Probezzia	0	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Family: Chironomidae	0	43	45	157	200	80	63	240
| Subfamily: Chironominae	0	0	0	0	0	0	0	0
| Tribe: Chironomini	15	29	145	57	1,057	0	0	80
Chironomus	0	0	0	0	0	0	0	20
Microtendipes	15	21	45	57	114	40	25	20
Phaenopsectra	0	0	0	0	0	0	0	0
Polypedilum	0	0	9	0	0	0	0	0
Stictochironomus	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	5	0	27	114	157	90	75	480
Micropsectra	0	14	18	86	0	40	13	80
Paratanytarsus	0	0	0	0	14	0	0	0
Rheotanytarsus	65	157	227	1,114	500	460	13	720
Stempellinella	0	0	0	0	0	0	0	0
Tanytarsus	20	57	73	57	214	40	38	260
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0
Pagastia	20	0	18	43	0	0	0	0
| Subfamily: Orthocladiinae	30	50	145	100	29	70	25	100
Brillia	0	0	0	0	0	0	0	0
Corynoneura	5	7	55	43	14	0	0	20
Eukiefferiella	0	0	0	0	0	0	0	20
Heterotrissocladius	15	0	18	29	0	0	13	0
Nanocladius	0	0	0	0	0	0	0	0
Orthocladius complex	95	29	255	486	100	30	50	220
Parakiefferiella	0	0	0	0	0	0	0	0
Parametriocnemus	0	21	18	43	0	70	13	20
Psectrocladius	0	0	0	0	0	0	0	0
Rheocricotopus	0	0	0	0	0	0	0	0
Synorthocladius	70	143	291	257	343	270	275	760
Thienemanniella	0	7	0	14	14	0	0	0
Tvetenia	0	7	0	14	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Subfamily: Tanypodinae	0	7	0	0	29	20	13	0
Ablabesmyia	0	0	9	29	29	30	50	40
Labrundinia	0	0	0	0	0	0	13	0
Paramerina	0	7	0	0	0	10	13	0
| Tribe: Macropelopiini	0	0	0	0	0	0	0	0
Psectrotanypus	0	0	0	0	0	0	0	0
| Tribe: Natarsiini	0	0	0	0	0	0	0	0
Natarsia	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0
Pentaneura	5	0	0	0	29	10	0	0
Telmatopelopia	0	0	0	0	0	0	0	0
Thienemannimyia group	140	321	391	500	486	320	325	300
| Tribe: Procladiini	0	0	0	0	0	0	0	0
Procladius	0	0	0	0	0	0	13	0
| Family: Empididae	0	0	0	0	0	0	0	0
Chelifera/ Metachela	5	0	0	0	0	0	0	0
Hemerodromia	90	29	27	57	0	20	0	20
Neoplasta	0	0	27	0	0	0	0	0
| Family: Sciomyzidae	0	0	0	0	0	0	0	0
| Family: Simuliidae	0	0	0	0	0	0	0	20
| Family: Tabanidae	0	0	0	0	0	0	0	0
Chrysops	0	0	9	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	10	0	20
Antocha	45	29	0	14	0	110	75	100
Hexatoma	0	0	0	0	0	0	0	0
| Order: Megaloptera	0	0	0	0	0	0	0	0
| Family: Sialidae	0	0	0	0	0	0	0	0
Sialis	0	0	0	14	0	0	0	0
| Order: Odonata	0	0	0	0	0	0	0	0
| Family: Corduliidae	0	7	0	0	0	0	0	0
| Order: Thysanoptera	0	0	0	0	0	0	0	0

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Minnow (BC)
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scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Subphylum: Chelicerata	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0
| Order: Oribatida	40	93	136	257	71	60	213	160
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	25	50	100	214	57	40	225	280
| Order: Trombidiformes	0	0	0	0	0	0	13	20
| Family: Aturidae	0	0	0	0	0	0	0	0
Aturus	0	0	0	0	0	0	0	0
Ljania	0	0	0	0	0	0	0	0
| Family: Feltriidae	0	0	0	0	0	0	0	0
Feltria	0	0	0	0	0	0	0	0
| Family: Hydrodromidae	0	0	0	0	0	0	0	0
Hydrodroma	0	0	0	0	29	0	0	0
| Family: Hydrovolzioidea	0	0	0	0	0	0	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0	0
Atractides	0	0	9	0	0	0	0	60
Hygrobates	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0
Lebertia	15	21	18	14	14	10	13	60
| Family: Pionidae	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0
Sperchon	0	7	0	0	0	0	0	20
Sperchonopsis	0	0	0	0	0	0	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0
| Order: Amphipoda	15	57	9	0	0	0	0	140
| Family: Gammaridae	0	0	0	0	0	0	0	0
Gammarus	10	43	27	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	300
Phylum: Annelida	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Order: Hirudinida	0	0	0	0	0	0	0	0
| Family: Glossiphoniidae	0	0	0	0	0	0	0	0
Helobdella stagnalis	0	0	0	57	0	0	0	20
| Class: Oligochaeta	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0	0
Enchytraeus	110	100	0	157	0	0	0	40
| Family: Naididae	0	0	0	0	0	0	0	0
Chaetogaster	0	7	18	43	14	0	13	0
Limnodrilus	0	0	300	0	57	0	13	0
Nais	25	29	100	214	29	10	38	60
Pristina	0	0	0	0	14	0	0	0
Rhyacodrilus	0	0	18	0	0	10	0	0
Slavina appendiculata	0	0	9	0	0	0	0	0
Stylaria lacustris	0	0	45	14	0	0	0	0
Uncinais uncinata	0	0	0	0	29	0	0	0
Vejdovskyella	0	0	0	0	14	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0
Hydra	10	0	9	0	0	0	13	0
Phylum: Mollusca	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0
| Class: Gastropoda	240	314	136	129	314	350	250	440
| Order: Basommatophora	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	115	129	55	86	171	30	113	320

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Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Fossaria	0	21	0	29	114	0	0	20
| Family: Physidae	0	0	0	0	0	0	0	20
Physella	0	0	0	0	0	0	0	0
| Family: Planorbidae	30	29	73	0	100	60	163	700
Gyraulus	5	21	9	0	0	0	13	40
Totals:	**1,575**	**2,362**	**3,378**	**5,269**	**4,828**	**3,170**	**3,999**	**9,120**
Taxa present but not included:								
Phylum: Arthropoda	0	0	0	0	0	0	0	0
| Class: Copepoda	5	7	9	0	14	10	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0
| Order: Cladocera	5	0	0	0	14	0	13	0
| Class: Ostracoda	5	7	9	0	14	10	13	0
Phylum: Annelida	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0
| Family: Lumbricidae	0	0	0	0	0	0	0	0
Phylum: Nemata	0	7	9	14	14	0	13	0
Totals:	**15**	**21**	**27**	**14**	**56**	**20**	**39**	0

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250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Phylum: Arthropoda	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0
| Family: Elmidae	1,240	800	160	145	172	77	79
Heterlimnius	0	0	0	0	0	0	3
Narpus	0	0	20	5	0	0	0
Optioservus	1,160	600	40	25	39	8	14
| Order: Ephemeroptera	0	0	0	0	0	8	0
| Family: Ameletidae	0	0	0	0	0	0	0
Ameletus	0	0	20	35	22	0	0
| Family: Baetidae	20	0	0	0	6	8	0
Diphetor hageni	0	0	0	0	0	0	0
Procloeon	0	0	0	0	0	0	0
| Family: Ephemerellidae	0	0	0	0	0	0	0
Drunella grandis group	0	0	0	0	0	0	10
Ephemerella	0	0	0	0	6	0	0
| Family: Heptageniidae	0	0	20	90	22	0	17
Epeorus	60	0	0	0	0	0	0
| Family: Leptohyphidae	0	0	0	0	0	0	0
Tricorythodes	0	0	0	0	0	0	0
| Family: Leptophlebiidae	140	180	120	420	117	262	279
Neoleptophlebia	0	0	0	0	6	0	0
Paraleptophlebia	0	0	0	5	67	92	0
| Order: Plecoptera	0	0	0	0	0	0	0
| Family: Capniidae	0	0	220	100	172	115	10
| Family: Chloroperlidae	0	0	100	20	0	0	7
Sweltsa	0	0	20	15	33	8	31
| Family: Nemouridae	0	0	0	0	6	0	0
| Family: Perlodidae	0	0	0	5	0	0	0
Isoperla	0	0	0	5	0	8	3
Skwala	0	0	0	5	0	0	0

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Minnow (BC)
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250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Order: Trichoptera	20	0	3,060	265	78	46	28
| Family: Apataniidae	0	0	0	0	0	0	0
Apatania	0	0	0	0	0	15	0
| Family: Hydropsychidae	20	0	0	0	0	0	0
Cheumatopsyche	0	0	0	0	0	0	0
Hydropsyche	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	20	0	0	0	0	0
Hydroptila	40	140	0	0	0	8	0
| Family: Lepidostomatidae	0	0	0	0	0	0	0
Lepidostoma	20	0	20	15	28	0	0
| Family: Leptoceridae	20	60	0	0	0	0	0
Ceraclea	0	0	0	0	0	0	0
| Family: Limnephilidae	0	0	0	5	0	8	14
Onocosmoecus	0	0	0	0	0	0	0
Psychoglypha	0	0	0	0	0	8	0
| Family: Phryganeidae	0	0	0	0	0	8	0
| Family: Polycentropodidae	0	0	20	135	17	23	17
Polycentropus	0	0	0	15	0	0	0
| Family: Rhyacophilidae	0	0	0	0	0	0	0
Rhyacophila	20	0	0	0	0	0	0
Rhyacophila arnaudi	0	40	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	40	10	6	0	3
Bezzia/ Palpomyia	0	0	0	0	0	0	0
Dasyhelea	0	0	0	0	0	0	3
Mallochohelea	0	0	0	5	11	0	0
Probezzia	0	0	0	30	6	15	0

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Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Family: Chironomidae	300	140	20	5	17	0	0
| Subfamily: Chironominae	0	0	0	0	0	0	0
| Tribe: Chironomini	280	0	0	0	0	0	0
Chironomus	0	0	0	0	0	0	0
Microtendipes	240	100	20	5	11	231	3
Phaenopsectra	0	0	0	0	6	0	7
Polypedilum	0	0	0	15	6	8	10
Stictochironomus	0	0	40	0	0	46	0
| Tribe: Tanytarsini	1,280	720	140	10	44	46	17
Micropsectra	40	20	340	95	83	54	72
Paratanytarsus	0	0	0	0	0	0	0
Rheotanytarsus	840	1,300	0	0	0	0	0
Stempellinella	0	0	0	5	6	0	0
Tanytarsus	420	220	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0
Pagastia	0	0	20	0	0	0	3
| Subfamily: Orthocladiinae	380	180	220	5	50	46	7
Brillia	0	0	40	10	33	8	0
Corynoneura	40	40	340	15	6	23	0
Eukiefferiella	0	0	140	5	6	0	0
Heterotrissocladius	0	0	0	0	6	0	0
Nanocladius	0	20	0	0	0	0	0
Orthocladius complex	140	60	80	0	211	208	103
Parakiefferiella	0	0	0	0	6	0	3
Parametriocnemus	20	20	0	0	6	0	0
Psectrocladius	0	0	0	0	11	23	28
Rheocricotopus	0	0	180	5	217	15	3
Synorthocladius	940	440	0	0	0	0	0
Thienemanniella	0	0	0	0	0	0	0
Tvetenia	0	0	0	5	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Subfamily: Tanypodinae	40	60	300	10	94	46	24
Ablabesmyia	0	60	0	5	6	0	0
Labrundinia	20	20	0	0	0	0	0
Paramerina	20	20	0	0	0	0	0
| Tribe: Macropelopiini	0	0	0	0	0	0	0
Psectrotanypus	0	0	0	0	0	15	0
| Tribe: Natarsiini	0	0	0	0	0	0	0
Natarsia	0	0	0	0	0	23	7
| Tribe: Pentaneurini	0	0	0	0	0	0	0
Pentaneura	0	40	0	0	0	0	0
Telmatopelopia	0	0	100	325	150	215	131
Thienemannimyia group	360	240	20	60	61	23	14
| Tribe: Procladiini	0	0	0	0	0	0	0
Procladius	0	0	20	0	17	54	7
| Family: Empididae	0	0	0	0	0	0	0
Chelifera/ Metachela	0	0	0	0	0	0	0
Hemerodromia	20	20	0	0	0	0	0
Neoplasta	0	0	40	0	0	0	3
| Family: Sciomyzidae	0	0	0	0	0	8	0
| Family: Simuliidae	0	0	0	0	0	0	0
| Family: Tabanidae	0	0	0	0	0	0	0
Chrysops	0	20	0	0	0	0	0
| Family: Tipulidae	0	0	0	5	0	0	0
Antocha	100	60	0	0	0	0	0
Hexatoma	0	0	0	0	6	0	0
| Order: Megaloptera	0	0	0	0	0	0	0
| Family: Sialidae	0	0	0	0	6	0	0
Sialis	0	0	20	15	11	31	0
| Order: Odonata	0	0	0	0	0	0	0
| Family: Corduliidae	0	0	0	0	0	0	0
| Order: Thysanoptera	0	0	0	0	0	8	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Subphylum: Chelicerata	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0
| Order: Oribatida	120	80	1,340	65	172	23	28
| Order: Sarcoptiformes	0	0	0	0	0	0	0
| Family: Hydrozetidae	200	260	20	0	0	15	0
| Order: Trombidiformes	0	0	40	0	6	8	0
| Family: Aturidae	0	0	0	0	0	0	0
Aturus	0	0	0	0	6	8	14
Ljania	0	0	20	45	6	0	10
| Family: Feltriidae	0	0	0	0	0	0	0
Feltria	0	0	0	0	0	0	7
| Family: Hydrodromidae	0	0	0	0	0	0	0
Hydrodroma	0	20	20	0	0	0	0
| Family: Hydrovolzioidea	60	0	0	0	6	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0
Atractides	40	0	20	0	0	0	0
Hygrobates	0	0	20	0	0	8	3
| Family: Lebertiidae	0	0	0	0	0	0	0
Lebertia	40	40	0	0	0	0	0
| Family: Pionidae	0	0	0	0	6	15	0
| Family: Sperchontidae	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0
Sperchonopsis	0	0	0	0	6	0	3
Subphylum: Crustacea	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0
| Order: Amphipoda	20	140	0	0	0	0	0
| Family: Gammaridae	0	0	0	0	0	0	0
Gammarus	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0
Hyalella	120	120	0	0	0	0	0
Phylum: Annelida	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Order: Hirudinida	0	0	0	0	0	0	0
| Family: Glossiphoniidae	0	0	0	0	0	0	0
Helobdella stagnalis	140	20	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0
Enchytraeus	0	0	40	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0
Chaetogaster	20	40	0	0	0	0	0
Limnodrilus	0	0	0	0	11	146	28
Nais	100	300	0	0	11	0	0
Pristina	0	20	0	0	0	0	0
Rhyacodrilus	0	0	0	15	6	785	62
Slavina appendiculata	0	0	0	0	0	0	0
Stylaria lacustris	0	40	0	0	0	0	0
Uncinais uncinata	0	0	0	0	0	0	0
Vejdovskyella	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0
Hydra	140	20	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	15	0
Pisidium	0	0	0	0	0	0	3
| Class: Gastropoda	440	720	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0
| Family: Lymnaeidae	980	500	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Fossaria	140	20	0	0	0	0	0
| Family: Physidae	0	0	0	0	0	0	0
Physella	0	0	0	0	0	8	0
| Family: Planorbidae	60	380	0	0	0	23	3
Gyraulus	0	0	0	0	0	0	0
Totals:	**10,860**	**8,360**	**7,460**	**2,080**	**2,126**	**2,902**	**1,121**
Taxa present but not included:							
Phylum: Arthropoda	0	0	0	0	0	0	0
| Class: Copepoda	0	20	20	5	0	8	3
Subphylum: Crustacea	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0
| Order: Cladocera	0	20	0	5	6	8	3
| Class: Ostracoda	0	20	20	5	6	8	0
Phylum: Annelida	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0
| Family: Lumbricidae	0	0	0	0	6	0	0
Phylum: Nemata	0	20	20	5	6	8	3
Totals:	0	**80**	**60**	**20**	**24**	**32**	**9**

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Phylum: Arthropoda	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0
| Family: Elmidae	383	737	970	810	477	1,667	4,000	6,133
Heterlimnius	0	0	0	0	0	0	0	0
Narpus	0	0	0	0	0	0	0	0
Optioservus	133	333	0	190	430	767	960	2,200
| Order: Ephemeroptera	0	0	0	0	0	0	0	0
| Family: Ameletidae	0	0	0	0	0	0	0	0
Ameletus	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	47	47	0	0	133
Diphetor hageni	0	0	0	0	0	0	0	67
Procloeon	0	0	0	0	47	0	43	0
| Family: Ephemerellidae	0	0	0	0	0	0	0	0
Drunella grandis group	0	0	0	0	0	0	0	0
Ephemerella	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0
Epeorus	0	0	60	0	47	33	0	67
| Family: Leptohyphidae	0	0	0	0	0	0	0	0
Tricorythodes	33	47	0	0	0	0	0	0
| Family: Leptophlebiidae	233	190	183	143	143	33	750	333
Neoleptophlebia	0	0	0	0	0	0	0	0
Paraleptophlebia	0	0	30	47	97	0	167	0
| Order: Plecoptera	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0
| Family: Perlodidae	0	0	0	0	0	0	0	0
Isoperla	0	0	0	0	0	0	0	0
Skwala	0	0	0	0	0	0	0	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Order: Trichoptera	0	0	0	47	0	0	0	0
| Family: Apataniidae	0	0	0	0	0	0	0	0
Apatania	0	0	0	0	0	0	0	0
| Family: Hydropsychidae	67	47	60	190	0	67	0	67
Cheumatopsyche	50	120	183	190	0	133	0	67
Hydropsyche	0	0	0	0	0	100	0	0
| Family: Hydroptilidae	0	0	0	97	0	33	0	0
Hydroptila	0	23	0	570	97	0	0	67
| Family: Lepidostomatidae	0	0	0	0	0	0	0	0
Lepidostoma	33	0	0	47	47	67	43	133
| Family: Leptoceridae	17	0	0	143	143	0	83	67
Ceraclea	33	23	0	0	0	0	0	0
| Family: Limnephilidae	0	0	0	47	0	0	0	0
Onocosmoecus	0	0	30	0	0	33	0	0
Psychoglypha	0	0	0	0	0	0	0	0
| Family: Phryganeidae	0	0	0	0	0	0	0	0
| Family: Polycentropodidae	0	0	0	0	0	0	0	0
Polycentropus	0	0	0	0	0	0	0	0
| Family: Rhyacophilidae	0	0	0	0	0	0	0	0
Rhyacophila	0	0	0	0	0	0	0	0
Rhyacophila arnaudi	0	0	0	0	0	0	0	200
| Order: Diptera	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	0	0	0	0	0	67
Dasyhelea	0	0	0	0	0	0	0	0
Mallochohelea	0	0	0	0	0	0	0	0
Probezzia	0	0	0	0	0	0	0	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Family: Chironomidae	0	143	150	523	667	267	210	800
| Subfamily: Chironominae	0	0	0	0	0	0	0	0
| Tribe: Chironomini	50	97	483	190	3,523	0	0	267
Chironomus	0	0	0	0	0	0	0	67
Microtendipes	50	70	150	190	380	133	83	67
Phaenopsectra	0	0	0	0	0	0	0	0
Polypedilum	0	0	30	0	0	0	0	0
Stictochironomus	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	17	0	90	380	523	300	250	1,600
Micropsectra	0	47	60	287	0	133	43	267
Paratanytarsus	0	0	0	0	47	0	0	0
Rheotanytarsus	217	523	757	3,713	1,667	1,533	43	2,400
Stempellinella	0	0	0	0	0	0	0	0
Tanytarsus	67	190	243	190	713	133	127	867
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0
Pagastia	67	0	60	143	0	0	0	0
| Subfamily: Orthocladiinae	100	167	483	333	97	233	83	333
Brillia	0	0	0	0	0	0	0	0
Corynoneura	17	23	183	143	47	0	0	67
Eukiefferiella	0	0	0	0	0	0	0	67
Heterotrissocladius	50	0	60	97	0	0	43	0
Nanocladius	0	0	0	0	0	0	0	0
Orthocladius complex	317	97	850	1,620	333	100	167	733
Parakiefferiella	0	0	0	0	0	0	0	0
Parametriocnemus	0	70	60	143	0	233	43	67
Psectrocladius	0	0	0	0	0	0	0	0
Rheocricotopus	0	0	0	0	0	0	0	0
Synorthocladius	233	477	970	857	1,143	900	917	2,533
Thienemanniella	0	23	0	47	47	0	0	0
Tvetenia	0	23	0	47	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Subfamily: Tanypodinae	0	23	0	0	97	67	43	0
Ablabesmyia	0	0	30	97	97	100	167	133
Labrundinia	0	0	0	0	0	0	43	0
Paramerina	0	23	0	0	0	33	43	0
| Tribe: Macropelopiini	0	0	0	0	0	0	0	0
Psectrotanypus	0	0	0	0	0	0	0	0
| Tribe: Natarsiini	0	0	0	0	0	0	0	0
Natarsia	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0
Pentaneura	17	0	0	0	97	33	0	0
Telmatopelopia	0	0	0	0	0	0	0	0
Thienemannimyia group	467	1,070	1,303	1,667	1,620	1,067	1,083	1,000
| Tribe: Procladiini	0	0	0	0	0	0	0	0
Procladius	0	0	0	0	0	0	43	0
| Family: Empididae	0	0	0	0	0	0	0	0
Chelifera/ Metachela	17	0	0	0	0	0	0	0
Hemerodromia	300	97	90	190	0	67	0	67
Neoplasta	0	0	90	0	0	0	0	0
| Family: Sciomyzidae	0	0	0	0	0	0	0	0
| Family: Simuliidae	0	0	0	0	0	0	0	67
| Family: Tabanidae	0	0	0	0	0	0	0	0
Chrysops	0	0	30	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	33	0	67
Antocha	150	97	0	47	0	367	250	333
Hexatoma	0	0	0	0	0	0	0	0
| Order: Megaloptera	0	0	0	0	0	0	0	0
| Family: Sialidae	0	0	0	0	0	0	0	0
Sialis	0	0	0	47	0	0	0	0
| Order: Odonata	0	0	0	0	0	0	0	0
| Family: Corduliidae	0	23	0	0	0	0	0	0
| Order: Thysanoptera	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Subphylum: Chelicerata	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0
| Order: Oribatida	133	310	453	857	237	200	710	533
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	83	167	333	713	190	133	750	933
| Order: Trombidiformes	0	0	0	0	0	0	43	67
| Family: Aturidae	0	0	0	0	0	0	0	0
Aturus	0	0	0	0	0	0	0	0
Ljania	0	0	0	0	0	0	0	0
| Family: Feltriidae	0	0	0	0	0	0	0	0
Feltria	0	0	0	0	0	0	0	0
| Family: Hydrodromidae	0	0	0	0	0	0	0	0
Hydrodroma	0	0	0	0	97	0	0	0
| Family: Hydrovolzioidea	0	0	0	0	0	0	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0	0
Atractides	0	0	30	0	0	0	0	200
Hygrobates	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0
Lebertia	50	70	60	47	47	33	43	200
| Family: Pionidae	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0
Sperchon	0	23	0	0	0	0	0	67
Sperchonopsis	0	0	0	0	0	0	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0
| Order: Amphipoda	50	190	30	0	0	0	0	467
| Family: Gammaridae	0	0	0	0	0	0	0	0
Gammarus	33	143	90	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	1,000
Phylum: Annelida	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
| Order: Hirudinida	0	0	0	0	0	0	0	0
| Family: Glossiphoniidae	0	0	0	0	0	0	0	0
Helobdella stagnalis	0	0	0	190	0	0	0	67
| Class: Oligochaeta	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0	0
Enchytraeus	367	333	0	523	0	0	0	133
| Family: Naididae	0	0	0	0	0	0	0	0
Chaetogaster	0	23	60	143	47	0	43	0
Limnodrilus	0	0	1,000	0	190	0	43	0
Nais	83	97	333	713	97	33	127	200
Pristina	0	0	0	0	47	0	0	0
Rhyacodrilus	0	0	60	0	0	33	0	0
Slavina appendiculata	0	0	30	0	0	0	0	0
Stylaria lacustris	0	0	150	47	0	0	0	0
Uncinais uncinata	0	0	0	0	97	0	0	0
Vejdovskyella	0	0	0	0	47	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0
Hydra	33	0	30	0	0	0	43	0
Phylum: Mollusca	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0
| Class: Gastropoda	800	1,047	453	430	1,047	1,167	833	1,467
| Order: Basommatophora	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	383	430	183	287	570	100	377	1,067

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-R1	HAC-U	HAC-U	HAC-U
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC #:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Fossaria	0	70	0	97	380	0	0	67
| Family: Physidae	0	0	0	0	0	0	0	67
Physella	0	0	0	0	0	0	0	0
| Family: Planorbidae	100	97	243	0	333	200	543	2,333
Gyraulus	17	70	30	0	0	0	43	133
Totals:	**5,250**	**7,873**	**11,260**	**17,563**	**16,093**	**10,567**	**13,330**	**30,400**
Taxa present but not included:								
Phylum: Arthropoda	0	0	0	0	0	0	0	0
| Class: Copepoda	17	23	30	0	47	33	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0
| Order: Cladocera	17	0	0	0	47	0	43	0
| Class: Ostracoda	17	23	30	0	47	33	43	0
Phylum: Annelida	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0
| Family: Lumbricidae	0	0	0	0	0	0	0	0
Phylum: Nemata	0	23	30	47	47	0	43	0
Totals:	**50**	**70**	**90**	**47**	**187**	**67**	**130**	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Phylum: Arthropoda	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0
| Family: Elmidae	4,133	2,667	573	520	616	276	283
Heterlimnius	0	0	0	0	0	0	11
Narpus	0	0	72	18	0	0	0
Optioservus	3,867	2,000	143	90	140	29	50
| Order: Ephemeroptera	0	0	0	0	0	29	0
| Family: Ameletidae	0	0	0	0	0	0	0
Ameletus	0	0	72	125	79	0	0
| Family: Baetidae	67	0	0	0	22	29	0
Diphetor hageni	0	0	0	0	0	0	0
Procloeon	0	0	0	0	0	0	0
| Family: Ephemerellidae	0	0	0	0	0	0	0
Drunella grandis group	0	0	0	0	0	0	36
Ephemerella	0	0	0	0	22	0	0
| Family: Heptageniidae	0	0	72	323	79	0	61
Epeorus	200	0	0	0	0	0	0
| Family: Leptohyphidae	0	0	0	0	0	0	0
Tricorythodes	0	0	0	0	0	0	0
| Family: Leptophlebiidae	467	600	430	1,505	419	939	1,000
Neoleptophlebia	0	0	0	0	22	0	0
Paraleptophlebia	0	0	0	18	240	330	0
| Order: Plecoptera	0	0	0	0	0	0	0
| Family: Capniidae	0	0	789	358	616	412	36
| Family: Chloroperlidae	0	0	358	72	0	0	25
Sweltsa	0	0	72	54	118	29	111
| Family: Nemouridae	0	0	0	0	22	0	0
| Family: Perlodidae	0	0	0	18	0	0	0
Isoperla	0	0	0	18	0	29	11
Skwala	0	0	0	18	0	0	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Order: Trichoptera	67	0	10,968	950	280	165	100
| Family: Apataniidae	0	0	0	0	0	0	0
Apatania	0	0	0	0	0	54	0
| Family: Hydropsychidae	67	0	0	0	0	0	0
Cheumatopsyche	0	0	0	0	0	0	0
Hydropsyche	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	67	0	0	0	0	0
Hydroptila	133	467	0	0	0	29	0
| Family: Lepidostomatidae	0	0	0	0	0	0	0
Lepidostoma	67	0	72	54	100	0	0
| Family: Leptoceridae	67	200	0	0	0	0	0
Ceraclea	0	0	0	0	0	0	0
| Family: Limnephilidae	0	0	0	18	0	29	50
Onocosmoecus	0	0	0	0	0	0	0
Psychoglypha	0	0	0	0	0	29	0
| Family: Phryganeidae	0	0	0	0	0	29	0
| Family: Polycentropodidae	0	0	72	484	61	82	61
Polycentropus	0	0	0	54	0	0	0
| Family: Rhyacophilidae	0	0	0	0	0	0	0
Rhyacophila	67	0	0	0	0	0	0
Rhyacophila arnaudi	0	133	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	143	36	22	0	11
Bezzia/ Palpomyia	0	0	0	0	0	0	0
Dasyhelea	0	0	0	0	0	0	11
Mallochohelea	0	0	0	18	39	0	0
Probezzia	0	0	0	108	22	54	0

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Family: Chironomidae	1,000	467	72	18	61	0	0
| Subfamily: Chironominae	0	0	0	0	0	0	0
| Tribe: Chironomini	933	0	0	0	0	0	0
Chironomus	0	0	0	0	0	0	0
Microtendipes	800	333	72	18	39	828	11
Phaenopsectra	0	0	0	0	22	0	25
Polypedilum	0	0	0	54	22	29	36
Stictochironomus	0	0	143	0	0	165	0
| Tribe: Tanytarsini	4,267	2,400	502	36	158	165	61
Micropsectra	133	67	1,219	341	297	194	258
Paratanytarsus	0	0	0	0	0	0	0
Rheotanytarsus	2,800	4,333	0	0	0	0	0
Stempellinella	0	0	0	18	22	0	0
Tanytarsus	1,400	733	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0
Pagastia	0	0	72	0	0	0	11
| Subfamily: Orthocladiinae	1,267	600	789	18	179	165	25
Brillia	0	0	143	36	118	29	0
Corynoneura	133	133	1,219	54	22	82	0
Eukiefferiella	0	0	502	18	22	0	0
Heterotrissocladius	0	0	0	0	22	0	0
Nanocladius	0	67	0	0	0	0	0
Orthocladius complex	467	200	287	0	756	746	369
Parakiefferiella	0	0	0	0	22	0	11
Parametriocnemus	67	67	0	0	22	0	0
Psectrocladius	0	0	0	0	39	82	100
Rheocricotopus	0	0	645	18	778	54	11
Synorthocladius	3,133	1,467	0	0	0	0	0
Thienemanniella	0	0	0	0	0	0	0
Tvetenia	0	0	0	18	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Subfamily: Tanypodinae	133	200	1,075	36	337	165	86
Ablabesmyia	0	200	0	18	22	0	0
Labrundinia	67	67	0	0	0	0	0
Paramerina	67	67	0	0	0	0	0
| Tribe: Macropelopiini	0	0	0	0	0	0	0
Psectrotanypus	0	0	0	0	0	54	0
| Tribe: Natarsiini	0	0	0	0	0	0	0
Natarsia	0	0	0	0	0	82	25
| Tribe: Pentaneurini	0	0	0	0	0	0	0
Pentaneura	0	133	0	0	0	0	0
Telmatopelopia	0	0	358	1,165	538	771	470
Thienemannimyia group	1,200	800	72	215	219	82	50
| Tribe: Procladiini	0	0	0	0	0	0	0
Procladius	0	0	72	0	61	194	25
| Family: Empididae	0	0	0	0	0	0	0
Chelifera/ Metachela	0	0	0	0	0	0	0
Hemerodromia	67	67	0	0	0	0	0
Neoplasta	0	0	143	0	0	0	11
| Family: Sciomyzidae	0	0	0	0	0	29	0
| Family: Simuliidae	0	0	0	0	0	0	0
| Family: Tabanidae	0	0	0	0	0	0	0
Chrysops	0	67	0	0	0	0	0
| Family: Tipulidae	0	0	0	18	0	0	0
Antocha	333	200	0	0	0	0	0
Hexatoma	0	0	0	0	22	0	0
| Order: Megaloptera	0	0	0	0	0	0	0
| Family: Sialidae	0	0	0	0	22	0	0
Sialis	0	0	72	54	39	111	0
| Order: Odonata	0	0	0	0	0	0	0
| Family: Corduliidae	0	0	0	0	0	0	0
| Order: Thysanoptera	0	0	0	0	0	29	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Subphylum: Chelicerata	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0
| Order: Oribatida	400	267	4,803	233	616	82	100
| Order: Sarcoptiformes	0	0	0	0	0	0	0
| Family: Hydrozetidae	667	867	72	0	0	54	0
| Order: Trombidiformes	0	0	143	0	22	29	0
| Family: Aturidae	0	0	0	0	0	0	0
Aturus	0	0	0	0	22	29	50
Ljania	0	0	72	161	22	0	36
| Family: Feltriidae	0	0	0	0	0	0	0
Feltria	0	0	0	0	0	0	25
| Family: Hydrodromidae	0	0	0	0	0	0	0
Hydrodroma	0	67	72	0	0	0	0
| Family: Hydrovolzioidea	200	0	0	0	22	0	0
| Family: Hygrobatidae	0	0	0	0	0	0	0
Atractides	133	0	72	0	0	0	0
Hygrobates	0	0	72	0	0	29	11
| Family: Lebertiidae	0	0	0	0	0	0	0
Lebertia	133	133	0	0	0	0	0
| Family: Pionidae	0	0	0	0	22	54	0
| Family: Sperchontidae	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0
Sperchonopsis	0	0	0	0	22	0	11
Subphylum: Crustacea	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0
| Order: Amphipoda	67	467	0	0	0	0	0
| Family: Gammaridae	0	0	0	0	0	0	0
Gammarus	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0
Hyalella	400	400	0	0	0	0	0
Phylum: Annelida	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
| Order: Hirudinida	0	0	0	0	0	0	0
| Family: Glossiphoniidae	0	0	0	0	0	0	0
Helobdella stagnalis	467	67	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0
| Family: Enchytraeidae	0	0	0	0	0	0	0
Enchytraeus	0	0	143	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0
Chaetogaster	67	133	0	0	0	0	0
Limnodrilus	0	0	0	0	39	523	100
Nais	333	1,000	0	0	39	0	0
Pristina	0	67	0	0	0	0	0
Rhyacodrilus	0	0	0	54	22	2,814	222
Slavina appendiculata	0	0	0	0	0	0	0
Stylaria lacustris	0	133	0	0	0	0	0
Uncinais uncinata	0	0	0	0	0	0	0
Vejdovskyella	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0
Hydra	467	67	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	54	0
Pisidium	0	0	0	0	0	0	11
| Class: Gastropoda	1,467	2,400	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0
| Family: Lymnaeidae	3,267	1,667	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	HAC-U	HAC-U	EDC-U	EDC-U	EDC-U	EDC-U	EDC-U
Replicate:	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC #:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Fossaria	467	67	0	0	0	0	0
| Family: Physidae	0	0	0	0	0	0	0
Physella	0	0	0	0	0	29	0
| Family: Planorbidae	200	1,267	0	0	0	82	11
Gyraulus	0	0	0	0	0	0	0
Totals:	**36,200**	**27,867**	**26,738**	**7,455**	**7,620**	**10,401**	**4,018**
Taxa present but not included:							
Phylum: Arthropoda	0	0	0	0	0	0	0
| Class: Copepoda	0	67	72	18	0	29	11
Subphylum: Crustacea	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0
| Order: Cladocera	0	67	0	18	22	29	11
| Class: Ostracoda	0	67	72	18	22	29	0
Phylum: Annelida	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0
| Family: Lumbricidae	0	0	0	0	22	0	0
Phylum: Nemata	0	67	72	18	22	29	11
Totals:	**0**	**267**	**215**	**72**	**86**	**115**	**32**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.4) due to differences in rounding.

Raw Benthic Invertebrate Biomass Results (g), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow Environmental (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	MP_HAC-R1	MP_HAC-R1	MP_HAC-R1	MP_HAC-R1	MP_HAC-R1	MP_HAC-U	MP_HAC-U	MP_HAC-U
Sample:	HESS-1_2024-08	HESS-2_2024-08	HESS-3_2024-08	HESS-4_2024-08	HESS-5_2024-08	HESS-1_2024-08	HESS-2_2024-08	HESS-3_2024-08
Sample Collection Date:	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
CC#:	CC250313	CC250314	CC250315	CC250316	CC250317	CC250318	CC250319	CC250320
Mesh:	250	250	250	250	250	250	250	250
Sub-sample %	20	14	11	7	7	10	8	5
Dry Biomass Analysis (g)								
Sample Total Dry Weight								
All organisms	0.3480	0.4021	0.3064	1.1843	0.5200	0.2190	0.2050	0.7240
Raw Dry Weight								
All organisms	0.0696	0.0563	0.0337	0.0829	0.0364	0.0219	0.0164	0.0362
Measured Weight								
All organisms	0.2085	0.1948	0.1726	0.2217	0.175	0.1624	0.1541	0.1757
Mesh Weight	0							
All organisms	0.1389	0.1385	0.1389	0.1388	0.1386	0.1405	0.1377	0.1395
Wet Biomass Analysis (g)								
Sample Total Wet Weight (g)								
All organisms	0.2621	0.2120	0.1808	0.2889	0.1358	0.1574	0.0851	0.1796
Mesh Weight								
Corrected Wet Weight								
All organisms	1.3105	1.5143	1.6436	4.1271	1.9400	1.5740	1.0638	3.5920
Raw Wet Weight								
All organisms	0.6862	0.6361	0.6049	0.7145	0.5614	0.583	0.5149	0.6094

Raw Benthic Invertebrate Biomass Results (g), Mount Polley Mine

Project: 24-01-6 (MPMC Creek CEMP)
Minnow Environmental (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	MP_HAC-U	MP_HAC-U	MP_EDC-U	MP_EDC-U	MP_EDC-U	MP_EDC-U	MP_EDC-U
Sample:	HESS-4_2024-08	HESS-5_2024-08	SURB-1_2024-08	SURB-2_2024-08	SURB-3_2024-08	SURB-4_2024-08	SURB-5_2024-08
Sample Collection Date:	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
CC#:	CC250321	CC250322	CC250323	CC250324	CC250325	CC250326	CC250327
Mesh:	250	250	250	250	250	250	250
Sub-sample %	5	5	5	20	18	13	29
Dry Biomass Analysis (g)							
Sample Total Dry Weight							
All organisms	1.1120	0.7120	0.5980	0.2485	0.0761	1.1731	0.8169
Raw Dry Weight							
All organisms	0.0556	0.0356	0.0299	0.0497	0.0137	0.1525	0.2369
Measured Weight							
All organisms	0.1959	0.1752	0.169	0.1882	0.153	0.2909	0.3758
Mesh Weight							
All organisms	0.1403	0.1396	0.1391	0.1385	0.1393	0.1384	0.1389
Wet Biomass Analysis (g)							
Sample Total Wet Weight (g)							
All organisms	0.1877	0.1541	0.1153	0.3369	0.0886	0.7014	1.0183
Mesh Weight							
Corrected Wet Weight							
All organisms	3.7540	3.0820	2.3060	1.6845	0.4922	5.3954	3.5114
Raw Wet Weight							
All organisms	0.6175	0.5826	0.5438	0.7662	0.5179	1.13	1.4464

BENTHIC INVERTEBRATE COMMUNITY

Cordillera Methods, QC Report, and Results 24-04-7

(Finalized November 12, 2024)

Methods and QC Report 2024

Project ID: 24-04-7 (MPMC Lake Sediment and BIC)

Client: Minnow Environmental

Prepared by:
Cordillera Consulting Inc.
Summerland, BC
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Sample Reception

On September 4, 2024, Cordillera Consulting received 30 benthic samples from Minnow Environmental. When samples arrived to Cordillera Consulting, exterior packaging was initially inspected for damage or wet spots that would have indicated damage to the interior containers.

Samples were logged into a proprietary software database (INSTAR1) where the clients assigned sample name was recorded along with a Cordillera Consulting (CC) number for cross-reference. Each sample was checked to ensure that all sites and replicates recorded on field sheets or packing lists were delivered intact and with adequate preservative. Any missing, mislabelled or extra samples were reported to the client immediately to confirm the total numbers and correct names on the sample jars. The client representative was notified of the arrival of the shipment and provided a sample inventory once intake was completed.
See table below for sample inventory:

Table 1: Summary of sample information including Cordillera Consulting (CC) number

Sample	CC#	Date	Size	# of Jars
MP_QUL-PNF_PON-1_2024-08	CC250492	08/23/2024	250 µM	1
MP_QUL-PNF_PON-2_2024-08	CC250493	08/23/2024	250 µM	1
MP_QUL-PNF_PON-3_2024-08	CC250494	08/24/2024	250 µM	1
MP_QUL-PNF_PON-4_2024-08	CC250495	08/24/2024	250 µM	1
MP_QUL-PNF_PON-5_2024-08	CC250496	08/24/2024	250 µM	1
MP_QUL-PFF1_PON-1_2024-08	CC250497	08/21/2024	250 µM	1
MP_QUL-PFF1_PON-2_2024-08	CC250498	08/21/2024	250 µM	1
MP_QUL-PFF1_PON-3_2024-08	CC250499	08/21/2024	250 µM	1
MP_QUL-PFF1_PON-4_2024-08	CC250500	08/21/2024	250 µM	1
MP_QUL-PFF1_PON-5_2024-08	CC250501	08/22/2024	250 µM	1
MP_QUL-PREF1-PON-1_2024-08	CC250502	08/22/2024	250 µM	1
MP_QUL-PREF1-PON-2_2024-08	CC250503	08/22/2024	250 µM	1
MP_QUL-PREF1-PON-3_2024-08	CC250504	08/22/2024	250 µM	1
MP_QUL-PREF1-PON-4_2024-08	CC250505	08/23/2024	250 µM	1
MP_QUL-PREF1-PON-5_2024-08	CC250506	08/23/2024	250 µM	1
MP_BOL-B2_PON-1_2024-08	CC250507	08/19/2024	250 µM	1

MP_BOL-B2_PON-2_2024-08	CC250508	08/20/2024	250 µM	1
MP_BOL-B2_PON-3_2024-08	CC250509	08/20/2024	250 µM	1
MP_BOL-B2_PON-4_2024-08	CC250510	08/20/2024	250 µM	1
MP_BOL-B2_PON-5_2024-08	CC250511	08/20/2024	250 µM	1
MP_POL-P1_PON-1_2024-08	CC250512	08/22/2024	250 µM	1
MP_POL-P1_PON-2_2024-08	CC250513	08/22/2024	250 µM	1
MP_POL-P1_PON-3_2024-08	CC250514	08/23/2024	250 µM	1
MP_POL-P1_PON-4_2024-08	CC250515	08/23/2024	250 µM	1
MP_POL-P1_PON-5_2024-08	CC250516	08/23/2024	250 µM	1
MP_POL-P2_PON-1_2024-08	CC250517	08/21/2024	250 µM	1
MP_POL-P2_PON-2_2024-08	CC250518	08/21/2024	250 µM	1
MP_POL-P2_PON-3_2024-08	CC250519	08/22/2024	250 µM	1
MP_POL-P2_PON-4_2024-08	CC250520	08/24/2024	250 µM	1
MP_POL-P2_PON-5_2024-08	CC250521	08/24/2024	250 µM	1

Sample Sorting

- Using a gridded Petri dish, fine forceps and a low power stereo-microscope (Olympus, Nikon, Leica) the sorting technicians removed the invertebrates and sorted them into family/orders.
- The sorting technician kept a running tally of total numbers excluding organisms from Porifera, Nemata, Platyhelminthes, Ostracoda, Copepoda, Cladocera and terrestrial drop-ins such as aphids. These organisms were marked for their presence (given a value of 1) only and left in the sample. They were not included towards the 300-organism subsample count.
- Where specimens are broken or damaged, only heads were counted.
- Subsampling was conducted with the use of a Marchant Box.
- When using the Marchant box, cells were extracted at the same time in the order indicated by a random number table. If the 300th organism was found part way into sorting a cell then the balance of that cell was sorted. If the organism count had not reached 300 by the 50th cell then the entire sample was sorted.
- The total number of cells sorted and the number of organisms removed were recorded manually on a bench sheet and then recorded into INSTAR1
- Organisms were stored in vials containing 80% ethanol and an interior label indicating the site names, date of sampling, site code numbers and portion

subsampled. This information was also recorded on the laboratory bench sheet and on INSTAR1.

- The sorted portion of the debris was preserved and labeled separately from the unsorted portion and was tested for sorting efficiency (Sorting Quality Control – Sorting Efficiency). The unsorted portion was also labeled and preserved in separate jars.

Percent sub-sampled and total countable invertebrates pulled from the samples were summarized in the table below.

Table 2: Percent sub-sample and invertebrate count for each sample

Sample	Date	CC#	250 micron fraction	
			% Sampled	# Invertebrates
MP_QUL-PNF_PON-1_2024-08	23-Aug-24	CC250492	100%	25
MP_QUL-PNF_PON-2_2024-08	23-Aug-24	CC250493	100%	38
MP_QUL-PNF_PON-3_2024-08	24-Aug-24	CC250494	100%	35
MP_QUL-PNF_PON-4_2024-08	24-Aug-24	CC250495	100%	40
MP_QUL-PNF_PON-5_2024-08	24-Aug-24	CC250496	100%	37
MP_QUL-PFF1_PON-1_2024-08	21-Aug-24	CC250497	100%	46
MP_QUL-PFF1_PON-2_2024-08	21-Aug-24	CC250498	100%	32
MP_QUL-PFF1_PON-3_2024-08	21-Aug-24	CC250499	100%	33
MP_QUL-PFF1_PON-4_2024-08	21-Aug-24	CC250500	100%	45
MP_QUL-PFF1_PON-5_2024-08	22-Aug-24	CC250501	100%	28
MP_QUL-PREF1-PON-1_2024-08	22-Aug-24	CC250502	50%	322
MP_QUL-PREF1-PON-2_2024-08	22-Aug-24	CC250503	100%	362
MP_QUL-PREF1-PON-3_2024-08	22-Aug-24	CC250504	100%	459
MP_QUL-PREF1-PON-4_2024-08	23-Aug-24	CC250505	100%	228
MP_QUL-PREF1-PON-5_2024-08	23-Aug-24	CC250506	100%	220
MP_BOL-B2_PON-1_2024-08	19-Aug-24	CC250507	100%	248
MP_BOL-B2_PON-2_2024-08	20-Aug-24	CC250508	100%	292
MP_BOL-B2_PON-3_2024-08	20-Aug-24	CC250509	100%	315
MP_BOL-B2_PON-4_2024-08	20-Aug-24	CC250510	100%	217
MP_BOL-B2_PON-5_2024-08	20-Aug-24	CC250511	100%	217
MP_POL-P1_PON-1_2024-08	22-Aug-24	CC250512	100%	188
MP_POL-P1_PON-2_2024-08	22-Aug-24	CC250513	100%	167
MP_POL-P1_PON-3_2024-08	23-Aug-24	CC250514	100%	233
MP_POL-P1_PON-4_2024-08	23-Aug-24	CC250515	100%	152
MP_POL-P1_PON-5_2024-08	23-Aug-24	CC250516	100%	115
MP_POL-P2_PON-1_2024-08	21-Aug-24	CC250517	100%	68
MP_POL-P2_PON-2_2024-08	21-Aug-24	CC250518	100%	69
MP_POL-P2_PON-3_2024-08	22-Aug-24	CC250519	100%	132

MP_POL-P2_PON-4_2024-08	24-Aug-24	CC250520	100%	63
MP_POL-P2_PON-5_2024-08	24-Aug-24	CC250521	100%	120

Sorting Quality Control - Sorting Efficiency

As a part of Cordillera's laboratory policy, all projects undergo sorting efficiency checks.

- As sorting progresses, 10% of samples were randomly chosen by senior members of the sorting team for resorting.
- All sorters working on a project had at least 1 sample resorted by another sorter.
- An efficiency of 90 % was expected (95% for CABIN samples).
- If 90/95% efficiency was not met, samples from that sorter were resorted.
- To calculated sorting efficiency the following formula was used:

$$\frac{\#OrganismsMissed}{TotalOrganismsFound} * 100 = \%OM$$

Table 3 Summary of sorting efficiency

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 1, CC# - CC250492, Percent sampled = 100%, Sieve size = 250			
No Invertebrates Found	1		
Total:	**1**	25	100.00%

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 2, CC# - CC250497, Percent sampled = 100%, Sieve size = 250			
Oligochaeta	1		
Total:	**1**	46	97.83%

		Total from Sample	Percent Efficiency
Site - QC, Sample - QC 3, CC# - CC250498, Percent sampled = 100%, Sieve size = 250			
Chironomidae	6		

Diptera	1		
Total:	**7**	32	78.13%

Sorting Quality Control - Sub-Sampling QC

Certain Provincial and Mining projects require additional sorting checks in the form of sub-sampling QC, (Environmental Effects Monitoring (EEM) protocol). This ensured that any fraction of the total sample that was examined was actually an accurate representation of the number of total organisms. Organisms from the additional sub-samples were not identified; rather total organism count only was compared.

Sub-Sampling efficiency was measured on 10% of the number of sub-sampled samples in the project. Ex. In a project where 50 of 100 total samples were processed through subsampling using a Marchant box, then 10% of 50; or 5 samples were used for sub sampling efficiency.

Sub-Sampling efficiency was performed by fractioning the entire sample into sub-sample percentages. On each sub-sampled portion, a total organism count was recorded and compared to the rest of the sub-samples. In order to pass, all fractions were required to be within 20% of total organism count.

Example: If 300 organisms are found in 10% of the sample, the sorter will continue to sample in 10% fractions until the entire sample is separated. They will then count the total number of organisms in each of the 10 fractions of 10% and compare the organism count.

When divergence is >20% the sorting manager examines for the source of the problem and takes steps to correct it. With the Marchant box, the problem typically rested with how the box is flipped back to the upright position. For this reason, subsampling was performed by experienced employees only. Another common source of error would be the type of debris in the sample. Samples with algae or heavy with periphyton have a higher incident of failure due to clumping than clear samples.

Table 4 Summary of Sub Sample Efficiency

Station ID		Organisms in Subsample																				Sorter		Actual Total	Precision		Accuracy	
CC#	Sample Name	1	2	3	4																	By	Time		Percent Range		Min	Max
250502 (50%)	MP_QUL-PREF1-PON-1_2024-08	325	306																			VWA	200	631	5.85	5.85	3.01	3.01
250503 (100%)	MP_QUL-PREF1-PON-2_2024-08	94	93	90	85																	MP	60	362	1.06	9.57	0.55	6.08

Taxonomic Effort

The next procedure was the identification to genus-species level where possible of all the organisms in the sample.

- Identifications were made at the genus/species level for all insect organisms found including Chironomidae (Based on CABIN protocol).
- Non-insect organisms (except those not included in CABIN count) were identified to genus/species where possible and to a minimum of family level with intact and mature specimens.
- The Standard Taxonomic Effort lists compiled by the CABIN manual[1], SAFIT[2] , and PNAMP[3] were used as a guide line for what level of identification to achieve where the condition and maturity of the organism enabled.
- Organisms from the same families/order were kept in separate vials with 80% ethanol and an interior label of printed laser paper.
- Chironomidae was identified to genus/species level where possible and was aided by slide mounts. CMC-10 was used to clear and mount the slide.
- Oligochaetes was identified to family/genus level with the aid of slide mounts. CMC-10 was used to clear and mount the slide.
- Other Annelida (leeches, polychaetes) were identified to the family/genus/species level with undamaged, mature specimens.
- Mollusca was identified to family and genus/species where possible
- Decapoda, Amphipoda and Isopoda were identified at family/genus/species level where possible.
- Bryozoans and Nemata remained at the phylum level
- Hydrachnidae and Cnidaria were identified at the family/genus level where possible.
- When requested, reference collections were made containing at least one individual from each taxa listed. Organisms represented will have been identified to the lowest practical level.
- Reference collection specimens were stored in 55 mm glass vials with screw-cap lids with polyseal inserts (museum quality). They were labeled with taxa name, site code, date identified and taxonomist name. The same information was applied to labels on the slide mounts.

Taxonomists

The taxonomists for this project were certified by the Society of Freshwater Science (SFS) Taxonomic Certification Program at level 2 which is the required certification for CABIN projects:

Scott Finlayson: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae (East/West); Group 4 Oligochaeta

Adam Bliss: Group 1 General Arthropods (East/West); Group 2 EPT (East/West); Group 3 Chironomidae
Rita Avery: Group 1 General Arthropods (East/West); Group 2 EPT (East/West)
Garret Naish: Group 2 EPT (East/West)

Taxonomic QC

Taxonomic QC was performed in house by someone other than the original taxonomist.

- Quality control protocol involved complete, blind re-identification and re-enumeration of at least 10% of samples by a second SFS-certified taxonomist.
- Samples for taxonomic quality control were randomly selected and quality control procedures were conducted as the project progresses through the laboratories.

- The second (QC) taxonomist will calculate and record four types of errors:
    1. Misidentification error
    2. Enumeration error
    3. Questionable taxonomic resolution error
    4. Insufficient taxonomic resolution error

The QC coordinator then calculates the following estimates of taxonomic precision.

1. The percent total identification error rate is calculated as:

$$\frac{Sum\ of\ incorrect\ identifications}{total\ organisms\ counted\ in\ audit} * (100)$$

The average total identification error rate of audited samples did not exceed 5%. All samples that exceed a 5% error rate were re-evaluated to determine whether repeated errors or patterns in error contributed.

2. The percent difference in enumeration (PDE) to quantify the consistency of specimen counts.

$$PDE = \frac{|n_1 - n_2|}{n_1 + n_2} x100$$

3. The percent taxonomic disagreement (PTD) to quantify the shared precision between two sets of identifications.

$$PTD = \left(1 - \left[\frac{a}{N}\right]\right) x100$$

4. Bray Curtis dissimilarity Index to quantify the differences in identifications.

$$BC_{ij} = 1 - \frac{2C_{ij}}{S_j + S_i}$$

Error Summary

All samples report errors within the acceptable limits for CABIN Laboratory methods (less than 5% error).

Table 5 Summary of taxonomic error following QC

Site	Taxa Identified	% Error	PDE	PTD	Bray - Curtis Dissimilarity index
Site - 2024, Sample - MP_QUL-PNF_PON-2_2024-08, CC# - CC250493, Percent sampled = 100%, Sieve size = 250	38	0.00	0	0	0
Site - 2024, Sample - MP_QUL-PREF1-PON-3_2024-08, CC# - CC250504, Percent sampled = 100%, Sieve size = 250	459	0.22	0	0.21786492	0.00217865
Site - 2024, Sample - MP_POL-P1_PON-3_2024-08, CC# - CC250514, Percent sampled = 100%, Sieve size = 250	234	0.00	0.21413276	0.42735043	0.00214133

There will always be disagreements between taxonomists regarding the degree of taxonomic resolution in immature specimens and when laboratories make use of different keys for certain groups (Mollusks is an especially disputed group). It is always possible that some taxa found by the original taxonomist were overlooked in QC.

All of the Taxonomic QC samples that were observed passed testing according to the CABIN misidentification protocols. See the tables below for results from taxonomic QC audit.

Error Rationale

Site - 2024, Sample - MP_QUL-PNF_PON-2_2024-08, CC# - CC250493, Percent sampled = 100%, Sieve size = 250	Laboratory Count	QC Audit Count	Agreement	Misidentification	Questionable Taxonomic Resolution	Enumeration	Insufficient Taxonomic Resolution	Comments
Chironomidae	2	2						
Dicrotendipes	1	1						
Heterotrissocladius	8	8						
Limnophyes	1	1						
Mesocricotopus	3	3						
Paratanytarsus	1	1						
Phaenopsectra	3	3						
Procladius	7	7						
Rhyacodrilus	6	6						
Sergentia	6	6						
Total:	**38**	**38**						
					0	0	0	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.00	**Pass**				

Site - 2024, Sample - MP_QUL-PREF1-PON-3_2024-08, CC# - CC250504, Percent sampled = 100%, Sieve size = 250	Laboratory Count	QC Audit Count	Agreement	Misidentification	Questionable Taxonomic Resolution	Enumeration	Insufficient Taxonomic Resolution	Comments
Bezzia/ Palpomyia	1	1						
Ceratopogonidae	1	1						
Chironomus	1	1						
Limnodrilus	82	82						
Mesocricotopus	1	1						
Oxyethira	1	1						
Phaenopsectra	101	102	No			X		
Polypedilum	2	2						
Procladius	3	3						
Rhyacodrilus	142	142						
Sergentia	124	123	No	1		X		

Total:	**459**	**459**						
					0	**2**	**0**	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.22	**Pass**				
Site - 2024, Sample - MP_POL-P1_PON-3_2024-08, CC# - CC250514, Percent sampled = 100%, Sieve size = 250	**Laboratory Count**	**QC Audit Count**	**Agreement**	**Misidentification**	**Questionable Taxonomic Resolution**	**Enumeration**	**Insufficient Taxonomic Resolution**	**Comments**
Bezzia/ Palpomyia	1	1						
Chironomus	94	95	No			X		
Heterotrissocladius	1	1						
Limnodrilus	89	89						
Piona	10	10						
Pisidiidae	1	1						
Procladius	2	2						
Rhyacodrilus	33	33						
Tanytarsus	2	2						
Total:	**233**	**234**						
					0	**1**	**0**	
% Total Misidentification Rate =	misidentifications / total number	x100 =	0.00	**Pass**				

References

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[3] Pacific Northwest Aquatic Monitoring Partnership (Accessed 2015). www.pnamp.org

Taxonomic Keys

Below is a reference list of taxonomic keys utilized by taxonomists at Cordillera Consulting. Cordillera taxonomists routinely seek out new literature to ensure the most accurate identification keys are being utilized. This is not reflective of the exhaustive list of resources that we use for identification. A more complete list of taxonomic resources can be found at Southwest Association of Freshwater Invertebrate

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0	0	0
| Family: Leptophlebiidae	0	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	0	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	1	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	0
| Family: Taeniopterygidae	0	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	1	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	0	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	1	0	0
Bezzia/ Palpomyia	0	0	0	0	0	0	0	0	0	0
Probezzia	0	0	0	1	0	0	0	1	0	1
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	0	0	0	0	0	0	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

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250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
| Family: Chironomidae	0	2	1	1	3	0	0	2	0	2
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	0	0	0	0	0	0	0	0	0	0
Cryptochironomus	0	0	0	0	0	0	0	0	0	0
Cryptotendipes	0	0	0	0	0	0	0	0	0	0
Dicrotendipes	0	1	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	1	0	0	0	0
Paracladopelma	1	0	0	0	0	0	0	0	0	0
Phaenopsectra	0	3	0	0	0	0	0	0	0	0
Polypedilum	0	0	0	0	0	0	0	0	0	0
Sergentia	3	6	1	0	0	0	0	0	0	0
|Tribelos	0	0	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	1	0	0	0	0
Paratanytarsus	0	1	0	0	0	0	0	0	0	0
Stempellinella	0	0	0	0	0	0	0	0	0	0
Tanytarsus	0	0	0	0	0	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	2	0	0	3	1	3	1	1	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	0	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	1	0	0	0	0	0
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	1	0	0	0	0	0	0	0	0	0
Heterotrissocladius	3	8	16	14	22	21	23	20	28	16
Limnophyes	1	1	0	0	0	0	0	0	0	0
Mesocricotopus	2	3	10	6	2	7	6	2	9	6
Orthocladius complex	0	0	0	0	0	1	0	0	0	0
Parakiefferiella	2	0	0	2	1	0	0	0	0	0

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250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Psectrocladius	0	0	0	0	0	0	0	0	0	0
Tvetenia	0	0	1	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	0	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	0	0	0	0	1	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	6	7	2	10	5	2	1	5	0	2
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	1	0
| Family: Tipulidae	0	0	0	0	0	1	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	0	0	0	0	4	0	0	0	0
| Order: Trombidiformes	0	0	1	0	0	1	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	0	3	0	1	0	1	0	2	0
| Family: Pionidae	0	0	0	0	0	0	0	0	0	0
Piona	0	0	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	1
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	0	0	0	0	0	0	0	0	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

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Minnow (BC)
Taxonomist: Scott Finlayson
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250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	0	0	0	0	0	0	0	0	0
Stylodrilus heringianus	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	2	0	0	2	0	0	0	1	0	0
Rhyacodrilus	2	6	0	1	0	0	0	0	0	0
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	3	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	0	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	2	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	2	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	0
Totals:	**25**	**38**	**35**	**40**	**37**	**46**	**32**	**33**	**45**	**28**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	1	1	1	1	1	1	0	1	1	1
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	1	1	1	1	1	1	1	1	1	1
| Class: Ostracoda	1	1	0	0	0	1	1	0	1	1
Phylum: Nemata	1	1	1	1	1	1	1	1	1	1
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	0	0	0	0	0
Totals:	**4**	**4**	**3**	**3**	**3**	**4**	**3**	**3**	**4**	**4**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	1	0	0	1	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	1
| Family: Heptageniidae	0	0	0	0	0	0	0	1	0	1
| Family: Leptophlebiidae	2	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	1
| Family: Capniidae	0	0	0	0	0	0	0	0	0	1
| Family: Chloroperlidae	0	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	1
| Family: Taeniopterygidae	0	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	1	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	1	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	1	0	0	0	0	0	0	0
Probezzia	2	0	0	0	0	0	0	0	0	0
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	0	0	0	0	0	80	81	79	74	67

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
| Family: Chironomidae	0	1	0	0	0	0	1	1	0	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	0	3	1	0	3	51	103	71	83	83
Cryptochironomus	0	0	0	0	1	0	0	0	0	0
Cryptotendipes	0	0	0	0	2	0	0	0	0	0
Dicrotendipes	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	0	0	0	0	0
Paracladopelma	0	0	0	0	0	0	0	0	0	0
Phaenopsectra	124	98	101	43	22	1	0	1	4	0
Polypedilum	0	0	2	0	0	0	0	0	0	0
Sergentia	158	67	124	67	82	0	0	0	0	0
|Tribelos	0	0	0	1	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	0	0	0	0	0
Paratanytarsus	0	0	0	0	1	0	0	0	0	0
Stempellinella	0	1	0	1	2	0	0	0	0	0
Tanytarsus	0	0	0	1	2	0	1	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	0	0	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	0	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	0	0	0	0	0	1
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	0	0	0	0	0	0	0	0	0	0
Heterotrissocladius	0	0	0	0	0	0	0	0	0	0
Limnophyes	0	0	0	0	0	0	0	0	0	0
Mesocricotopus	0	0	1	1	1	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	0	1	0	0	0
Parakiefferiella	0	0	0	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Psectrocladius	0	0	0	0	0	0	0	0	0	0
Tvetenia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	2	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	1	0	0	0	0	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	2	2	3	0	4	0	2	0	1	0
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	2	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	8	0	0	0	0	0	0	0	0	0
| Order: Trombidiformes	0	0	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	4	0	0	0	0	0	1	0	0	0
| Family: Pionidae	0	0	0	0	0	0	0	0	0	0
Piona	0	0	0	0	0	0	1	3	0	1
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	0
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	0	0	0	0	0	3	1	2	0	2
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	0	0	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	1	0	0	5	0	0	0	0	0
Stylodrilus heringianus	0	1	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	104	64	82	43	22	98	40	148	45	31
Rhyacodrilus	234	122	142	71	71	15	60	8	10	27
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	2	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0	0	0
Pisidium	2	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	0	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	0
Totals:	**644**	**362**	**459**	**228**	**220**	**248**	**292**	**315**	**217**	**217**

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	2	1	1	1	1	1	1	1	1	1
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	2	1	1	1	1	1	1	1	1	1
| Class: Ostracoda	2	1	1	1	1	0	0	0	0	0
Phylum: Nemata	2	1	1	1	1	1	0	0	0	0
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	1	0	0	0	0	0	0
Totals:	**8**	**4**	**4**	**5**	**4**	**3**	**2**	**2**	**2**	**2**

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0	0	0
| Family: Leptophlebiidae	0	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	1	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	1	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	0
| Family: Taeniopterygidae	1	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	0	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	1	0	1	0	0	0	0	0
Probezzia	0	0	0	0	0	0	0	0	0	0
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	1	0	0	1	3	1	0	0	1	0

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Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
| Family: Chironomidae	0	0	0	0	0	0	0	0	1	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	78	110	94	73	51	52	47	112	59	72
Cryptochironomus	0	0	0	0	0	0	0	0	0	0
Cryptotendipes	0	0	0	0	0	0	0	0	0	0
Dicrotendipes	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	0	0	0	0	0
Paracladopelma	0	0	0	0	1	0	0	0	0	0
Phaenopsectra	0	1	0	0	0	0	0	1	0	0
Polypedilum	0	0	0	0	0	0	0	0	0	0
Sergentia	0	0	0	0	0	0	0	0	0	0
|Tribelos	0	0	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	0	0	0	0	0
Paratanytarsus	0	0	0	0	0	0	0	0	1	0
Stempellinella	0	0	0	0	0	0	1	0	0	0
Tanytarsus	0	1	2	0	0	2	0	1	0	1
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	0	1	0	0	1	2	5	1	1	6
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	2	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	0	0	0	0	0	0	0	0	0	0
Heterotrissocladius	1	0	1	8	2	1	2	0	0	1
Limnophyes	1	0	0	0	0	0	0	0	0	0
Mesocricotopus	0	0	0	0	0	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	0	0	0	0	0
Parakiefferiella	0	0	0	0	0	0	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Psectrocladius	0	0	0	0	0	1	0	0	0	0
Tvetenia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	0	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	0	0	0	0	0	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	0	1	2	2	0	1	1	1	0	0
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	1	0	0	0	0	0	0	0	0
| Order: Trombidiformes	1	2	0	4	1	0	1	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	0	0	0	0	0	0	0	0	0
| Family: Pionidae	0	25	0	0	0	0	0	0	0	0
Piona	1	2	10	5	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	0
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	1	3	0	1	0	2	2	1	0	1
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	1	0	0	0	0

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	0	0	0	0	0	0	0	0	0
Stylodrilus heringianus	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	73	8	89	20	17	5	2	4	0	11
Rhyacodrilus	27	12	33	38	38	0	7	11	0	27
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	0	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	1	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	0	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	1
Totals:	**188**	**167**	**233**	**152**	**115**	**68**	**69**	**132**	**63**	**120**

Notes: A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix C.5) due to differences in rounding.

Raw Benthic Invertebrate Density Results (# individuals/sample), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	1	1	1	1	1	1	1	1	1	1
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	1	0	1	1	1	0	1	1	1	1
| Class: Ostracoda	1	0	0	1	1	1	0	0	1	0
Phylum: Nemata	1	1	1	1	1	1	0	0	0	1
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	0	0	0	0	0
Totals:	**4**	**2**	**3**	**4**	**4**	**3**	**2**	**2**	**3**	**3**

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Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0	0	0
| Family: Leptophlebiidae	0	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	0	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	8.61	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	0
| Family: Taeniopterygidae	0	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	8.61	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	0	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	8.61	0	0
Bezzia/ Palpomyia	0	0	0	0	0	0	0	0	0	0
Probezzia	0	0	0	8.61	0	0	0	8.61	0	8.61
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	0	0	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
| Family: Chironomidae	0	17.2	8.61	8.61	25.8	0	0	17.2	0	17.2
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	0	0	0	0	0	0	0	0	0	0
Cryptochironomus	0	0	0	0	0	0	0	0	0	0
Cryptotendipes	0	0	0	0	0	0	0	0	0	0
Dicrotendipes	0	8.61	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	8.61	0	0	0	0
Paracladopelma	8.61	0	0	0	0	0	0	0	0	0
Phaenopsectra	0	25.8	0	0	0	0	0	0	0	0
Polypedilum	0	0	0	0	0	0	0	0	0	0
Sergentia	25.8	51.7	8.61	0	0	0	0	0	0	0
|Tribelos	0	0	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	8.61	0	0	0	0
Paratanytarsus	0	8.61	0	0	0	0	0	0	0	0
Stempellinella	0	0	0	0	0	0	0	0	0	0
Tanytarsus	0	0	0	0	0	0	0	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	17.2	0	0	25.8	8.61	25.8	8.61	8.61	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	0	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	8.61	0	0	0	0	0
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	8.61	0	0	0	0	0	0	0	0	0
Heterotrissocladius	25.8	68.9	138	121	189	181	198	172	241	138
Limnophyes	8.61	8.61	0	0	0	0	0	0	0	0
Mesocricotopus	17.2	25.8	86.1	51.7	17.2	60.3	51.7	17.2	77.5	51.7
Orthocladius complex	0	0	0	0	0	8.61	0	0	0	0
Parakiefferiella	17.2	0	0	17.2	8.61	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Psectrocladius	0	0	0	0	0	0	0	0	0	0
Tvetenia	0	0	8.61	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	0	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	0	0	0	0	8.61	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	51.7	60.3	17.2	86.1	43.1	17.2	8.61	43.1	0	17.2
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	8.61	0
| Family: Tipulidae	0	0	0	0	0	8.61	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	0	0	0	0	34.4	0	0	0	0
| Order: Trombidiformes	0	0	8.61	0	0	8.61	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	0	25.8	0	8.61	0	8.61	0	17.2	0
| Family: Pionidae	0	0	0	0	0	0	0	0	0	0
Piona	0	0	0	0	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	8.61
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	0	0	0	0	0	0	0	0	0	0
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	0	0	0	0	0	0	0	0	0
Stylodrilus heringianus	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	17.2	0	0	17.2	0	0	0	8.61	0	0
Rhyacodrilus	17.2	51.7	0	8.61	0	0	0	0	0	0
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	25.8	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	0	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	17.2	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	17.2	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	0
Totals:	**215**	**327**	**301**	**344**	**319**	**396**	**276**	**284**	**387**	**241**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Project: 24-04-7 (MPMC Lake Sediment and BIC)
Minnow (BC)
Taxonomist: Scott Finlayson
scottfinlayson@cordilleraconsulting.ca
250-494-7553

Site:	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PNF	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1	QUL-PFF1
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	23-Aug-24	23-Aug-24	24-Aug-24	24-Aug-24	24-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24
CC #:	CC250492	CC250493	CC250494	CC250495	CC250496	CC250497	CC250498	CC250499	CC250500	CC250501
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	8.61	8.61	8.61	8.61	8.61	8.61	0	8.61	8.61	8.61
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
| Class: Ostracoda	8.61	8.61	0	0	0	8.61	8.61	0	8.61	8.61
Phylum: Nemata	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	0	0	0	0	0
Totals:	**34.4**	**34.4**	**25.8**	**25.8**	**25.8**	**34.4**	**25.8**	**25.8**	**34.4**	**34.4**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	8.61	0	0	8.61	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	8.61
| Family: Heptageniidae	0	0	0	0	0	0	0	8.61	0	8.61
| Family: Leptophlebiidae	17.2	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	8.61
| Family: Capniidae	0	0	0	0	0	0	0	0	0	8.61
| Family: Chloroperlidae	0	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	0	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	8.61
| Family: Taeniopterygidae	0	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	8.61	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	8.61	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	8.61	0	0	0	0	0	0	0
Probezzia	17.2	0	0	0	0	0	0	0	0	0
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	0	0	0	0	0	689	697	680	637	577

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
| Family: Chironomidae	0	8.61	0	0	0	0	8.61	8.61	0	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	0	25.8	8.61	0	25.8	439	887	611	715	715
Cryptochironomus	0	0	0	0	8.61	0	0	0	0	0
Cryptotendipes	0	0	0	0	17.2	0	0	0	0	0
Dicrotendipes	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	0	0	0	0	0
Paracladopelma	0	0	0	0	0	0	0	0	0	0
Phaenopsectra	1,068	844	870	370	189	8.61	0	8.61	34.4	0
Polypedilum	0	0	17.2	0	0	0	0	0	0	0
Sergentia	1,361	577	1,068	577	706	0	0	0	0	0
|Tribelos	0	0	0	8.61	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	0	0	0	0	0
Paratanytarsus	0	0	0	0	8.61	0	0	0	0	0
Stempellinella	0	8.61	0	8.61	17.2	0	0	0	0	0
Tanytarsus	0	0	0	8.61	17.2	0	8.61	0	0	0
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	0	0	0	0	0	0	0	0	0	0
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	0	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	0	0	0	0	0	8.61
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	0	0	0	0	0	0	0	0	0	0
Heterotrissocladius	0	0	0	0	0	0	0	0	0	0
Limnophyes	0	0	0	0	0	0	0	0	0	0
Mesocricotopus	0	0	8.61	8.61	8.61	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	0	8.61	0	0	0
Parakiefferiella	0	0	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Psectrocladius	0	0	0	0	0	0	0	0	0	0
Tvetenia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	17.2	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	8.61	0	0	0	0	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	17.2	17.2	25.8	0	34.4	0	17.2	0	8.61	0
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	17.2	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	68.9	0	0	0	0	0	0	0	0	0
| Order: Trombidiformes	0	0	0	0	0	0	0	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	34.4	0	0	0	0	0	8.61	0	0	0
| Family: Pionidae	0	0	0	0	0	0	0	0	0	0
Piona	0	0	0	0	0	0	8.61	25.8	0	8.61
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	0
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	0	0	0	0	0	25.8	8.61	17.2	0	17.2
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	8.61	0	0	43.1	0	0	0	0	0
Stylodrilus heringianus	0	8.61	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	896	551	706	370	189	844	344	1,274	387	267
Rhyacodrilus	2,015	1,051	1,223	611	611	129	517	68.9	86.1	232
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	17.2	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	0	0	0	0	0	0	0	0
Pisidium	17.2	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	0	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	0
Totals:	**5,546**	**3,117**	**3,952**	**1,963**	**1,894**	**2,136**	**2,514**	**2,712**	**1,869**	**1,869**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	QUL-PREF1	BOL-B2	BOL-B2	BOL-B2	BOL-B2	BOL-B2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	19-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24	20-Aug-24
CC #:	CC250502	CC250503	CC250504	CC250505	CC250506	CC250507	CC250508	CC250509	CC250510	CC250511
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	17.2	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	17.2	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
| Class: Ostracoda	17.2	8.61	8.61	8.61	8.61	0	0	0	0	0
Phylum: Nemata	17.2	8.61	8.61	8.61	8.61	8.61	0	0	0	0
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	8.61	0	0	0	0	0	0
Totals:	**68.9**	**34.4**	**34.4**	**43.1**	**34.4**	**25.8**	**17.2**	**17.2**	**17.2**	**17.2**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
Subphylum: Hexapoda	0	0	0	0	0	0	0	0	0	0
| Class: Insecta	0	0	0	0	0	0	0	0	0	0
| Order: Coleoptera	0	0	0	0	0	0	0	0	0	0
| Family: Elmidae	0	0	0	0	0	0	0	0	0	0
Optioservus	0	0	0	0	0	0	0	0	0	0
| Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
| Family: Baetidae	0	0	0	0	0	0	0	0	0	0
Baetis	0	0	0	0	0	0	0	0	0	0
| Family: Heptageniidae	0	0	0	0	0	0	0	0	0	0
| Family: Leptophlebiidae	0	0	0	0	0	0	0	0	0	0
| Order: Plecoptera	0	0	0	0	0	0	0	0	0	0
| Family: Capniidae	0	0	0	0	0	0	0	0	0	0
| Family: Chloroperlidae	8.61	0	0	0	0	0	0	0	0	0
Haploperla	0	0	0	0	0	0	0	0	0	0
Sweltsa	0	0	0	0	0	0	8.61	0	0	0
| Family: Nemouridae	0	0	0	0	0	0	0	0	0	0
Zapada columbiana	0	0	0	0	0	0	0	0	0	0
| Family: Taeniopterygidae	8.61	0	0	0	0	0	0	0	0	0
| Order: Trichoptera	0	0	0	0	0	0	0	0	0	0
| Family: Hydroptilidae	0	0	0	0	0	0	0	0	0	0
Oxyethira	0	0	0	0	0	0	0	0	0	0
| Order: Diptera	0	0	0	0	0	0	0	0	0	0
| Family: Ceratopogonidae	0	0	0	0	0	0	0	0	0	0
Bezzia/ Palpomyia	0	0	8.61	0	8.61	0	0	0	0	0
Probezzia	0	0	0	0	0	0	0	0	0	0
| Family: Chaoboridae	0	0	0	0	0	0	0	0	0	0
Chaoborus	8.61	0	0	8.61	25.8	8.61	0	0	8.61	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
| Family: Chironomidae	0	0	0	0	0	0	0	0	8.61	0
| Subfamily: Chironominae	0	0	0	0	0	0	0	0	0	0
| Tribe: Chironomini	0	0	0	0	0	0	0	0	0	0
Chironomus	672	947	809	629	439	448	405	964	508	620
Cryptochironomus	0	0	0	0	0	0	0	0	0	0
Cryptotendipes	0	0	0	0	0	0	0	0	0	0
Dicrotendipes	0	0	0	0	0	0	0	0	0	0
Microtendipes	0	0	0	0	0	0	0	0	0	0
Paracladopelma	0	0	0	0	8.61	0	0	0	0	0
Phaenopsectra	0	8.61	0	0	0	0	0	8.61	0	0
Polypedilum	0	0	0	0	0	0	0	0	0	0
Sergentia	0	0	0	0	0	0	0	0	0	0
|Tribelos	0	0	0	0	0	0	0	0	0	0
| Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	0
Constempellina	0	0	0	0	0	0	0	0	0	0
Paratanytarsus	0	0	0	0	0	0	0	0	8.61	0
Stempellinella	0	0	0	0	0	0	8.61	0	0	0
Tanytarsus	0	8.61	17.2	0	0	17.2	0	8.61	0	8.61
| Subfamily: Diamesinae	0	0	0	0	0	0	0	0	0	0
Protanypus	0	8.61	0	0	8.61	17.2	43.1	8.61	8.61	51.7
| Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
Diamesa	17.2	0	0	0	0	0	0	0	0	0
Pagastia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Orthocladiinae	0	0	0	0	0	0	0	0	0	0
Brillia	0	0	0	0	0	0	0	0	0	0
Heterotrissocladius	8.61	0	8.61	68.9	17.2	8.61	17.2	0	0	8.61
Limnophyes	8.61	0	0	0	0	0	0	0	0	0
Mesocricotopus	0	0	0	0	0	0	0	0	0	0
Orthocladius complex	0	0	0	0	0	0	0	0	0	0
Parakiefferiella	0	0	0	0	0	0	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Psectrocladius	0	0	0	0	0	8.61	0	0	0	0
Tvetenia	0	0	0	0	0	0	0	0	0	0
| Subfamily: Prodiamesinae	0	0	0	0	0	0	0	0	0	0
Monodiamesa	0	0	0	0	0	0	0	0	0	0
| Subfamily: Tanypodinae	0	0	0	0	0	0	0	0	0	0
| Tribe: Pentaneurini	0	0	0	0	0	0	0	0	0	0
Thienemannimyia group	0	0	0	0	0	0	0	0	0	0
| Tribe: Procladiini	0	0	0	0	0	0	0	0	0	0
Procladius	0	8.61	17.2	17.2	0	8.61	8.61	8.61	0	0
| Family: Empididae	0	0	0	0	0	0	0	0	0	0
Hemerodromia	0	0	0	0	0	0	0	0	0	0
| Family: Tipulidae	0	0	0	0	0	0	0	0	0	0
Subphylum: Chelicerata	0	0	0	0	0	0	0	0	0	0
| Class: Arachnida	0	0	0	0	0	0	0	0	0	0
| Order: Oribatida	0	0	0	0	0	0	0	0	0	0
| Order: Sarcoptiformes	0	0	0	0	0	0	0	0	0	0
| Family: Hydrozetidae	0	8.61	0	0	0	0	0	0	0	0
| Order: Trombidiformes	8.61	17.2	0	34.4	8.61	0	8.61	0	0	0
| Family: Lebertiidae	0	0	0	0	0	0	0	0	0	0
Lebertia	0	0	0	0	0	0	0	0	0	0
| Family: Pionidae	0	215	0	0	0	0	0	0	0	0
Piona	8.61	17.2	86.1	43.1	0	0	0	0	0	0
| Family: Sperchontidae	0	0	0	0	0	0	0	0	0	0
Sperchon	0	0	0	0	0	0	0	0	0	0
| Family: Unionicolidae	0	0	0	0	0	0	0	0	0	0
Unionicola	8.61	25.8	0	8.61	0	17.2	17.2	8.61	0	8.61
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Malacostraca	0	0	0	0	0	0	0	0	0	0
| Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
| Family: Hyalellidae	0	0	0	0	0	0	0	0	0	0
Hyalella	0	0	0	0	0	8.61	0	0	0	0

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Phylum: Annelida	0	0	0	0	0	0	0	0	0	0
Subphylum: Clitellata	0	0	0	0	0	0	0	0	0	0
| Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0
| Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
| Family: Lumbriculidae	0	0	0	0	0	0	0	0	0	0
Rhynchelmis	0	0	0	0	0	0	0	0	0	0
Stylodrilus heringianus	0	0	0	0	0	0	0	0	0	0
| Order: Tubificida	0	0	0	0	0	0	0	0	0	0
| Family: Naididae	0	0	0	0	0	0	0	0	0	0
Limnodrilus	629	68.9	766	172	146	43.1	17.2	34.4	0	94.7
Rhyacodrilus	232	103	284	327	327	0	60.3	94.7	0	232
| Subfamily: Tubificinae without hair chaetae	0	0	0	0	0	0	0	0	0	0
Phylum: Cnidaria	0	0	0	0	0	0	0	0	0	0
| Class: Hydrozoa	0	0	0	0	0	0	0	0	0	0
| Order: Anthoathecatae	0	0	0	0	0	0	0	0	0	0
| Family: Hydridae	0	0	0	0	0	0	0	0	0	0
Hydra	0	0	0	0	0	0	0	0	0	0
Phylum: Mollusca	0	0	0	0	0	0	0	0	0	0
| Class: Bivalvia	0	0	0	0	0	0	0	0	0	0
| Order: Veneroida	0	0	0	0	0	0	0	0	0	0
| Family: Pisidiidae	0	0	8.61	0	0	0	0	0	0	0
Pisidium	0	0	0	0	0	0	0	0	0	0
| Class: Gastropoda	0	0	0	0	0	0	0	0	0	0
| Order: Basommatophora	0	0	0	0	0	0	0	0	0	0
| Family: Lymnaeidae	0	0	0	0	0	0	0	0	0	0
Fossaria	0	0	0	0	0	0	0	0	0	0
| Family: Planorbidae	0	0	0	0	0	0	0	0	0	0
Gyraulus	0	0	0	0	0	0	0	0	0	8.61
Totals:	**1,619**	**1,438**	**2,006**	**1,309**	**990**	**586**	**594**	**1,137**	**542**	**1,033**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

Area-Based Benthic Invertebrate Density Results (# individuals/m^2), Mount Polley Mine

Site:	POL-P1	POL-P1	POL-P1	POL-P1	POL-P1	POL-P2	POL-P2	POL-P2	POL-P2	POL-P2
Replicate:	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Sample Collection Date:	22-Aug-24	22-Aug-24	23-Aug-24	23-Aug-24	23-Aug-24	21-Aug-24	21-Aug-24	22-Aug-24	24-Aug-24	24-Aug-24
CC #:	CC250512	CC250513	CC250514	CC250515	CC250516	CC250517	CC250518	CC250519	CC250520	CC250521
Taxa present but not included:										
Phylum: Arthropoda	0	0	0	0	0	0	0	0	0	0
| Class: Copepoda	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61
Subphylum: Crustacea	0	0	0	0	0	0	0	0	0	0
| Class: Branchiopoda	0	0	0	0	0	0	0	0	0	0
| Order: Cladocera	8.61	0	8.61	8.61	8.61	0	8.61	8.61	8.61	8.61
| Class: Ostracoda	8.61	0	0	8.61	8.61	8.61	0	0	8.61	0
Phylum: Nemata	8.61	8.61	8.61	8.61	8.61	8.61	0	0	0	8.61
Phylum: Platyhelminthes	0	0	0	0	0	0	0	0	0	0
| Class: Turbellaria	0	0	0	0	0	0	0	0	0	0
Totals:	**34.4**	**17.2**	**25.8**	**34.4**	**34.4**	**25.8**	**17.2**	**17.2**	**25.8**	**25.8**

Notes: All results displayed are area-based densities (#/m^2). A value of zero reported at a less specific level of taxonomy does not indicate an absence of organisms at a more specific level of taxonomy. Results displayed above may differ slightly from those presented in benthic invertebrate community summary statistics (see Appendix D.5) due to differences in rounding.

PERIPHYTON AND BENTHIC INVERTEBRATE TISSUE QUALITY

ALS Laboratory Report VA24C1418

(Finalized December 5, 2024)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C1418**		
Amendment	:	**2**		
Client	:	**Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Mr. Gabriel Holmes	Account Manager	: Can Dang
Address	:	306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	1-289-775-1547	Telephone	: +1 604 253 4188
Project	:	----	Date Samples Received	: 21-Aug-2024 09:45
PO	:	5590017616	Date Analysis Commenced	: 21-Oct-2024
C-O-C number	:	----	Issue Date	: 05-Dec-2024 15:14
Sampler	:	----		
Site	:	----		
Quote number	:	VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	:	159		
No. of samples analysed	:	159		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Russell Zhang	Analyst	Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/kg wwt	milligrams per kilogram wet weight
mg/kg	milligrams per kilogram
%	percent

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (06/11/2024): This report has been amended to add "DUP-H" qualifier to the lab duplicate of the sample, VA24C1418-021. The quality system is being utilised to resolve this issue. All analysis results are as per the previous report.
Amendment (05/12/2024): This report has been amended and re-released to remove the wet weight reporting unit analysis data.

Qualifiers

Qualifier	Description
DLA	Detection Limit adjusted for required dilution.
DLB	Detection Limit Raised. Analyte detected at comparable level in Method Blank.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_PERT-1_2024-08	MP_HAC-R1_PERT-2_2024-08	MP_HAC-R1_PERT-3_2024-08	MP_HAC-R1_PERT-4_2024-08	MP_HAC-R1_PERT-5_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1418-001	VA24C1418-002	VA24C1418-003	VA24C1418-004	VA24C1418-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		64.5	64.4	63.9	64.9	59.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		718	410	1470	1380	814
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.065	0.061	0.081	0.094	0.070
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.71	1.56	3.73	1.95	1.54
Barium	7440-39-3	E472/VA	0.050	mg/kg		61.8	62.2	79.6	150	67.0
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.039	0.016	0.048	0.034	0.031
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.017 DLA	<0.015 DLA	<0.018 DLA	<0.018 DLA	<0.015 DLA
Boron	7440-42-8	E472/VA	1.0	mg/kg		251	241	259	235	240
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.102	0.105	0.088	0.156	0.121
Calcium	7440-70-2	E472/VA	20	mg/kg		213000	223000	225000	198000	208000
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.128	0.0797	0.183	0.414	0.127
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.01	0.96	1.34	1.52	1.44
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.00	0.819	1.59	1.62	1.09
Copper	7440-50-8	E472/VA	0.20	mg/kg		32.2	18.8	25.9	32.8	31.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		1170	716	1980	1960	1300
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.305	0.178	0.374	0.572	0.303
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.84 DLA	<0.76 DLA	1.64	1.27	0.80
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2280	1990	2670	2390	2380
Manganese	7439-96-5	E472/VA	0.050	mg/kg		808	913	954	1450	1270
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0058	<0.0050	0.0056	0.0054	0.0111

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_PERT-1_2024-08	MP_HAC-R1_PERT-2_2024-08	MP_HAC-R1_PERT-3_2024-08	MP_HAC-R1_PERT-4_2024-08	MP_HAC-R1_PERT-5_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1418-001	VA24C1418-002	VA24C1418-003	VA24C1418-004	VA24C1418-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0021	0.0012	0.0020	0.0019	0.0044
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.11	0.867	1.36	1.19	0.958
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.09	2.05	1.98	2.50	2.06
Phosphorus	7723-14-0	E472/VA	10	mg/kg		646	545	644	781	583
Potassium	7440-09-7	E472/VA	20	mg/kg		3610	2620	3530	4530	3150
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.67	2.44	3.74	5.47	3.27
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.82	1.91	1.24	1.49	1.54
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0077	<0.0050	0.0100	0.0080	0.0100
Sodium	7440-23-5	E472/VA	20	mg/kg		364	190	311	349	282
Strontium	7440-24-6	E472/VA	0.10	mg/kg		473	482	512	442	481
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.034 DLA	<0.031 DLA	<0.035 DLA	<0.037 DLA	<0.030 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0049	0.0034	0.0045	0.0085	0.0041
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.17 DLA	<0.15 DLA	<0.18 DLA	<0.18 DLA	<0.15 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		72.2	39.9	115	89.6	61.8
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0965	0.0734	0.102	0.102	0.0866
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		4.98	2.83	8.85	6.33	4.87
Zinc	7440-66-6	E472/VA	1.0	mg/kg		8.0	6.4	20.6	17.2	8.3
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.63	0.48	1.05	0.64	0.72

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_PERT-6_2024-08	MP_HAC-R1_PERT-7_2024-08	MP_HAC-R1_PERT-8_2024-08	MP_HAC-U_PERT-1_2024-08	MP_HAC-U_PERT-2_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-006	VA24C1418-007	VA24C1418-008	VA24C1418-009	VA24C1418-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		63.0	63.4	64.8	64.5	60.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		642	413	574	190	338
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.069	0.057	0.051	0.079	0.096
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.64	1.41	1.31	1.33	2.01
Barium	7440-39-3	E472/VA	0.050	mg/kg		72.8	67.0	60.2	90.8	127
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.026	0.020	0.022	<0.016 DLA	<0.037 DLA
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.013 DLA	<0.014 DLA	<0.017 DLA	<0.016 DLA	<0.037 DLA
Boron	7440-42-8	E472/VA	1.0	mg/kg		301	199	250	254	264
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.125	0.114	0.101	0.125	0.178
Calcium	7440-70-2	E472/VA	20	mg/kg		216000	236000	201000	211000	224000
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.109	0.0930	0.107	0.0704	0.0665
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.66	0.63	0.83	0.40	<0.74 DLA
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.03	0.775	0.796	0.608	1.16
Copper	7440-50-8	E472/VA	0.20	mg/kg		26.8	29.4	29.5	12.8	21.3
Iron	7439-89-6	E472/VA	5.0	mg/kg		1020	715	972	331	566
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.194	0.163	0.213	0.118	0.211
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.91	<0.69 DLA	<0.84 DLA	<0.78 DLA	<1.84 DLA
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2300	2220	2180	2140	2320
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1450	1110	848	3190	4880
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0054	<0.0050	<0.0050

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_PERT-6_2024-08	MP_HAC-R1_PERT-7_2024-08	MP_HAC-R1_PERT-8_2024-08	MP_HAC-U_PERT-1_2024-08	MP_HAC-U_PERT-2_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-006	VA24C1418-007	VA24C1418-008	VA24C1418-009	VA24C1418-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0012	<0.0010	0.0019	0.0017	0.0017
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.971	0.930	0.922	0.671	0.724
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.15	2.33	2.27	1.33	1.91
Phosphorus	7723-14-0	E472/VA	10	mg/kg		651	589	539	506	616
Potassium	7440-09-7	E472/VA	20	mg/kg		3340	3170	2510	2820	2940
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.46	3.20	2.65	2.68	2.86
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.69	1.81	1.88	2.20	2.52
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0063	0.0062	0.0065	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		264	236	237	167	165
Strontium	7440-24-6	E472/VA	0.10	mg/kg		479	506	459	467	492
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.026 DLA	<0.028 DLA	<0.034 DLA	<0.031 DLA	<0.074 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0041	0.0044	0.0040	0.0042	<0.0074 DLA
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.13 DLA	<0.14 DLA	<0.17 DLA	<0.16 DLA	<0.37 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		58.0	35.0	44.7	13.3	25.0
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0804	0.0799	0.0751	0.0844	0.0825
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		4.36	2.90	3.41	2.40	3.42
Zinc	7440-66-6	E472/VA	1.0	mg/kg		6.3	5.0	5.2	4.9	9.4
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.64	0.50	0.60	0.37	<0.74 DLA

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_PERT-3_2024-08	MP_HAC-U_PERT-4_2024-08	MP_HAC-U_PERT-5_2024-08	MP_HAC-U_PERT-6_2024-08	MP_HAC-U_PERT-7_2024-08
					Client sampling date / time	13-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-011	VA24C1418-012	VA24C1418-013	VA24C1418-014	VA24C1418-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		57.3	59.2	54.6	61.3	66.7
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		271	335	1180	494	172
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.088	0.074	0.072	0.055	0.071
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.51	1.51	2.24	1.35	1.67
Barium	7440-39-3	E472/VA	0.050	mg/kg		116	97.8	109	79.4	94.5
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.015	0.015	0.043	0.014	<0.015 DLA
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.015 DLA	<0.012 DLA	<0.013 DLA	<0.012 DLA	<0.015 DLA
Boron	7440-42-8	E472/VA	1.0	mg/kg		277	250	106	176	214
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.149	0.146	0.149	0.107	0.130
Calcium	7440-70-2	E472/VA	20	mg/kg		213000	231000	221000	182000	234000
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0831	0.0678	0.104	0.0666	0.0887
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.42	0.72	1.12	0.91	0.38
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.707	0.646	1.62	0.962	0.571
Copper	7440-50-8	E472/VA	0.20	mg/kg		18.8	21.8	62.6	17.9	18.3
Iron	7439-89-6	E472/VA	5.0	mg/kg		495	455	1480	761	345
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.187	0.126	0.237	0.080	0.145
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.74 DLA	<0.62 DLA	1.38	0.81	<0.76 DLA
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2260	2360	3160	2180	2260
Manganese	7439-96-5	E472/VA	0.050	mg/kg		3280	2930	2430	2120	2880
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0054	<0.0050	<0.0050

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_PERT-3_2024-08	MP_HAC-U_PERT-4_2024-08	MP_HAC-U_PERT-5_2024-08	MP_HAC-U_PERT-6_2024-08	MP_HAC-U_PERT-7_2024-08
					Client sampling date / time	13-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-011	VA24C1418-012	VA24C1418-013	VA24C1418-014	VA24C1418-015
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0016	0.0018	0.0025	0.0014	0.0013
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.688	0.716	0.525	0.557	0.686
Nickel	7440-02-0	E472/VA	0.20	mg/kg		1.71	1.90	1.84	1.71	1.16
Phosphorus	7723-14-0	E472/VA	10	mg/kg		561	564	651	520	607
Potassium	7440-09-7	E472/VA	20	mg/kg		2780	2500	1480	2530	3400
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		2.66	2.39	2.01	2.41	3.38
Selenium	7782-49-2	E472/VA	0.10	mg/kg		2.57	3.08	1.96	1.50	2.63
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0107	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		197	212	220	163	182
Strontium	7440-24-6	E472/VA	0.10	mg/kg		483	511	483	410	501
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.030 DLA	<0.025 DLA	<0.026 DLA	<0.025 DLA	<0.030 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0040	0.0053	0.0061	0.0027	0.0039
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.15 DLA	<0.12 DLA	<0.13 DLA	<0.12 DLA	<0.15 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		24.1	17.7	162	31.7	16.1
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0856	0.0943	0.0927	0.0699	0.0902
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		2.85	2.89	6.60	3.24	2.54
Zinc	7440-66-6	E472/VA	1.0	mg/kg		5.0	4.3	12.7	4.2	3.7
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.37	0.38	0.47	0.41	0.33

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_PERT-8_2024-08	MP_HAC-D_PERT-1_2024-08	MP_HAC-D_PERT-2_2024-08	MP_HAC-D_PERT-3_2024-08	MP_HAC-D_PERT-4_2024-08
					Client sampling date / time	10-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-016	VA24C1418-017	VA24C1418-018	VA24C1418-019	VA24C1418-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		61.2	61.2	65.0	67.6	62.6
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		2100	770	2510	4950	1320
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.136	0.049	0.068	0.077	0.072
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.93	2.52	4.64	8.67	3.65
Barium	7440-39-3	E472/VA	0.050	mg/kg		848	72.8	84.9	113	156
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.037 DLA	0.031	0.085	0.172	0.046
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.037 DLA	<0.013 DLA	0.022	0.051	<0.013 DLA
Boron	7440-42-8	E472/VA	1.0	mg/kg		186	210	236	156	226
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.252	0.461	0.431	0.369	0.540
Calcium	7440-70-2	E472/VA	20	mg/kg		207000	215000	224000	180000	240000
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.111	0.182	0.477	0.809	0.316
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.73 DLA	1.37	4.74	9.20	2.52
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		3.30	1.53	2.96	5.25	2.48
Copper	7440-50-8	E472/VA	0.20	mg/kg		1100	32.1	55.9	92.1	40.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		2190	1480	4320	9320	2290
Lead	7439-92-1	E472/VA	0.050	mg/kg		2.10	0.464	1.25	3.00	0.642
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<1.83 DLA	0.84	2.83	5.49	1.48
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2810	2470	3440	4410	3220
Manganese	7439-96-5	E472/VA	0.050	mg/kg		6520	846	870	1390	2980
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0114	0.0085	0.0169	0.0311	0.0128

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_PERT-8_2024-08	MP_HAC-D_PERT-1_2024-08	MP_HAC-D_PERT-2_2024-08	MP_HAC-D_PERT-3_2024-08	MP_HAC-D_PERT-4_2024-08
					Client sampling date / time	10-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-016	VA24C1418-017	VA24C1418-018	VA24C1418-019	VA24C1418-020
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0044	0.0033	0.0059	0.0101	0.0048
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.13	0.614	0.760	0.874	0.830
Nickel	7440-02-0	E472/VA	0.20	mg/kg		3.69	2.99	6.15	10.2	4.51
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1010	604	772	961	714
Potassium	7440-09-7	E472/VA	20	mg/kg		3270	2340	3320	3120	3530
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.78	2.77	5.05	6.67	4.59
Selenium	7782-49-2	E472/VA	0.10	mg/kg		2.08	3.44	3.38	1.96	3.93
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0073	0.0084	0.0202	0.0478	0.0122
Sodium	7440-23-5	E472/VA	20	mg/kg		229	191	245	249	216
Strontium	7440-24-6	E472/VA	0.10	mg/kg		488	429	480	421	479
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		0.086	<0.027 DLA	<0.033 DLA	0.029	<0.027 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0073 DLA	0.0199	0.0368	0.0639	0.0332
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.37 DLA	<0.13 DLA	<0.16 DLA	0.12	<0.13 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		58.1	41.0	126	238	63.2
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.135	0.129	0.210	0.331	0.164
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		12.3	4.96	11.8	23.6	7.39
Zinc	7440-66-6	E472/VA	1.0	mg/kg		12.2	11.8	18.5	28.3	14.8
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.73 DLA	0.71	1.96	3.77	1.03

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_PERT-5_2024-08	MP_HAC-D_PERT-6_2024-08	MP_HAC-D_PERT-7_2024-08	MP_HAC-D_PERT-8_2024-08	MP_EDC-U_PERT-1_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1418-021	VA24C1418-022	VA24C1418-023	VA24C1418-024	VA24C1418-025
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		72.2	64.5	59.7	64.3	80.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		10400	4280	1570	3070	3000
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.106	0.128	0.167	0.140	0.126
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		16.6	7.74	6.10	6.73	9.78
Barium	7440-39-3	E472/VA	0.050	mg/kg		487	304	321	332	208
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.381	0.136	0.056	0.111	0.122
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.098	<0.041 DLA	<0.040 DLA	<0.038 DLA	0.027
Boron	7440-42-8	E472/VA	1.0	mg/kg		148	224	231	182	68.8
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.842	0.697	0.788	0.675	0.875
Calcium	7440-70-2	E472/VA	20	mg/kg		150000	207000	213000	182000	11500
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		1.45	0.442	0.363	0.441	0.292
Chromium	7440-47-3	E472/VA	0.20	mg/kg		14.7	3.61	6.04	3.61	8.18
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		14.7	6.80	6.17	7.42	13.5
Copper	7440-50-8	E472/VA	0.20	mg/kg		190	83.2	221	86.3	21.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		19100	6270	3530	5700	7320
Lead	7439-92-1	E472/VA	0.050	mg/kg		5.39	1.68	0.806	1.35	1.44
Lithium	7439-93-2	E472/VA	0.50	mg/kg		10.2	3.44	<2.01 DLA	3.12	2.00
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		7210	4190	3620	3940	2870
Manganese	7439-96-5	E472/VA	0.050	mg/kg		15900	11300	12800	12300	6240
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0742	0.0238	0.0188	0.0241	0.0412

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_PERT-5_2024-08	MP_HAC-D_PERT-6_2024-08	MP_HAC-D_PERT-7_2024-08	MP_HAC-D_PERT-8_2024-08	MP_EDC-U_PERT-1_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1418-021	VA24C1418-022	VA24C1418-023	VA24C1418-024	VA24C1418-025
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0206	0.0084	0.0076	0.0086	0.0079
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.22	1.48	1.46	1.33	3.40
Nickel	7440-02-0	E472/VA	0.20	mg/kg		23.9	8.95	8.28	9.76	30.8
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1280	932	1000	967	1940
Potassium	7440-09-7	E472/VA	20	mg/kg		3880	3170	3750	3500	4610
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		10.7	4.71	4.74	5.11	8.30
Selenium	7782-49-2	E472/VA	0.10	mg/kg		3.73	4.47	6.75	4.17	0.28
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0325	0.0200	0.0134	0.0270	0.0447
Sodium	7440-23-5	E472/VA	20	mg/kg		331	234	255	232	382
Strontium	7440-24-6	E472/VA	0.10	mg/kg		394	481	455	419	83.7
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.109 DLA	<0.082 DLA	<0.080 DLA	<0.077 DLA	<0.033 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.140	0.0854	0.0928	0.0856	0.100
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.54 DLA	<0.41 DLA	<0.40 DLA	<0.38 DLA	<0.17 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		117	153	68.2	169	111
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.594	0.259	0.265	0.242	0.395
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		46.7	20.4	18.2	18.6	19.1
Zinc	7440-66-6	E472/VA	1.0	mg/kg		61.1	25.7	23.3	23.8	83.4
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		6.78	2.24	1.03	1.92	3.22

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_PERT-2_2024-08	MP_EDC-U_PERT-3_2024-08	MP_EDC-U_PERT-4_2024-08	MP_EDC-U_PERT-5_2024-08	MP_EDC-U_PERT-6_2024-08
					Client sampling date / time	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-026	VA24C1418-027	VA24C1418-028	VA24C1418-029	VA24C1418-030
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		83.2	82.2	78.9	84.4	86.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		4640	8880	4480	8810	5190
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.093	0.102	0.108	0.107	0.079
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		6.18	11.7	9.74	14.7	8.04
Barium	7440-39-3	E472/VA	0.050	mg/kg		150	297	313	372	155
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.156	0.297	0.207	0.299	0.187
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.037	0.056	0.035	0.071	0.042
Boron	7440-42-8	E472/VA	1.0	mg/kg		49.7	45.5	54.7	42.6	36.5
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.466	0.846	0.693	1.29	0.508
Calcium	7440-70-2	E472/VA	20	mg/kg		12000	11500	11400	11800	9500
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.308	0.505	0.286	0.583	0.360
Chromium	7440-47-3	E472/VA	0.20	mg/kg		15.7	25.1	17.2	28.0	23.3
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		9.80	19.0	17.6	25.4	13.8
Copper	7440-50-8	E472/VA	0.20	mg/kg		22.0	28.4	23.0	35.6	21.8
Iron	7439-89-6	E472/VA	5.0	mg/kg		9730	20000	12200	19600	12200
Lead	7439-92-1	E472/VA	0.050	mg/kg		1.80	3.26	1.77	3.49	2.27
Lithium	7439-93-2	E472/VA	0.50	mg/kg		3.64	8.37	3.40	6.68	4.08
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		3710	4940	3620	4670	3310
Manganese	7439-96-5	E472/VA	0.050	mg/kg		4360	8510	8480	11800	4710
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0459	0.0610	0.0533	0.0851	0.0583

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_PERT-2_2024-08	MP_EDC-U_PERT-3_2024-08	MP_EDC-U_PERT-4_2024-08	MP_EDC-U_PERT-5_2024-08	MP_EDC-U_PERT-6_2024-08
					Client sampling date / time	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-026	VA24C1418-027	VA24C1418-028	VA24C1418-029	VA24C1418-030
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0077	0.0109	0.0112	0.0132	0.0077
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.62	2.20	2.72	3.20	2.62
Nickel	7440-02-0	E472/VA	0.20	mg/kg		23.8	39.8	32.0	43.3	25.3
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1560	1680	1980	2280	1680
Potassium	7440-09-7	E472/VA	20	mg/kg		4380	2830	4930	4100	3730
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		10.0	9.33	9.95	12.1	10.4
Selenium	7782-49-2	E472/VA	0.10	mg/kg		0.30	0.34	0.33	0.62	0.31
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0970	0.0762	0.0507	0.0909	0.410
Sodium	7440-23-5	E472/VA	20	mg/kg		240	399	173	186	171
Strontium	7440-24-6	E472/VA	0.10	mg/kg		78.0	87.7	89.2	99.7	65.1
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.036 DLA	<0.064 DLA	<0.058 DLA	<0.069 DLA	<0.043 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0709	0.110	0.0955	0.167	0.0843
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.18 DLA	<0.32 DLA	<0.29 DLA	<0.34 DLA	<0.21 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		163	323	293	228	246
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.276	0.476	0.382	0.590	0.343
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		20.4	50.2	25.2	43.7	29.3
Zinc	7440-66-6	E472/VA	1.0	mg/kg		56.4	76.9	78.4	88.2	47.8
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		4.53	6.70	5.42	5.80	5.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_PERT-7_2024-08	MP_EDC-U_PERT-8_2024-08	MP_EDC-D_PERT-1_2024-08	MP_EDC-D_PERT-2_2024-08	MP_EDC-D_PERT-3_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-031	VA24C1418-032	VA24C1418-033	VA24C1418-034	VA24C1418-035
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		84.2	75.1	88.2	90.5	85.6
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		7210	10700	4370	4360	4680
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.101	0.057	0.051	0.042	0.043
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		9.90	11.5	9.70	8.22	10.3
Barium	7440-39-3	E472/VA	0.050	mg/kg		168	142	87.2	73.5	68.1
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.234	0.312	0.164	0.147	0.173
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.057	0.065	0.036	0.033	0.040
Boron	7440-42-8	E472/VA	1.0	mg/kg		31.7	18.8	229	238	106
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.724	0.343	0.230	0.132	0.197
Calcium	7440-70-2	E472/VA	20	mg/kg		9540	7610	20600	19000	10200
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.499	0.724	0.724	0.692	0.789
Chromium	7440-47-3	E472/VA	0.20	mg/kg		23.2	45.0	16.4	11.2	7.02
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		16.6	13.3	4.82	4.48	4.53
Copper	7440-50-8	E472/VA	0.20	mg/kg		35.0	23.1	14.0	11.5	14.2
Iron	7439-89-6	E472/VA	5.0	mg/kg		15400	23100	9630	9390	10200
Lead	7439-92-1	E472/VA	0.050	mg/kg		2.91	4.08	2.16	2.05	2.48
Lithium	7439-93-2	E472/VA	0.50	mg/kg		6.03	8.88	4.70	4.46	4.75
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		3990	4840	3180	3240	2920
Manganese	7439-96-5	E472/VA	0.050	mg/kg		6340	3250	1330	769	741
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0670	0.0680	0.0512	0.0426	0.0414

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_PERT-7_2024-08	MP_EDC-U_PERT-8_2024-08	MP_EDC-D_PERT-1_2024-08	MP_EDC-D_PERT-2_2024-08	MP_EDC-D_PERT-3_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-031	VA24C1418-032	VA24C1418-033	VA24C1418-034	VA24C1418-035
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0106	0.0169	0.0060	0.0040	0.0060
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.09	0.770	1.12	0.655	1.10
Nickel	7440-02-0	E472/VA	0.20	mg/kg		38.5	23.7	11.4	10.1	10.9
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1930	1210	1410	920	1300
Potassium	7440-09-7	E472/VA	20	mg/kg		3760	1310	2900	2360	2320
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		10.4	8.51	6.49	5.97	6.26
Selenium	7782-49-2	E472/VA	0.10	mg/kg		0.49	0.37	1.04	0.60	1.10
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0941	0.0925	0.0423	0.0372	0.0676
Sodium	7440-23-5	E472/VA	20	mg/kg		158	181	352	439	300
Strontium	7440-24-6	E472/VA	0.10	mg/kg		71.5	61.6	116	112	124
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.072 DLA	<0.023 DLA	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.115	0.0894	0.0389	0.0351	0.0447
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.36 DLA	0.12	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		274	473	168	164	155
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.602	0.646	0.237	0.182	0.236
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		34.9	50.9	17.7	15.3	19.5
Zinc	7440-66-6	E472/VA	1.0	mg/kg		66.0	56.9	33.7	24.3	27.6
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		5.68	6.91	3.48	3.44	2.71

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_PERT-4_2024-08	MP_EDC-D_PERT-5_2024-08	MP_EDC-D_PERT-6_2024-08	MP_EDC-D_PERT-7_2024-08	MP_EDC-D_PERT-8_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-036	VA24C1418-037	VA24C1418-038	VA24C1418-039	VA24C1418-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		91.0	93.0	87.8	90.6	92.6
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		3620	4690	7000	8140	5610
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.061	0.068	0.063	0.066	0.099
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		12.0	15.0	10.2	14.2	20.7
Barium	7440-39-3	E475/VA	0.050	mg/kg		77.2	88.1	106	114	117
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		0.137	0.159	0.209	0.250	0.269
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		0.032	0.038	0.054	0.067	0.048
Boron	7440-42-8	E475/VA	1.0	mg/kg		177	424	187	288	325
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.264	0.221	0.242	0.274	0.302
Calcium	7440-70-2	E475/VA	20	mg/kg		17300	26200	26900	20600	19500
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.573	0.747	1.02	1.17	0.894
Chromium	7440-47-3	E475/VA	0.20	mg/kg		15.5	22.8	13.5	24.4	27.7
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		4.27	5.74	6.39	8.55	7.57
Copper	7440-50-8	E475/VA	0.20	mg/kg		14.2	12.6	20.0	21.8	19.5
Iron	7439-89-6	E475/VA	5.0	mg/kg		7620	10300	12800	16700	13300
Lead	7439-92-1	E475/VA	0.050	mg/kg		1.60	2.01	3.17	3.67	2.60
Lithium	7439-93-2	E475/VA	0.50	mg/kg		3.69	4.41	6.66	8.60	5.15
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		3260	4230	4560	5340	3840
Manganese	7439-96-5	E475/VA	0.050	mg/kg		1220	1690	1060	1460	1790
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0032	0.0022	0.0066	0.0060	0.0036

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_PERT-4_2024-08	MP_EDC-D_PERT-5_2024-08	MP_EDC-D_PERT-6_2024-08	MP_EDC-D_PERT-7_2024-08	MP_EDC-D_PERT-8_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-036	VA24C1418-037	VA24C1418-038	VA24C1418-039	VA24C1418-040
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.035	0.032	0.054	0.064	0.048
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.69	1.61	1.04	0.898	1.43
Nickel	7440-02-0	E475/VA	0.20	mg/kg		16.2	20.1	12.9	17.1	24.7
Phosphorus	7723-14-0	E475/VA	20	mg/kg		1700	1720	1390	1470	1820
Potassium	7440-09-7	E475/VA	20	mg/kg		5130	6750	3300	3510	5080
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		7.88	9.56	8.63	9.09	9.11
Selenium	7782-49-2	E475/VA	0.10	mg/kg		1.08	0.80	0.89	0.96	1.20
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0398	0.0445	0.0576	0.0704	0.0539
Sodium	7440-23-5	E475/VA	20	mg/kg		429	673	411	439	492
Strontium	7440-24-6	E475/VA	0.10	mg/kg		121	155	144	133	132
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0504	0.0398	0.0545	0.0628	0.0474
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	<0.10	<0.20 DLB	<0.20 DLB	<0.10
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		142	203	305	321	221
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.209	0.206	0.343	0.342	0.258
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		13.7	18.8	25.8	29.7	24.1
Zinc	7440-66-6	E475/VA	1.0	mg/kg		43.0	34.1	46.1	47.5	80.8
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		3.85	4.69	4.76	5.65	5.79

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-1_2024-08	MP_E1_PERT-2_2024-08	MP_E1_PERT-3_2024-08	MP_E1_PERT-4_2024-08	MP_E1_PERT-5_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-041	VA24C1418-042	VA24C1418-043	VA24C1418-044	VA24C1418-045
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	89.2	----	----	----
Moisture	----	E144-H/VA	2.0	%		87.0	----	84.1	78.8	83.0
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	9730	----	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		8440	----	3930	11700	10500
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	0.080	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.062	----	0.041	0.072	0.065
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	11.0	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		8.18	----	4.83	10.9	10.2
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	111	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		100	----	56.6	159	184
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	0.290	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.248	----	0.129	0.378	0.325
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	0.082	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.070	----	0.032	0.087	0.103
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	183	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		168	----	79.5	35.3	40.3
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	0.302	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.215	----	0.171	0.242	0.260
Calcium	7440-70-2	E475/VA	20	mg/kg		----	34500	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		36000	----	31700	16100	23200

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-1_2024-08	MP_E1_PERT-2_2024-08	MP_E1_PERT-3_2024-08	MP_E1_PERT-4_2024-08	MP_E1_PERT-5_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-041	VA24C1418-042	VA24C1418-043	VA24C1418-044	VA24C1418-045
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	1.30	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		1.03	----	0.537	1.45	1.22
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	31.0	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		20.8	----	9.93	24.0	22.2
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	7.88	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		6.36	----	3.55	10.4	8.74
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	30.9	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		29.3	----	38.1	180	147
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	18400	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		16400	----	7640	22300	20200
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	4.39	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		3.75	----	1.87	5.49	4.82
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	11.6	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		10.3	----	4.62	12.1	10.5
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	6050	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		5360	----	2930	6520	5770
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	921	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		640	----	458	1040	1040
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	0.0050	----	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	0.046	----	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0317	----	0.0367	0.0552	0.0646

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-1_2024-08	MP_E1_PERT-2_2024-08	MP_E1_PERT-3_2024-08	MP_E1_PERT-4_2024-08	MP_E1_PERT-5_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-041	VA24C1418-042	VA24C1418-043	VA24C1418-044	VA24C1418-045
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0041	----	0.0058	0.0117	0.0110
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	0.763	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.692	----	0.384	1.15	0.799
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	25.4	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		17.0	----	11.2	22.3	18.5
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	1440	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1300	----	1010	1150	1160
Potassium	7440-09-7	E475/VA	20	mg/kg		----	2970	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		2690	----	1570	1790	1900
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	10.9	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		9.68	----	4.79	9.12	8.74
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	0.81	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		0.65	----	0.38	0.74	0.83
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	0.0625	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0536	----	0.0409	0.102	0.0920
Sodium	7440-23-5	E475/VA	20	mg/kg		----	460	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		453	----	242	357	325
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	156	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		148	----	124	104	127
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	0.022	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	<0.020	<0.029 DLA	0.028

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-1_2024-08	MP_E1_PERT-2_2024-08	MP_E1_PERT-3_2024-08	MP_E1_PERT-4_2024-08	MP_E1_PERT-5_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-041	VA24C1418-042	VA24C1418-043	VA24C1418-044	VA24C1418-045
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	0.0794	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0709	----	0.0332	0.0721	0.0669
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	<0.20 DLB	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		0.15	----	<0.10	0.19	0.23
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	403	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		348	----	157	604	509
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	0.363	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.295	----	0.140	0.497	0.410
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	33.8	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		31.4	----	14.0	52.5	46.1
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	63.9	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		53.1	----	26.8	55.7	48.8
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	6.15	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		5.74	----	2.67	8.34	6.28

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-6_2024-08	MP_E1_PERT-7_2024-08	MP_E1_PERT-8_2024-08	MP_HAC-R1_INV-1_2024-08	MP_HAC-R1_INV-2_2024-08
					Client sampling date / time	08-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00
						VA24C1418-046	VA24C1418-047	VA24C1418-048	VA24C1418-049	VA24C1418-050
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		83.1	77.9	72.6	85.4	85.5
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		6420	12500	9690	1170	2170
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.070	0.066	0.068	0.047	0.059
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		9.00	10.0	9.35	2.23	2.52
Barium	7440-39-3	E472/VA	0.050	mg/kg		142	387	1320	59.9	79.1
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.230	0.306	0.277	0.042	0.058
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.046	0.059	0.063	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		54.2	68.9	48.9	4.1	4.1
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.341	0.368	0.392	1.27	1.09
Calcium	7440-70-2	E472/VA	20	mg/kg		34000	32600	37900	74600	58700
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.800	1.06	0.842	0.169	0.425
Chromium	7440-47-3	E472/VA	0.20	mg/kg		14.1	16.4	13.7	2.02	2.35
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		6.17	9.24	8.28	2.10	2.87
Copper	7440-50-8	E472/VA	0.20	mg/kg		97.5	179	158	116	142
Iron	7439-89-6	E472/VA	5.0	mg/kg		12400	18000	14800	1850	3120
Lead	7439-92-1	E472/VA	0.050	mg/kg		3.20	4.26	4.29	0.425	0.694
Lithium	7439-93-2	E472/VA	0.50	mg/kg		6.48	8.71	7.45	1.22	2.25
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		4100	6170	5020	2370	3070
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1540	2200	2870	890	1300
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0811	0.0672	0.122	0.0626	0.0566

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_PERT-6_2024-08	MP_E1_PERT-7_2024-08	MP_E1_PERT-8_2024-08	MP_HAC-R1_INV-1_2024-08	MP_HAC-R1_INV-2_2024-08
					Client sampling date / time	08-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00
						VA24C1418-046	VA24C1418-047	VA24C1418-048	VA24C1418-049	VA24C1418-050
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0137	0.0148	0.0335	0.0092	0.0082
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.974	0.782	1.25	1.92	2.37
Nickel	7440-02-0	E472/VA	0.20	mg/kg		14.6	14.6	14.4	2.03	2.92
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1800	1560	1660	14200	13000
Potassium	7440-09-7	E472/VA	20	mg/kg		3560	2780	3030	8130	7820
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		8.84	8.31	7.83	7.80	7.89
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.12	0.71	0.88	3.89	4.34
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0785	0.0789	0.123	0.0216	0.0277
Sodium	7440-23-5	E472/VA	20	mg/kg		350	497	1240	4560	4390
Strontium	7440-24-6	E472/VA	0.10	mg/kg		136	238	228	449	356
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.028 DLA	<0.034 DLA	0.023	0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0524	0.0523	0.0523	0.0116	0.0142
Tin	7440-31-5	E472/VA	0.10	mg/kg		0.17	0.17	0.17	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		293	495	557	68.7	195
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.251	0.337	0.320	0.0906	0.116
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		27.2	46.0	41.7	6.36	11.1
Zinc	7440-66-6	E472/VA	1.0	mg/kg		113	42.3	71.2	95.8	108
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		3.67	7.26	6.32	0.75	0.82

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-3_2024-08	MP_HAC-R1_INV-4_2024-08	MP_HAC-R1_INV-5_2024-08	MP_HAC-R1_INV-6_2024-08	MP_HAC-R1_INV-7_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1418-051	VA24C1418-052	VA24C1418-053	VA24C1418-054	VA24C1418-055
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		86.5	84.9	83.2	83.0	84.2
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		1080	1210	1300	1520	1350
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.043	0.051	0.054	0.042	0.080
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.40	2.68	1.94	2.10	3.60
Barium	7440-39-3	E472/VA	0.050	mg/kg		68.0	53.5	36.4	43.6	59.1
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.041	0.041	0.048	0.057	0.049
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.2	2.8	2.1	3.7	2.8
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.76	2.19	1.20	1.78	2.67
Calcium	7440-70-2	E472/VA	20	mg/kg		90200	53100	11900	6150	23900
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.162	0.165	0.154	0.188	0.179
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.56	1.71	1.60	1.93	1.75
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		2.01	2.20	1.98	2.26	2.14
Copper	7440-50-8	E472/VA	0.20	mg/kg		120	175	178	170	236
Iron	7439-89-6	E472/VA	5.0	mg/kg		1830	1980	2100	2460	2220
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.412	0.504	0.492	0.622	0.459
Lithium	7439-93-2	E472/VA	0.50	mg/kg		1.15	1.23	1.31	1.56	1.34
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2570	2400	1960	2360	2340
Manganese	7439-96-5	E472/VA	0.050	mg/kg		953	1160	1180	1240	1550
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0799	0.0570	0.0693	0.0559	0.0744

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-3_2024-08	MP_HAC-R1_INV-4_2024-08	MP_HAC-R1_INV-5_2024-08	MP_HAC-R1_INV-6_2024-08	MP_HAC-R1_INV-7_2024-08
					Client sampling date / time	15-Aug-2024 00:00	15-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1418-051	VA24C1418-052	VA24C1418-053	VA24C1418-054	VA24C1418-055
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0107	0.0086	0.0116	0.0095	0.0117
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.73	2.28	3.15	2.75	1.95
Nickel	7440-02-0	E472/VA	0.20	mg/kg		1.85	2.47	2.62	2.90	3.19
Phosphorus	7723-14-0	E472/VA	10	mg/kg		15300	16200	9320	8740	13100
Potassium	7440-09-7	E472/VA	20	mg/kg		8950	8990	9110	7940	9130
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		8.43	7.58	3.52	4.35	6.64
Selenium	7782-49-2	E472/VA	0.10	mg/kg		4.44	4.98	4.70	4.95	4.64
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0236	0.0246	0.0357	0.0352	0.0311
Sodium	7440-23-5	E472/VA	20	mg/kg		5170	5040	4290	4180	4320
Strontium	7440-24-6	E472/VA	0.10	mg/kg		543	325	56.7	29.4	135
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		0.026	0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0120	0.0103	0.0060	0.0076	0.0083
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		66.9	59.8	75.0	81.5	73.6
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0943	0.109	0.0937	0.105	0.0979
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		6.29	6.73	7.12	8.01	7.71
Zinc	7440-66-6	E472/VA	1.0	mg/kg		103	113	124	119	127
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.83	0.54	0.74	0.92	0.76

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-8_2024-08	MP_HAC-U_INV-1_2024-08	MP_HAC-U_INV-2_2024-08	MP_HAC-U_INV-3_2024-08	MP_HAC-U_INV-4_2024-08
					Client sampling date / time	14-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-056	VA24C1418-057	VA24C1418-058	VA24C1418-059	VA24C1418-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		75.2	81.9	76.7	84.8	82.6
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		1220	692	237	506	638
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.068	0.033	0.029	0.046	0.051
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.57	1.42	1.51	1.98	1.52
Barium	7440-39-3	E472/VA	0.050	mg/kg		75.9	83.5	42.7	74.7	60.7
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.052	0.019	<0.011 DLA	0.021	0.026
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.011 DLA	<0.020 DLA	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.5	2.3	2.4	3.5	3.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.78	1.90	2.31	2.50	1.41
Calcium	7440-70-2	E472/VA	20	mg/kg		4930	3350	16800	7340	4570
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.134	0.0541	0.0488	0.0815	0.0908
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.90	1.39	0.42	1.09	1.14
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.98	1.06	0.822	1.18	1.12
Copper	7440-50-8	E472/VA	0.20	mg/kg		147	121	144	152	136
Iron	7439-89-6	E472/VA	5.0	mg/kg		1910	940	432	1010	1160
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.590	0.265	0.164	0.238	0.328
Lithium	7439-93-2	E472/VA	0.50	mg/kg		1.11	<0.50	<0.57 DLA	<0.99 DLA	0.57
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1960	1710	1360	2070	1930
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1520	2700	2220	4150	3030
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0726	0.103	0.0633	0.0987	0.0834

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-8_2024-08	MP_HAC-U_INV-1_2024-08	MP_HAC-U_INV-2_2024-08	MP_HAC-U_INV-3_2024-08	MP_HAC-U_INV-4_2024-08
					Client sampling date / time	14-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-056	VA24C1418-057	VA24C1418-058	VA24C1418-059	VA24C1418-060
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0180	0.0186	0.0148	0.0150	0.0145
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.15	2.09	1.46	3.13	5.23
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.67	2.67	1.72	2.35	2.06
Phosphorus	7723-14-0	E472/VA	10	mg/kg		11400	9100	9620	11700	9460
Potassium	7440-09-7	E472/VA	20	mg/kg		10200	7280	5370	9020	7880
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.88	3.24	3.33	4.25	2.95
Selenium	7782-49-2	E472/VA	0.10	mg/kg		4.91	5.86	3.52	6.76	8.20
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0273	0.0314	0.0248	0.0649	0.0578
Sodium	7440-23-5	E472/VA	20	mg/kg		4390	2870	2150	4090	4090
Strontium	7440-24-6	E472/VA	0.10	mg/kg		28.2	30.8	61.5	28.6	23.0
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.023 DLA	<0.040 DLA	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0062	0.0050	0.0048	0.0062	0.0148
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	0.14	<0.11 DLA	<0.20 DLA	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		54.9	54.3	12.7	28.8	32.6
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0805	0.0593	0.0502	0.0882	0.102
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		6.29	3.22	1.91	3.96	4.34
Zinc	7440-66-6	E472/VA	1.0	mg/kg		121	119	72.5	133	158
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.68	0.73	<0.23 DLA	0.41	0.48

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INV-5_2024-08	MP_HAC-U_INV-6_2024-08	MP_HAC-U_INV-7_2024-08	MP_HAC-U_INV-8_2024-08	MP_HAC-D_INV-1_2024-08
					Client sampling date / time	12-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-061	VA24C1418-062	VA24C1418-063	VA24C1418-064	VA24C1418-065
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		78.2	81.0	81.6	78.9	79.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		648	2620	243	268	513
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.045	0.153	0.040	0.029	0.057
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.80	19.1	2.78	2.25	4.43
Barium	7440-39-3	E472/VA	0.050	mg/kg		45.6	50.6	48.1	41.0	54.2
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.024	0.104	<0.014 DLA	0.012	0.022
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	0.027	<0.014 DLA	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		4.4	9.2	5.0	2.9	4.8
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		2.02	1.68	2.70	1.52	1.54
Calcium	7440-70-2	E472/VA	20	mg/kg		24000	16600	17300	33600	49800
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0942	0.484	0.0520	0.0503	0.0803
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.22	6.08	0.55	0.50	1.04
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.944	7.55	0.949	0.899	1.10
Copper	7440-50-8	E472/VA	0.20	mg/kg		130	463	146	119	310
Iron	7439-89-6	E472/VA	5.0	mg/kg		1150	4700	664	543	1010
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.330	1.67	0.195	0.125	0.244
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.52	2.60	<0.70 DLA	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2670	11600	2760	1740	2520
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2280	1940	2650	2630	2960
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0918	0.132	0.104	0.0448	0.0647

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INV-5_2024-08	MP_HAC-U_INV-6_2024-08	MP_HAC-U_INV-7_2024-08	MP_HAC-U_INV-8_2024-08	MP_HAC-D_INV-1_2024-08
					Client sampling date / time	12-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-061	VA24C1418-062	VA24C1418-063	VA24C1418-064	VA24C1418-065
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0200	0.0252	0.0191	0.0094	0.0130
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.79	4.71	1.84	1.43	1.45
Nickel	7440-02-0	E472/VA	0.20	mg/kg		1.80	12.3	1.34	1.22	2.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		11900	29500	13200	9310	11600
Potassium	7440-09-7	E472/VA	20	mg/kg		8450	17200	8680	5440	6640
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.99	13.7	4.83	3.44	5.03
Selenium	7782-49-2	E472/VA	0.10	mg/kg		11.0	19.9	16.0	5.37	6.62
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0905	0.126	0.0831	0.0484	0.0824
Sodium	7440-23-5	E472/VA	20	mg/kg		5780	7340	6120	2670	3990
Strontium	7440-24-6	E472/VA	0.10	mg/kg		81.1	104	65.4	76.3	125
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.028 DLA	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0075	0.0581	0.0077	0.0064	0.0251
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.14 DLA	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		26.1	106	10.3	12.2	17.5
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0924	0.534	0.0594	0.0780	0.121
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		4.09	13.9	2.13	2.21	3.92
Zinc	7440-66-6	E472/VA	1.0	mg/kg		114	414	183	92.5	94.5
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	1.83	<0.28 DLA	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-2_2024-08	MP_HAC-D_INV-3_2024-08	MP_HAC-D_INV-4_2024-08	MP_HAC-D_INV-5_2024-08	MP_HAC-D_INV-6_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-066	VA24C1418-067	VA24C1418-068	VA24C1418-069	VA24C1418-070
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		72.0	73.8	84.5	79.6	81.5
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		954	411	2080	2760	2230
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.040	0.028	0.058	0.082	0.064
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		4.09	3.53	8.06	6.54	5.73
Barium	7440-39-3	E472/VA	0.050	mg/kg		29.0	9.38	51.5	88.2	73.5
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.040	0.017	0.075	0.098	0.075
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.010	<0.010	0.023	0.026	0.018
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.0	2.0	11.3	6.6	3.2
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.25	2.19	11.3	5.66	4.20
Calcium	7440-70-2	E472/VA	20	mg/kg		4080	2660	14700	9480	5550
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.170	0.110	0.467	0.493	0.319
Chromium	7440-47-3	E472/VA	0.20	mg/kg		2.04	1.20	4.23	5.78	3.71
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		2.36	1.94	4.79	4.52	3.40
Copper	7440-50-8	E472/VA	0.20	mg/kg		99.8	156	443	252	262
Iron	7439-89-6	E472/VA	5.0	mg/kg		1990	940	4350	5160	4320
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.638	0.267	1.19	1.55	1.11
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.93	0.51	2.77	3.12	2.02
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1170	1160	2890	2700	2290
Manganese	7439-96-5	E472/VA	0.050	mg/kg		378	410	1660	3770	2280
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0447	0.109	0.175	0.122	0.130

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-2_2024-08	MP_HAC-D_INV-3_2024-08	MP_HAC-D_INV-4_2024-08	MP_HAC-D_INV-5_2024-08	MP_HAC-D_INV-6_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-066	VA24C1418-067	VA24C1418-068	VA24C1418-069	VA24C1418-070
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0125	0.0286	0.0271	0.0248	0.0240
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.34	0.875	2.47	2.97	2.88
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.98	1.63	5.89	7.03	4.84
Phosphorus	7723-14-0	E472/VA	10	mg/kg		5390	7010	11700	10800	9560
Potassium	7440-09-7	E472/VA	20	mg/kg		5070	6010	10000	10100	8570
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.54	4.99	10.6	8.54	5.89
Selenium	7782-49-2	E472/VA	0.10	mg/kg		3.70	6.46	9.44	6.33	6.95
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0259	0.0259	0.117	0.0965	0.0686
Sodium	7440-23-5	E472/VA	20	mg/kg		1850	3160	3750	4570	4290
Strontium	7440-24-6	E472/VA	0.10	mg/kg		25.7	11.5	54.8	43.0	40.4
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.035 DLA	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0255	0.0138	0.0498	0.0515	0.0468
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.21	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		38.6	20.5	87.1	112	96.6
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.144	0.0406	0.173	0.174	0.130
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		5.19	2.32	11.1	13.1	12.4
Zinc	7440-66-6	E472/VA	1.0	mg/kg		84.8	116	164	121	123
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.69	0.35	0.58	1.91	1.63

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-7_2024-08	MP_HAC-D_INV-8_2024-08	MP_EDC-U_INV-1_2024-08	MP_EDC-U_INV-2_2024-08	MP_EDC-U_INV-3_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-071	VA24C1418-072	VA24C1418-073	VA24C1418-074	VA24C1418-075
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	87.6	----	----
Moisture	----	E144-H/VA	2.0	%		70.2	76.3	----	71.4	86.9
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	1690	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		2430	4890	----	203	715
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	0.044	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.087	0.056	----	0.012	0.025
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	1.81	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		4.38	3.50	----	0.721	1.62
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	22.7	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		60.8	90.3	----	10.9	13.5
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	0.044	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.085	0.204	----	<0.010	0.023
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	0.012	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.016	0.017	----	<0.010	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	1.4	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		4.1	7.9	----	2.6	1.4
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	5.19	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.64	1.66	----	0.657	4.46
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	4390	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		5630	10200	----	3680	2670

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-7_2024-08	MP_HAC-D_INV-8_2024-08	MP_EDC-U_INV-1_2024-08	MP_EDC-U_INV-2_2024-08	MP_EDC-U_INV-3_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-071	VA24C1418-072	VA24C1418-073	VA24C1418-074	VA24C1418-075
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.130	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.351	0.302	----	0.0148	0.0582
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	4.64	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		4.25	6.94	----	0.65	2.38
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	2.57	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		3.77	4.26	----	1.06	3.42
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	35.3	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		173	129	----	23.7	26.7
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	2550	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		4560	7020	----	539	1590
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	0.538	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		1.11	1.26	----	0.079	0.291
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	1.35	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		2.77	4.35	----	<0.50	0.59
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	2830	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2640	3390	----	4600	2180
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	636	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2660	2780	----	888	701
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.0114	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.092	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0721	0.0779	----	0.0238	0.0849

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-7_2024-08	MP_HAC-D_INV-8_2024-08	MP_EDC-U_INV-1_2024-08	MP_EDC-U_INV-2_2024-08	MP_EDC-U_INV-3_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-071	VA24C1418-072	VA24C1418-073	VA24C1418-074	VA24C1418-075
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0214	0.0185	----	0.0068	0.0111
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.979	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		3.26	2.82	----	0.397	1.03
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	4.08	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		6.61	8.63	----	1.68	2.65
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	12800	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		6820	5930	----	11400	10000
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	10500	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		6700	5960	----	4580	8110
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	10.4	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		4.84	3.68	----	2.92	7.56
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	1.90	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		7.49	4.65	----	0.48	1.34
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	0.232	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0661	0.0761	----	0.101	0.245
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	5960	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		3790	2650	----	2160	6110
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	23.6	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		29.2	48.9	----	23.4	12.6
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	<0.020	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.023 DLA	<0.029 DLA	----	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INV-7_2024-08	MP_HAC-D_INV-8_2024-08	MP_EDC-U_INV-1_2024-08	MP_EDC-U_INV-2_2024-08	MP_EDC-U_INV-3_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-071	VA24C1418-072	VA24C1418-073	VA24C1418-074	VA24C1418-075
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0307	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0261	0.0370	----	0.0107	0.0263
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.12 DLA	<0.14 DLA	----	<0.10	<0.10
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	64.0	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		117	212	----	6.65	29.6
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.196	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.119	0.178	----	0.0478	0.160
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	5.61	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		13.4	27.7	----	0.86	3.16
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	275	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		121	106	----	218	206
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	1.22	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		1.49	1.54	----	<0.20	0.71

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INV-4_2024-08	MP_EDC-U_INV-5_2024-08	MP_EDC-U_INV-6_2024-08	MP_EDC-U_INV-7_2024-08	MP_EDC-U_INV-8_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-076	VA24C1418-077	VA24C1418-078	VA24C1418-079	VA24C1418-080
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%	----	87.2	78.4	86.2	83.2	
Moisture	----	E144A/VA	2.0	%	87.9	----	----	----	----	
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg	----	1240	1050	2830	432	
Aluminum	7429-90-5	E475/VA	5.0	mg/kg	1280	----	----	----	----	
Antimony	7440-36-0	E472/VA	0.010	mg/kg	----	0.049	0.026	0.050	0.020	
Antimony	7440-36-0	E475/VA	0.020	mg/kg	0.033	----	----	----	----	
Arsenic	7440-38-2	E472/VA	0.030	mg/kg	----	1.92	1.83	3.83	1.08	
Arsenic	7440-38-2	E475/VA	0.050	mg/kg	2.18	----	----	----	----	
Barium	7440-39-3	E472/VA	0.050	mg/kg	----	25.6	17.7	44.7	18.5	
Barium	7440-39-3	E475/VA	0.050	mg/kg	30.9	----	----	----	----	
Beryllium	7440-41-7	E472/VA	0.010	mg/kg	----	0.039	0.034	0.087	0.014	
Beryllium	7440-41-7	E475/VA	0.010	mg/kg	0.036	----	----	----	----	
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	----	<0.010	<0.010	0.018	<0.010	
Bismuth	7440-69-9	E475/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E472/VA	1.0	mg/kg	----	1.3	<1.0	1.8	1.7	
Boron	7440-42-8	E475/VA	1.0	mg/kg	1.3	----	----	----	----	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	----	3.45	1.01	3.84	1.75	
Cadmium	7440-43-9	E475/VA	0.010	mg/kg	3.73	----	----	----	----	
Calcium	7440-70-2	E472/VA	20	mg/kg	----	4320	1820	14500	2160	
Calcium	7440-70-2	E475/VA	20	mg/kg	3850	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INV-4_2024-08	MP_EDC-U_INV-5_2024-08	MP_EDC-U_INV-6_2024-08	MP_EDC-U_INV-7_2024-08	MP_EDC-U_INV-8_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-076	VA24C1418-077	VA24C1418-078	VA24C1418-079	VA24C1418-080
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0950	0.0647	0.188	0.0290
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0934	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	3.60	2.72	8.09	1.59
Chromium	7440-47-3	E475/VA	0.20	mg/kg		3.66	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	3.45	1.89	4.40	1.78
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		4.80	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	27.7	24.9	60.2	20.2
Copper	7440-50-8	E475/VA	0.20	mg/kg		29.3	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	2420	2190	5180	1110
Iron	7439-89-6	E475/VA	5.0	mg/kg		2740	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	0.469	0.385	1.00	0.192
Lead	7439-92-1	E475/VA	0.050	mg/kg		0.375	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	0.96	0.83	2.18	<0.50
Lithium	7439-93-2	E475/VA	0.50	mg/kg		0.95	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	2360	1310	3250	1840
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		2540	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	1080	631	1250	504
Manganese	7439-96-5	E475/VA	0.050	mg/kg		1560	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0138	0.0285	0.0124	0.0180
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.108	0.132	0.0899	0.107
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0154	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INV-4_2024-08	MP_EDC-U_INV-5_2024-08	MP_EDC-U_INV-6_2024-08	MP_EDC-U_INV-7_2024-08	MP_EDC-U_INV-8_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-076	VA24C1418-077	VA24C1418-078	VA24C1418-079	VA24C1418-080
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.127	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	1.10	0.306	1.02	0.712
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.03	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	3.54	2.82	6.64	1.92
Nickel	7440-02-0	E475/VA	0.20	mg/kg		3.74	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	11100	7200	10800	9990
Phosphorus	7723-14-0	E475/VA	20	mg/kg		12300	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	9000	7150	8770	9080
Potassium	7440-09-7	E475/VA	20	mg/kg		10300	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	7.91	8.15	8.95	5.62
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		10.0	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	1.34	1.40	1.39	1.57
Selenium	7782-49-2	E475/VA	0.10	mg/kg		1.76	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.206	0.135	0.658	0.120
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.220	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	5150	5590	4730	6720
Sodium	7440-23-5	E475/VA	20	mg/kg		6310	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	23.6	10.0	42.7	9.13
Strontium	7440-24-6	E475/VA	0.10	mg/kg		17.9	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INV-4_2024-08	MP_EDC-U_INV-5_2024-08	MP_EDC-U_INV-6_2024-08	MP_EDC-U_INV-7_2024-08	MP_EDC-U_INV-8_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-076	VA24C1418-077	VA24C1418-078	VA24C1418-079	VA24C1418-080
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0264	0.0201	0.0726	0.0118
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0252	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	47.5	36.6	101	16.8
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		47.4	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.206	0.143	0.366	0.108
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.169	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	5.43	4.46	12.2	2.20
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		5.13	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	240	114	175	171
Zinc	7440-66-6	E475/VA	1.0	mg/kg		214	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	1.08	0.86	1.46	0.43
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		1.02	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INV-1_2024-08	MP_EDC-D_INV-2_2024-08	MP_EDC-D_INV-3_2024-08	MP_EDC-D_INV-4_2024-08	MP_EDC-D_INV-5_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-081	VA24C1418-082	VA24C1418-083	VA24C1418-084	VA24C1418-085
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		81.9	71.1	80.6	82.9	73.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		718	94.7	902	1670	104
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.026	<0.010	0.030	0.029	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		4.75	6.04	8.09	7.50	1.29
Barium	7440-39-3	E472/VA	0.050	mg/kg		35.9	7.02	39.8	48.2	8.17
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.029	<0.010	0.035	0.056	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.012	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.6	3.2	8.9	13.3	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.427	0.118	0.899	0.934	0.298
Calcium	7440-70-2	E472/VA	20	mg/kg		2470	2420	3090	2530	1650
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.125	0.0230	0.147	0.263	0.0306
Chromium	7440-47-3	E472/VA	0.20	mg/kg		2.16	0.47	2.54	4.05	0.43
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.34	0.501	1.70	1.99	0.377
Copper	7440-50-8	E472/VA	0.20	mg/kg		38.5	31.1	29.6	27.1	55.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		1760	283	1930	2940	297
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.376	<0.050	0.407	0.598	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.75	<0.50	0.84	1.65	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1360	3380	1940	2220	1690
Manganese	7439-96-5	E472/VA	0.050	mg/kg		643	200	661	564	228
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0738	0.0116	0.0492	0.0446	0.0510

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INV-1_2024-08	MP_EDC-D_INV-2_2024-08	MP_EDC-D_INV-3_2024-08	MP_EDC-D_INV-4_2024-08	MP_EDC-D_INV-5_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-081	VA24C1418-082	VA24C1418-083	VA24C1418-084	VA24C1418-085
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0133	0.0033	0.0095	0.0076	0.0134
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.910	0.452	1.25	1.23	0.434
Nickel	7440-02-0	E472/VA	0.20	mg/kg		5.86	3.23	5.33	4.35	1.57
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7460	10600	9060	10900	8670
Potassium	7440-09-7	E472/VA	20	mg/kg		8150	7480	9450	11200	6380
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.28	2.62	5.53	6.84	2.54
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.48	0.69	2.35	1.76	1.61
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.136	0.0793	0.0908	0.0978	0.222
Sodium	7440-23-5	E472/VA	20	mg/kg		4040	2610	3250	3540	2930
Strontium	7440-24-6	E472/VA	0.10	mg/kg		20.2	18.7	26.2	17.8	9.53
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0148	0.0061	0.0201	0.0222	0.0039
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		29.1	3.68	32.3	63.3	4.60
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0787	0.0189	0.103	0.102	0.0121
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		2.86	0.36	3.29	5.41	0.41
Zinc	7440-66-6	E472/VA	1.0	mg/kg		162	164	181	165	173
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.74	<0.20	0.81	1.24	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INV-6_2024-08	MP_EDC-D_INV-7_2024-08	MP_EDC-D_INV-8_2024-08	MP_E1_INV-1_2024-08	MP_E1_INV-2_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-086	VA24C1418-087	VA24C1418-088	VA24C1418-089	VA24C1418-090
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		76.7	72.6	73.1	74.9	83.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		231	114	126	304	1190
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.018	<0.010	0.012	0.019	0.037
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.46	0.938	2.18	1.94	5.65
Barium	7440-39-3	E472/VA	0.050	mg/kg		11.1	5.35	7.73	8.26	19.6
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.012	0.036
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.5	<1.0	<1.0	2.0	6.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.367	0.392	0.447	0.980	2.71
Calcium	7440-70-2	E472/VA	20	mg/kg		1770	3030	2620	3320	4110
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0434	0.0356	0.0330	0.0589	0.187
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.77	0.48	0.54	1.04	3.33
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.553	0.360	0.524	0.865	2.76
Copper	7440-50-8	E472/VA	0.20	mg/kg		37.4	43.2	33.3	48.3	42.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		539	293	344	772	2340
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.105	<0.050	0.066	0.216	0.537
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	1.32
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1420	1750	1840	2650	2030
Manganese	7439-96-5	E472/VA	0.050	mg/kg		285	230	236	212	223
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0801	0.110	0.0552	0.0682	0.0452

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INV-6_2024-08	MP_EDC-D_INV-7_2024-08	MP_EDC-D_INV-8_2024-08	MP_E1_INV-1_2024-08	MP_E1_INV-2_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-086	VA24C1418-087	VA24C1418-088	VA24C1418-089	VA24C1418-090
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0186	0.0300	0.0149	0.0171	0.0072
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.630	0.413	0.457	0.602	0.877
Nickel	7440-02-0	E472/VA	0.20	mg/kg		1.84	0.99	1.53	1.70	3.93
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9530	9340	9660	10500	10200
Potassium	7440-09-7	E472/VA	20	mg/kg		8160	6490	6750	6720	9360
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		2.57	2.11	3.05	2.41	8.79
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.45	2.02	1.40	1.62	3.27
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.133	0.201	0.154	0.231	0.0891
Sodium	7440-23-5	E472/VA	20	mg/kg		3990	2620	2830	5540	4340
Strontium	7440-24-6	E472/VA	0.10	mg/kg		13.0	13.1	12.4	13.8	21.0
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0075	0.0039	0.0047	0.0103	0.0229
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	0.26
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		9.71	4.52	5.56	13.6	47.0
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0452	0.0124	0.0142	0.0295	0.0855
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		1.12	0.43	0.51	1.73	4.46
Zinc	7440-66-6	E472/VA	1.0	mg/kg		182	154	181	154	168
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.27	<0.20	<0.20	0.22	0.79

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INV-3_2024-08	MP_E1_INV-4_2024-08	MP_E1_INV-5_2024-08	MP_E1_INV-6_2024-08	MP_E1_INV-7_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1418-091	VA24C1418-092	VA24C1418-093	VA24C1418-094	VA24C1418-095
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		77.4	79.4	77.3	79.6	79.5
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		712	1010	1320	673	424
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.025	0.034	0.047	0.026	0.011
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		3.63	2.70	3.04	3.74	1.32
Barium	7440-39-3	E472/VA	0.050	mg/kg		19.8	16.3	37.6	36.3	21.2
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.023	0.037	0.045	0.025	0.015
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.7	2.4	3.3	2.5	1.5
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.90	1.84	1.84	1.73	0.638
Calcium	7440-70-2	E472/VA	20	mg/kg		3970	3880	3490	1980	2410
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.122	0.126	0.170	0.0936	0.0565
Chromium	7440-47-3	E472/VA	0.20	mg/kg		2.00	2.56	3.35	2.74	1.10
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.63	1.90	2.15	2.05	0.650
Copper	7440-50-8	E472/VA	0.20	mg/kg		38.4	53.1	49.1	79.5	47.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		1440	1900	2490	1440	881
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.304	0.482	0.526	0.336	0.185
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.79	1.07	1.38	0.69	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2380	2960	1880	1850	1000
Manganese	7439-96-5	E472/VA	0.050	mg/kg		249	243	424	526	360
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0543	0.0560	0.0824	0.0877	0.0364

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INV-3_2024-08	MP_E1_INV-4_2024-08	MP_E1_INV-5_2024-08	MP_E1_INV-6_2024-08	MP_E1_INV-7_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1418-091	VA24C1418-092	VA24C1418-093	VA24C1418-094	VA24C1418-095
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0123	0.0116	0.0187	0.0179	0.0075
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.565	0.765	1.30	0.968	0.283
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.53	2.62	3.51	2.54	1.16
Phosphorus	7723-14-0	E472/VA	10	mg/kg		8940	10300	8130	8650	3790
Potassium	7440-09-7	E472/VA	20	mg/kg		7180	7100	7500	8800	3070
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.54	4.62	4.32	4.75	1.85
Selenium	7782-49-2	E472/VA	0.10	mg/kg		2.26	1.76	1.92	2.28	0.81
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.140	0.115	0.0474	0.0965	0.0655
Sodium	7440-23-5	E472/VA	20	mg/kg		3250	6430	5260	4780	1830
Strontium	7440-24-6	E472/VA	0.10	mg/kg		19.9	18.2	17.5	10.8	10.8
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0132	0.0150	0.0183	0.0119	0.0085
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	0.18	<0.10	0.26	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		29.8	50.8	54.6	31.4	15.9
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0872	0.0682	0.0902	0.0716	0.0628
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		2.81	4.73	5.27	3.07	1.54
Zinc	7440-66-6	E472/VA	1.0	mg/kg		143	121	145	140	66.4
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.57	0.82	0.99	0.63	0.27

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INV-8_2024-08	MP_HAC-R1_INVTRI-1_2024-08	MP_HAC-R1_INVTRI-2_2024-08	MP_HAC-R1_INVTRI-3_2024-08	MP_HAC-R1_INVTRI-4_2024-08
					Client sampling date / time	07-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00
						VA24C1418-096	VA24C1418-097	VA24C1418-098	VA24C1418-099	VA24C1418-100
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		79.9	75.0	76.0	75.0	60.7
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		1560	75.0	85.1	49.7	36.0
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.076	0.029	0.027	0.021	0.014
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		3.65	0.326	0.416	0.309	0.298
Barium	7440-39-3	E472/VA	0.050	mg/kg		36.9	2.03	1.67	1.42	1.43
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.045	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.011	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		2.4	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		2.74	<0.010	0.011	<0.010	<0.010
Calcium	7440-70-2	E472/VA	20	mg/kg		3340	470	585	582	522
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.167	0.0097	0.0101	0.0089	0.0062
Chromium	7440-47-3	E472/VA	0.20	mg/kg		4.96	<0.20	0.30	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		2.54	0.109	0.154	0.102	0.056
Copper	7440-50-8	E472/VA	0.20	mg/kg		74.9	18.5	19.5	17.2	10.4
Iron	7439-89-6	E472/VA	5.0	mg/kg		3210	181	225	146	108
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.695	<0.050	0.082	0.051	0.267
Lithium	7439-93-2	E472/VA	0.50	mg/kg		1.99	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2740	1100	1060	1010	636
Manganese	7439-96-5	E472/VA	0.050	mg/kg		670	62.2	99.7	75.2	66.8
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.114	0.0636	0.0699	0.0485	0.0552

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INV-8_2024-08	MP_HAC-R1_INVTRI-1_2024-08	MP_HAC-R1_INVTRI-2_2024-08	MP_HAC-R1_INVTRI-3_2024-08	MP_HAC-R1_INVTRI-4_2024-08
					Client sampling date / time	07-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00	15-Aug-2024 00:00
						VA24C1418-096	VA24C1418-097	VA24C1418-098	VA24C1418-099	VA24C1418-100
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0229	0.0159	0.0168	0.0121	0.0217
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.33	5.35	8.02	6.16	5.48
Nickel	7440-02-0	E472/VA	0.20	mg/kg		6.10	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9990	7570	7040	7540	5020
Potassium	7440-09-7	E472/VA	20	mg/kg		7870	6560	5920	6720	3820
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.40	1.31	1.10	1.49	1.04
Selenium	7782-49-2	E472/VA	0.10	mg/kg		2.45	10.9	11.2	10.5	6.91
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0906	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		5460	2100	2210	1980	1140
Strontium	7440-24-6	E472/VA	0.10	mg/kg		20.0	3.28	3.53	4.43	3.40
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0239	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		57.4	8.66	4.98	3.45	2.80
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0926	0.0042	0.0041	0.0036	0.0021
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		6.53	0.36	0.46	0.29	0.21
Zinc	7440-66-6	E472/VA	1.0	mg/kg		178	102	103	80.3	71.5
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.98	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INVTRI-5_2024-08	MP_HAC-R1_INVTRI-6_2024-08	MP_HAC-R1_INVTRI-7_2024-08	MP_HAC-R1_INVTRI-8_2024-08	MP_HAC-U_INVTRI-1_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-101	VA24C1418-102	VA24C1418-103	VA24C1418-104	VA24C1418-105
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		75.7	78.7	77.1	75.9	77.3
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		45.5	46.8	58.1	57.0	21.1
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.021	0.028	0.023	0.021	0.016
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.426	0.354	0.376	0.366	0.341
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.84	1.47	1.96	1.51	2.09
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.011	0.011	<0.010	<0.010	0.011
Calcium	7440-70-2	E472/VA	20	mg/kg		654	644	615	700	963
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0085	0.0097	0.0113	0.0120	0.0087
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.071	0.079	0.100	0.080	0.056
Copper	7440-50-8	E472/VA	0.20	mg/kg		17.8	20.2	20.3	18.3	20.5
Iron	7439-89-6	E472/VA	5.0	mg/kg		134	144	182	209	114
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1180	1230	1270	1360	1260
Manganese	7439-96-5	E472/VA	0.050	mg/kg		88.4	81.0	109	98.9	104
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0537	0.0456	0.0788	0.0559	0.0622

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INVTRI-5_2024-08	MP_HAC-R1_INVTRI-6_2024-08	MP_HAC-R1_INVTRI-7_2024-08	MP_HAC-R1_INVTRI-8_2024-08	MP_HAC-U_INVTRI-1_2024-08
					Client sampling date / time	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00	13-Aug-2024 00:00
						VA24C1418-101	VA24C1418-102	VA24C1418-103	VA24C1418-104	VA24C1418-105
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0130	0.0097	0.0180	0.0134	0.0141
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		6.36	7.97	7.26	7.83	10.1
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7900	8150	8210	8200	8080
Potassium	7440-09-7	E472/VA	20	mg/kg		7170	7620	7640	7380	7420
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.51	1.76	1.67	1.30	1.50
Selenium	7782-49-2	E472/VA	0.10	mg/kg		10.8	16.4	13.8	13.2	16.7
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		2510	2620	2630	2870	2610
Strontium	7440-24-6	E472/VA	0.10	mg/kg		4.73	4.39	4.06	4.66	4.06
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		4.02	3.43	4.09	6.07	1.45
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0031	0.0035	0.0047	0.0041	0.0026
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.30	0.30	0.34	0.36	0.21
Zinc	7440-66-6	E472/VA	1.0	mg/kg		87.3	101	112	107	99.3
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INVTRI-2_2024-08	MP_HAC-U_INVTRI-3_2024-08	MP_HAC-U_INVTRI-4_2024-08	MP_HAC-U_INVTRI-5_2024-08	MP_HAC-U_INVTRI-6_2024-08
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-106	VA24C1418-107	VA24C1418-108	VA24C1418-109	VA24C1418-110
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		70.9	77.5	75.1	77.6	73.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		11.4	62.2	83.5	38.3	30.0
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.012	0.015	0.022	0.022	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.302	0.713	0.574	0.497	0.481
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.50	5.00	15.0	4.18	4.29
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	4.1	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		<0.010	0.044	0.110	0.043	0.037
Calcium	7440-70-2	E472/VA	20	mg/kg		430	1170	908	3400	663
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		<0.0050	0.0129	0.0135	0.0095	0.0112
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.045	0.378	0.210	0.124	0.083
Copper	7440-50-8	E472/VA	0.20	mg/kg		15.6	33.5	20.9	22.0	22.9
Iron	7439-89-6	E472/VA	5.0	mg/kg		77.1	188	206	131	105
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	0.052	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		910	1340	1180	1090	1070
Manganese	7439-96-5	E472/VA	0.050	mg/kg		81.2	276	1170	386	230
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0360	0.0445	0.0649	0.0625	0.0241

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INVTRI-2_2024-08	MP_HAC-U_INVTRI-3_2024-08	MP_HAC-U_INVTRI-4_2024-08	MP_HAC-U_INVTRI-5_2024-08	MP_HAC-U_INVTRI-6_2024-08
					Client sampling date / time	13-Aug-2024 00:00	13-Aug-2024 00:00	13-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-106	VA24C1418-107	VA24C1418-108	VA24C1418-109	VA24C1418-110
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0104	0.0100	0.0161	0.0140	0.0063
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		4.50	18.5	5.82	7.21	5.64
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	0.21	0.26	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		5750	9300	7440	7370	6900
Potassium	7440-09-7	E472/VA	20	mg/kg		5500	6710	6900	7440	5750
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		0.820	1.33	1.34	1.36	1.05
Selenium	7782-49-2	E472/VA	0.10	mg/kg		9.89	16.2	11.0	12.3	12.0
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.0166	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		1920	2660	2250	2210	2580
Strontium	7440-24-6	E472/VA	0.10	mg/kg		2.72	7.39	6.64	10.5	4.52
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	0.0031	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.85	3.66	5.09	2.20	1.76
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0023	0.0264	0.0242	0.0109	0.0102
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.12	0.81	0.63	0.39	0.26
Zinc	7440-66-6	E472/VA	1.0	mg/kg		69.8	124	90.1	90.0	92.5
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INVTRI-7_2024-08	MP_HAC-U_INVTRI-8_2024-08	MP_HAC-D_INVTRI-1_2024-08	MP_HAC-D_INVTRI-2_2024-08	MP_HAC-D_INVTRI-3_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-111	VA24C1418-112	VA24C1418-113	VA24C1418-114	VA24C1418-115
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		73.4	73.6	71.3	77.9	75.4
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		198	5.8	57.8	483	903
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.012	0.016	0.020	0.027	0.036
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.470	0.238	0.644	1.27	1.76
Barium	7440-39-3	E472/VA	0.050	mg/kg		5.64	2.59	7.63	14.4	22.8
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.018	0.029
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	1.6	3.3
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.026	0.011	0.069	0.345	0.317
Calcium	7440-70-2	E472/VA	20	mg/kg		918	687	902	2330	3540
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0322	<0.0050	0.0182	0.0907	0.128
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	1.10	1.51
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.284	0.043	0.252	1.12	1.42
Copper	7440-50-8	E472/VA	0.20	mg/kg		21.9	18.1	15.3	43.5	57.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		284	75.3	193	943	1310
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	0.086	0.314	0.545
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	0.77
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1250	936	979	1220	1270
Manganese	7439-96-5	E472/VA	0.050	mg/kg		272	159	157	311	618
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0645	0.0846	0.0357	0.0318	0.0436

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-U_INVTRI-7_2024-08	MP_HAC-U_INVTRI-8_2024-08	MP_HAC-D_INVTRI-1_2024-08	MP_HAC-D_INVTRI-2_2024-08	MP_HAC-D_INVTRI-3_2024-08
					Client sampling date / time	10-Aug-2024 00:00	10-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-111	VA24C1418-112	VA24C1418-113	VA24C1418-114	VA24C1418-115
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0171	0.0223	0.0102	0.0070	0.0107
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		11.8	7.32	7.84	6.70	5.75
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	0.27	1.42	1.99
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7820	7140	6650	8430	8750
Potassium	7440-09-7	E472/VA	20	mg/kg		6170	5560	5620	5800	6770
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.45	1.06	1.18	2.40	2.86
Selenium	7782-49-2	E472/VA	0.10	mg/kg		20.1	13.8	13.3	7.57	10.9
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	0.0165	0.0213
Sodium	7440-23-5	E472/VA	20	mg/kg		2210	1920	2180	2650	3150
Strontium	7440-24-6	E472/VA	0.10	mg/kg		5.60	3.86	6.63	14.1	16.2
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	0.0104	0.0150
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	0.20
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		24.9	<0.50	3.07	22.4	30.7
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0250	0.0025	0.0062	0.0496	0.0573
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		1.16	<0.10	0.28	2.20	3.21
Zinc	7440-66-6	E472/VA	1.0	mg/kg		108	91.2	71.1	111	110
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	0.40	0.53

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INVTRI-4_2024-08	MP_HAC-D_INVTRI-5_2024-08	MP_HAC-D_INVTRI-6_2024-08	MP_HAC-D_INVTRI-7_2024-08	MP_HAC-D_INVTRI-8_2024-08
					Client sampling date / time	09-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-116	VA24C1418-117	VA24C1418-118	VA24C1418-119	VA24C1418-120
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		77.7	80.2	77.5	81.3	81.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		802	990	706	1420	2180
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.049	0.055	0.049	0.064	0.064
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.89	1.95	2.28	3.31	3.57
Barium	7440-39-3	E472/VA	0.050	mg/kg		37.0	39.5	52.2	84.7	87.4
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.030	0.036	0.024	0.055	0.079
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.011	0.011	<0.010	0.019	0.026
Boron	7440-42-8	E472/VA	1.0	mg/kg		3.4	2.8	2.6	6.9	4.1
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.400	0.198	0.327	0.707	0.521
Calcium	7440-70-2	E472/VA	20	mg/kg		3580	2360	2970	7150	4220
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.145	0.168	0.111	0.247	0.381
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.88	2.13	2.33	3.33	4.72
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.68	1.45	1.66	2.92	3.23
Copper	7440-50-8	E472/VA	0.20	mg/kg		68.0	53.5	58.5	102	110
Iron	7439-89-6	E472/VA	5.0	mg/kg		1610	1920	1750	3130	4570
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.540	0.607	0.464	0.897	1.35
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.88	1.12	0.78	1.56	2.49
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1280	1370	1160	1440	1880
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1140	1160	1660	2570	2430
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0517	0.0837	0.0694	0.0736	0.0861

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-D_INVTRI-4_2024-08	MP_HAC-D_INVTRI-5_2024-08	MP_HAC-D_INVTRI-6_2024-08	MP_HAC-D_INVTRI-7_2024-08	MP_HAC-D_INVTRI-8_2024-08
					Client sampling date / time	09-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-116	VA24C1418-117	VA24C1418-118	VA24C1418-119	VA24C1418-120
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0115	0.0165	0.0156	0.0137	0.0157
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		5.17	7.10	4.71	4.10	4.14
Nickel	7440-02-0	E472/VA	0.20	mg/kg		2.52	2.53	2.35	4.26	9.70
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7980	7490	6630	7880	7480
Potassium	7440-09-7	E472/VA	20	mg/kg		6900	7020	6960	8380	7480
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		3.01	2.21	2.64	3.74	3.77
Selenium	7782-49-2	E472/VA	0.10	mg/kg		8.37	10.0	11.8	5.56	5.49
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0289	0.0219	0.0237	0.0417	0.0513
Sodium	7440-23-5	E472/VA	20	mg/kg		2880	3010	3090	3620	3400
Strontium	7440-24-6	E472/VA	0.10	mg/kg		17.8	14.6	16.5	28.8	27.1
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0153	0.0166	0.0152	0.0288	0.0384
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		37.5	44.3	30.5	62.6	90.8
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0777	0.0635	0.0558	0.122	0.160
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		3.95	4.44	4.47	7.91	10.2
Zinc	7440-66-6	E472/VA	1.0	mg/kg		128	108	93.6	133	138
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.66	0.71	0.26	1.16	1.66

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INVTRI-1_2024-08	MP_EDC-U_INVTRI-2_2024-08	MP_EDC-U_INVTRI-3_2024-08	MP_EDC-U_INVTRI-4_2024-08	MP_EDC-U_INVTRI-5_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-121	VA24C1418-122	VA24C1418-123	VA24C1418-124	VA24C1418-125
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		77.7	77.2	77.6	77.3	78.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		38.4	65.3	91.8	185	48.6
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	0.011	0.013	0.011
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.505	0.496	0.622	0.499	0.381
Barium	7440-39-3	E472/VA	0.050	mg/kg		7.74	9.78	19.6	12.0	5.52
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.048	0.042	0.142	0.062	0.043
Calcium	7440-70-2	E472/VA	20	mg/kg		1040	780	678	676	671
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0060	0.0128	<0.0050
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.30	0.25	0.34	0.66	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.644	0.923	1.60	1.03	1.19
Copper	7440-50-8	E472/VA	0.20	mg/kg		14.6	17.0	15.5	15.8	16.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		146	436	400	534	278
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	0.052	0.055	0.096	0.057
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1230	1200	1290	1160	1340
Manganese	7439-96-5	E472/VA	0.050	mg/kg		288	560	974	532	746
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0273	0.0707	0.0560	0.0665	0.0551

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INVTRI-1_2024-08	MP_EDC-U_INVTRI-2_2024-08	MP_EDC-U_INVTRI-3_2024-08	MP_EDC-U_INVTRI-4_2024-08	MP_EDC-U_INVTRI-5_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00
						VA24C1418-121	VA24C1418-122	VA24C1418-123	VA24C1418-124	VA24C1418-125
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0061	0.0161	0.0126	0.0151	0.0116
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		5.17	2.65	2.07	1.91	2.21
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.61	0.45	1.00	0.73	0.29
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9070	7790	7640	7670	8290
Potassium	7440-09-7	E472/VA	20	mg/kg		7280	6100	7440	6840	7230
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.84	1.24	1.44	1.86	1.49
Selenium	7782-49-2	E472/VA	0.10	mg/kg		0.57	0.79	0.86	0.96	0.85
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0248	0.0264	0.0232	0.0238	0.0222
Sodium	7440-23-5	E472/VA	20	mg/kg		2750	2680	3030	2090	2900
Strontium	7440-24-6	E472/VA	0.10	mg/kg		6.36	5.87	5.48	4.92	5.01
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	0.0021	0.0025	0.0028	<0.0020
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		1.58	2.02	2.72	7.41	1.59
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0128	0.0121	0.0220	0.0218	0.0086
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.26	0.43	0.47	0.84	0.36
Zinc	7440-66-6	E472/VA	1.0	mg/kg		101	105	160	99.8	116
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INVTRI-6_2024-08	MP_EDC-U_INVTRI-7_2024-08	MP_EDC-U_INVTRI-8_2024-08	MP_EDC-D_INVTRI-1_2024-08	MP_EDC-D_INVTRI-2_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-126	VA24C1418-127	VA24C1418-128	VA24C1418-129	VA24C1418-130
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		76.8	76.7	78.5	79.1	77.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		75.9	40.2	43.1	1530	789
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.013	0.011	0.012	0.030	0.033
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.373	0.296	0.902	15.6	10.4
Barium	7440-39-3	E472/VA	0.050	mg/kg		4.34	5.69	4.71	113	86.5
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.064	0.039
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.012	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	8.4	4.7
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.033	0.056	0.017	0.187	0.280
Calcium	7440-70-2	E472/VA	20	mg/kg		739	602	582	2640	2080
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0055	<0.0050	<0.0050	0.227	0.127
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.33	<0.20	0.21	4.64	2.73
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.14	0.593	0.814	3.24	2.37
Copper	7440-50-8	E472/VA	0.20	mg/kg		16.6	16.4	19.1	19.6	22.3
Iron	7439-89-6	E472/VA	5.0	mg/kg		268	198	992	3050	1720
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.062	0.054	<0.050	0.641	0.498
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	1.52	0.73
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1160	1230	1110	1780	1550
Manganese	7439-96-5	E472/VA	0.050	mg/kg		483	418	461	1000	1050
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0122	0.0143	0.0123	0.0144	0.0148

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-U_INVTRI-6_2024-08	MP_EDC-U_INVTRI-7_2024-08	MP_EDC-U_INVTRI-8_2024-08	MP_EDC-D_INVTRI-1_2024-08	MP_EDC-D_INVTRI-2_2024-08
					Client sampling date / time	11-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-126	VA24C1418-127	VA24C1418-128	VA24C1418-129	VA24C1418-130
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0527	0.0613	0.0573	0.0688	0.0665
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.68	1.89	1.55	5.55	4.97
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.33	0.23	0.23	6.39	4.99
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7910	8340	7410	8710	7410
Potassium	7440-09-7	E472/VA	20	mg/kg		7510	6910	6520	14600	10500
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.21	1.68	1.12	6.41	4.02
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.11	0.98	1.01	2.03	1.54
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0204	0.0179	0.0187	0.0380	0.0289
Sodium	7440-23-5	E472/VA	20	mg/kg		2500	2630	2580	2950	2340
Strontium	7440-24-6	E472/VA	0.10	mg/kg		5.16	4.37	4.27	19.4	14.2
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	0.0169	0.0199
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.21	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		2.81	1.57	1.41	56.2	29.4
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0076	0.0061	0.0068	0.136	0.104
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.43	0.22	0.72	5.18	3.50
Zinc	7440-66-6	E472/VA	1.0	mg/kg		88.6	111	115	125	167
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	1.46	0.74

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INVTRI-3_2024-08	MP_EDC-D_INVTRI-4_2024-08	MP_EDC-D_INVTRI-5_2024-08	MP_EDC-D_INVTRI-6_2024-08	MP_EDC-D_INVTRI-7_2024-08
					Client sampling date / time	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-131	VA24C1418-132	VA24C1418-133	VA24C1418-134	VA24C1418-135
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		76.3	72.7	70.4	78.9	77.7
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		15.5	266	183	1410	718
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	0.015	0.011	0.035	0.023
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.67	5.83	3.42	9.80	6.30
Barium	7440-39-3	E472/VA	0.050	mg/kg		2.98	39.2	33.4	102	39.5
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	0.012	<0.010	0.056	0.027
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.011	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	2.8	1.7	17.6	10.2
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.012	0.166	0.117	0.237	0.121
Calcium	7440-70-2	E472/VA	20	mg/kg		925	888	807	2550	1610
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0087	0.0422	0.0319	0.198	0.117
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	1.00	0.82	3.73	2.14
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.116	1.01	0.580	2.76	1.63
Copper	7440-50-8	E472/VA	0.20	mg/kg		16.1	17.7	15.1	21.6	17.7
Iron	7439-89-6	E472/VA	5.0	mg/kg		134	683	420	2660	1440
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	0.206	0.106	0.684	0.372
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	1.36	0.72
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1180	1290	1150	1920	1540
Manganese	7439-96-5	E472/VA	0.050	mg/kg		72.4	553	326	946	437
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0109	0.0121	0.0114	0.0145	0.0129

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INVTRI-3_2024-08	MP_EDC-D_INVTRI-4_2024-08	MP_EDC-D_INVTRI-5_2024-08	MP_EDC-D_INVTRI-6_2024-08	MP_EDC-D_INVTRI-7_2024-08
					Client sampling date / time	09-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-131	VA24C1418-132	VA24C1418-133	VA24C1418-134	VA24C1418-135
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0458	0.0444	0.0386	0.0687	0.0579
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		5.34	4.07	5.17	3.53	4.89
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	1.84	1.08	6.42	3.25
Phosphorus	7723-14-0	E472/VA	10	mg/kg		8410	7600	6870	7910	8640
Potassium	7440-09-7	E472/VA	20	mg/kg		6740	8790	6540	14600	10700
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.48	3.16	2.01	6.50	4.08
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.62	1.28	1.15	1.92	1.50
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0142	0.0206	0.0175	0.0377	0.0232
Sodium	7440-23-5	E472/VA	20	mg/kg		2720	2190	2090	2890	2880
Strontium	7440-24-6	E472/VA	0.10	mg/kg		7.05	7.29	6.04	17.6	12.1
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	0.0048	0.0031	0.0186	0.0098
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.95	12.6	7.69	54.1	28.9
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0023	0.0316	0.0209	0.134	0.0762
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	1.15	0.75	5.23	2.68
Zinc	7440-66-6	E472/VA	1.0	mg/kg		98.6	148	127	120	109
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	0.28	<0.20	1.45	0.73

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INVTRI-8_2024-08	MP_E1_INVTRI-1_2024-08	MP_E1_INVTRI-2_2024-08	MP_E1_INVTRI-3_2024-08	MP_E1_INVTRI-4_2024-08
					Client sampling date / time	10-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-136	VA24C1418-137	VA24C1418-138	VA24C1418-139	VA24C1418-140
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		75.7	73.2	78.5	78.4	75.2
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		572	35.6	6.7	2040	58.4
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.020	<0.010	<0.010	0.043	0.011
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		7.95	1.26	0.945	8.48	0.766
Barium	7440-39-3	E472/VA	0.050	mg/kg		68.4	10.7	6.37	97.3	5.94
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.025	<0.010	<0.010	0.065	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	0.016	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		5.3	<1.0	<1.0	41.9	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.143	0.061	0.022	0.480	0.095
Calcium	7440-70-2	E472/VA	20	mg/kg		1450	608	778	2850	521
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0878	0.0095	0.0058	0.268	0.0112
Chromium	7440-47-3	E472/VA	0.20	mg/kg		1.70	<0.20	<0.20	5.55	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.59	0.316	0.066	3.06	0.120
Copper	7440-50-8	E472/VA	0.20	mg/kg		17.7	14.1	16.8	38.9	16.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		1210	150	116	3730	174
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.261	0.059	<0.050	0.937	0.079
Lithium	7439-93-2	E472/VA	0.50	mg/kg		0.53	<0.50	<0.50	2.08	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1570	1150	1260	1920	1050
Manganese	7439-96-5	E472/VA	0.050	mg/kg		687	149	132	754	114
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0438	0.0371	0.0420	0.0599	0.0358

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_INVTRI-8_2024-08	MP_E1_INVTRI-1_2024-08	MP_E1_INVTRI-2_2024-08	MP_E1_INVTRI-3_2024-08	MP_E1_INVTRI-4_2024-08
					Client sampling date / time	10-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00	08-Aug-2024 00:00
						VA24C1418-136	VA24C1418-137	VA24C1418-138	VA24C1418-139	VA24C1418-140
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0107	0.0099	0.0090	0.0129	0.0089
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		3.89	3.86	3.54	2.72	3.47
Nickel	7440-02-0	E472/VA	0.20	mg/kg		3.13	0.40	<0.20	6.46	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9550	7250	8210	6680	7060
Potassium	7440-09-7	E472/VA	20	mg/kg		10800	6440	6900	11700	6170
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		4.29	1.30	1.51	5.67	1.48
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.33	0.78	1.08	1.48	1.26
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0258	0.0097	0.0114	0.0546	0.0073
Sodium	7440-23-5	E472/VA	20	mg/kg		2860	2450	2650	2360	2400
Strontium	7440-24-6	E472/VA	0.10	mg/kg		10.1	4.07	4.44	18.4	3.84
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0061	<0.0020	<0.0020	0.0206	0.0045
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		22.6	1.88	<0.50	81.5	2.92
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0504	0.0084	<0.0020	0.179	0.0038
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		2.15	0.19	<0.10	8.08	0.23
Zinc	7440-66-6	E472/VA	1.0	mg/kg		179	116	140	136	94.4
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.53	<0.20	<0.20	1.70	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INVTRI-5_2024-08	MP_E1_INVTRI-6_2024-08	MP_E1_INVTRI-7_2024-08	MP_E1_INVTRI-8_2024-08	MP_HAC-D_PERT-4X_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-141	VA24C1418-142	VA24C1418-143	VA24C1418-144	VA24C1418-145
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		77.3	79.8	76.5	74.8	57.9
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		1070	1180	740	105	970
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.036	0.044	0.028	0.020	0.067
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		4.29	4.22	3.09	0.885	3.00
Barium	7440-39-3	E472/VA	0.050	mg/kg		59.9	85.9	53.5	7.37	170
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.043	0.054	0.029	<0.010	0.042
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.013	0.011	<0.010	<0.010	<0.015 DLA
Boron	7440-42-8	E472/VA	1.0	mg/kg		6.4	5.3	3.4	<1.0	216
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.297	0.402	0.284	0.178	0.565
Calcium	7440-70-2	E472/VA	20	mg/kg		1660	2200	2520	847	228000
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.130	0.140	0.0964	0.0179	0.209
Chromium	7440-47-3	E472/VA	0.20	mg/kg		5.64	3.11	3.34	0.37	1.78
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.95	2.44	1.39	0.208	2.13
Copper	7440-50-8	E472/VA	0.20	mg/kg		56.3	70.0	44.4	21.3	35.9
Iron	7439-89-6	E472/VA	5.0	mg/kg		2160	2790	1730	291	1530
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.617	0.708	0.422	0.094	0.399
Lithium	7439-93-2	E472/VA	0.50	mg/kg		1.16	1.23	0.81	<0.50	0.93
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1600	1990	1560	1240	2620
Manganese	7439-96-5	E472/VA	0.050	mg/kg		445	757	829	232	3150
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0870	0.101	0.0604	0.0772	0.0160

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_E1_INVTRI-5_2024-08	MP_E1_INVTRI-6_2024-08	MP_E1_INVTRI-7_2024-08	MP_E1_INVTRI-8_2024-08	MP_HAC-D_PERT-4X_2024-08
					Client sampling date / time	08-Aug-2024 00:00	08-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1418-141	VA24C1418-142	VA24C1418-143	VA24C1418-144	VA24C1418-145
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0197	0.0204	0.0142	0.0195	0.0067
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.14	2.54	4.05	5.32	0.827
Nickel	7440-02-0	E472/VA	0.20	mg/kg		5.84	3.38	2.98	0.30	3.78
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7060	7700	8330	6880	624
Potassium	7440-09-7	E472/VA	20	mg/kg		10000	9860	8680	5890	2770
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		4.03	3.56	3.56	1.32	3.19
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.69	2.20	1.54	1.50	3.57
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0363	0.0451	0.0320	0.0097	0.0106
Sodium	7440-23-5	E472/VA	20	mg/kg		2760	3230	2880	2810	214
Strontium	7440-24-6	E472/VA	0.10	mg/kg		11.4	14.7	16.2	5.79	442
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.030 DLA
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0133	0.0165	0.0101	0.0030	0.0262
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.15 DLA
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		55.6	60.9	39.3	5.52	50.2
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.104	0.136	0.0758	0.0073	0.155
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		4.84	5.62	3.42	0.47	5.63
Zinc	7440-66-6	E472/VA	1.0	mg/kg		107	178	115	137	17.1
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.92	1.20	0.79	<0.20	0.34

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_PERT-4X_2024-08	MP_HAC-R1_PERT-8X_2024-08	MP_E1_PERT-8X_2024-08	MP_HAC-U_PERT-4X_2024-08	MP_E1_INV-8X_2024-08
					Client sampling date / time	10-Aug-2024 00:00	14-Aug-2024 00:00	07-Aug-2024 00:00	13-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1418-146	VA24C1418-147	VA24C1418-148	VA24C1418-149	VA24C1418-150
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		89.8	62.1	82.2	68.1	77.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		6030	434	12600	398	583
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.054	0.056	0.068	0.073	0.026
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		14.5	1.35	14.0	1.50	2.93
Barium	7440-39-3	E472/VA	0.050	mg/kg		106	62.0	238	81.8	16.9
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.188	0.020	0.422	0.018	0.021
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.043	<0.014 DLA	0.100	<0.017 DLA	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		271	226	24.2	256	2.3
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.273	0.111	0.337	0.153	2.45
Calcium	7440-70-2	E472/VA	20	mg/kg		19900	223000	20200	220000	1820
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.870	0.0931	1.41	0.109	0.0842
Chromium	7440-47-3	E472/VA	0.20	mg/kg		13.8	0.72	19.1	0.97	1.62
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		6.17	0.690	11.6	0.667	1.42
Copper	7440-50-8	E472/VA	0.20	mg/kg		17.6	27.4	233	21.1	57.2
Iron	7439-89-6	E472/VA	5.0	mg/kg		12000	756	24500	651	1440
Lead	7439-92-1	E472/VA	0.050	mg/kg		2.41	0.170	6.26	0.163	0.365
Lithium	7439-93-2	E472/VA	0.50	mg/kg		5.28	<0.68 DLA	12.7	<0.84 DLA	0.60
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		4300	2160	7140	2400	1450
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1340	920	2100	2380	329
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0048	0.0015	0.0151	0.0032	0.0260

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-D_PERT-4X_2024-08	MP_HAC-R1_PERT-8X_2024-08	MP_E1_PERT-8X_2024-08	MP_HAC-U_PERT-4X_2024-08	MP_E1_INV-8X_2024-08
					Client sampling date / time	10-Aug-2024 00:00	14-Aug-2024 00:00	07-Aug-2024 00:00	13-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1418-146	VA24C1418-147	VA24C1418-148	VA24C1418-149	VA24C1418-150
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0468	<0.0050	0.0848	0.0100	0.117
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.16	0.870	0.739	0.976	0.930
Nickel	7440-02-0	E472/VA	0.20	mg/kg		11.9	2.44	19.9	1.94	1.88
Phosphorus	7723-14-0	E472/VA	10	mg/kg		1950	539	2030	540	8470
Potassium	7440-09-7	E472/VA	20	mg/kg		4940	2540	2430	3180	7430
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		9.75	2.66	10.2	3.17	8.26
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.12	2.42	1.19	1.99	2.18
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0479	0.0062	0.127	0.0053	0.0511
Sodium	7440-23-5	E472/VA	20	mg/kg		481	202	386	224	4700
Strontium	7440-24-6	E472/VA	0.10	mg/kg		134	485	113	488	11.2
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.027 DLA	<0.050 DLA	<0.034 DLA	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0588	0.0041	0.0826	0.0052	0.0188
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.14 DLA	<0.25 DLA	<0.17 DLA	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		229	36.9	599	33.5	29.0
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.267	0.0882	0.552	0.0922	0.0459
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		23.2	2.95	54.2	3.43	2.87
Zinc	7440-66-6	E472/VA	1.0	mg/kg		42.9	4.7	66.7	4.3	127
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		4.93	0.45	7.65	0.45	0.52

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-8X_2024-08	MP_HAC-D_INV-4X_2024-08	MP_EDC-D_INV-4X_2024-08	MP_HAC-U_INV-4X_2024-08	MP_EDC-D_INVTRI-4X_2024-08
					Client sampling date / time	14-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	13-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-151	VA24C1418-152	VA24C1418-153	VA24C1418-154	VA24C1418-155
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		82.2	81.2	79.5	78.9	75.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		1410	2110	210	438	698
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.046	0.057	0.019	0.057	0.056
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		2.44	6.09	3.28	1.58	9.31
Barium	7440-39-3	E472/VA	0.050	mg/kg		56.4	52.4	7.54	62.7	55.6
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		0.046	0.070	<0.010	0.017	0.031
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	0.018	<0.010	<0.013 DLA	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		4.7	8.5	2.7	5.9	6.2
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		2.06	5.65	0.722	1.91	0.122
Calcium	7440-70-2	E472/VA	20	mg/kg		6670	9150	1460	6300	1640
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.174	0.378	0.0490	0.0684	0.0943
Chromium	7440-47-3	E472/VA	0.20	mg/kg		2.35	4.26	1.43	1.24	2.02
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		2.39	4.03	0.850	0.969	1.58
Copper	7440-50-8	E472/VA	0.20	mg/kg		209	275	31.7	139	18.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		2560	3900	549	830	1730
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.557	1.08	0.125	0.365	0.391
Lithium	7439-93-2	E472/VA	0.50	mg/kg		1.32	2.20	<0.50	<0.66 DLA	0.70
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		2380	2380	1520	1900	1330
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1550	1520	242	2740	709
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0120	0.0220	0.0126	0.0266	0.0126

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INV-8X_2024-08	MP_HAC-D_INV-4X_2024-08	MP_EDC-D_INV-4X_2024-08	MP_HAC-U_INV-4X_2024-08	MP_EDC-D_INVTRI-4X_2024-08
					Client sampling date / time	14-Aug-2024 00:00	09-Aug-2024 00:00	10-Aug-2024 00:00	13-Aug-2024 00:00	10-Aug-2024 00:00
						VA24C1418-151	VA24C1418-152	VA24C1418-153	VA24C1418-154	VA24C1418-155
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0675	0.117	0.0614	0.126	0.0520
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		2.38	2.62	0.756	3.09	4.63
Nickel	7440-02-0	E472/VA	0.20	mg/kg		3.62	5.55	2.20	2.10	3.04
Phosphorus	7723-14-0	E472/VA	10	mg/kg		11200	10200	7900	10800	7390
Potassium	7440-09-7	E472/VA	20	mg/kg		9720	9920	6820	9890	10500
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.07	8.60	3.54	3.57	3.78
Selenium	7782-49-2	E472/VA	0.10	mg/kg		5.36	6.92	2.36	9.11	1.66
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0349	0.0736	0.106	0.0891	0.0199
Sodium	7440-23-5	E472/VA	20	mg/kg		4530	4100	2890	4520	2430
Strontium	7440-24-6	E472/VA	0.10	mg/kg		38.2	37.2	10.5	31.3	11.6
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.026 DLA	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0076	0.0372	0.0120	0.0070	0.0104
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.13 DLA	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		86.0	93.5	8.68	26.2	33.3
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.103	0.148	0.0321	0.0884	0.0702
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		9.13	9.76	0.93	3.00	3.12
Zinc	7440-66-6	E472/VA	1.0	mg/kg		134	146	168	184	126
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		0.88	1.48	0.20	0.31	0.74

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INVTRI-8X_2024-08	MP_E1_INVTRI-8X_2024-08	MP_HAC-D_INVTRI-4X_2024-08	MP_HAC-U_INVTRI-4X_2024-08	----
					Client sampling date / time	14-Aug-2024 00:00	07-Aug-2024 00:00	09-Aug-2024 00:00	13-Aug-2024 00:00	----
						VA24C1418-156	VA24C1418-157	VA24C1418-158	VA24C1418-159	----
						Result	Result	Result	Result	----
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		73.2	75.7	78.6	74.9	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		31.2	224	1320	10.2	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.023	0.023	0.051	0.011	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.243	1.28	2.21	0.432	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.15	21.0	59.6	1.63	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	0.039	<0.010	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	0.013	<0.010	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	4.2	<1.0	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		<0.010	0.218	0.480	0.041	----
Calcium	7440-70-2	E472/VA	20	mg/kg		479	1200	4890	740	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0072	0.0293	0.212	0.0087	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	2.24	<0.20	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.079	0.385	2.06	0.124	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		18.9	27.8	91.5	25.2	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		136	566	2100	92.9	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	0.172	0.702	<0.050	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	1.13	<0.50	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1110	1320	1500	1140	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		75.9	302	1310	144	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0636	0.0487	0.0724	0.0532	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R1_INVTRI-8X_2024-08	MP_E1_INVTRI-8X_2024-08	MP_HAC-D_INVTRI-4X_2024-08	MP_HAC-U_INVTRI-4X_2024-08	----
					Client sampling date / time	14-Aug-2024 00:00	07-Aug-2024 00:00	09-Aug-2024 00:00	13-Aug-2024 00:00	----
						VA24C1418-156	VA24C1418-157	VA24C1418-158	VA24C1418-159	----
						Result	Result	Result	Result	----
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0170	0.0118	0.0155	0.0134	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		12.6	5.48	4.37	10.8	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	0.23	3.04	<0.20	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		7490	8160	8370	7560	----
Potassium	7440-09-7	E472/VA	20	mg/kg		6170	7330	7400	7040	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		1.22	1.68	3.54	1.81	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		18.4	1.51	6.95	15.5	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.0130	0.0438	<0.0050	----
Sodium	7440-23-5	E472/VA	20	mg/kg		2300	3260	3340	2540	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		3.04	7.37	40.5	3.97	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		<0.0020	0.0049	0.0218	<0.0020	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		2.34	13.5	50.1	0.71	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0024	0.0303	0.0872	0.0045	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.21	1.16	5.14	0.18	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		93.9	137	131	93.7	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	0.21	0.85	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C1418**	Page	: 1 of 114
Amendment	: **2**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Issue Date	: 05-Dec-2024 15:11
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 159		
No. of samples analysed	: 159		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- Method Blank value outliers occur - please see following pages for full details.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Metals	QC-MRG6-1723450 001	----	Manganese	7439-96-5	E472	0.053 mg/kg B	0.05 mg/kg	Blank result exceeds permitted value
Metals	QC-MRG6-1723612 001	----	Manganese	7439-96-5	E472	0.066 mg/kg B	0.05 mg/kg	Blank result exceeds permitted value
Metals	QC-MRG8-1721538 001	----	Manganese	7439-96-5	E475	0.052 mg/kg B	0.05 mg/kg	Blank result exceeds permitted value
Metals	QC-MRG8-1721538 001	----	Tin	7440-31-5	E475	0.10 mg/kg MB-LOR	0.1 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	*Description*
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*
MB-LOR	*Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.*

Duplicate (DUP) RPDs								
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Aluminum	7429-90-5	E472	51.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Barium	7440-39-3	E472	68.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Barium	7440-39-3	E472	113 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Cadmium	7440-43-9	E472	88.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Cadmium	7440-43-9	E472	102 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Cobalt	7440-48-4	E472	68.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Iron	7439-89-6	E472	45.7 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Lead	7439-92-1	E472	41.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Magnesium	7439-95-4	E472	97.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Manganese	7439-96-5	E472	72.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs - Continued								
Metals	VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Molybdenum	7439-98-7	E472	51.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Nickel	7440-02-0	E472	0.54 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Phosphorus	7723-14-0	E472	52.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Selenium	7782-49-2	E472	69.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Thallium	7440-28-0	E472	52.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Uranium	7440-61-1	E472	97.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Vanadium	7440-62-2	E472	46.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-066	MP_HAC-D_INV-2_2024-08	Zinc	7440-66-6	E472	41.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Silver	7440-22-4	E472.Ag	67.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Titanium	7440-32-6	E472.Ti	75.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG6-1721133002	----	Titanium	7440-32-6	E472.Ti	79.3 % MES	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-1_2024-08	E512	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	27-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4_2024-08	E512	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-5_2024-08	E512	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-6_2024-08	E512	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-7_2024-08	E512	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-8_2024-08	E512	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-4_2024-08	E512	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	27-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-2_2024-08	E512	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	25-Oct-2024	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-1_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-2_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-3_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-4_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-1_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-2_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-3_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-4_2024-08	E511	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-5_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-6_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-7_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-1_2024-08	E511	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-2_2024-08	E511	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-3_2024-08	E511	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-4_2024-08	E511	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-5_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-6_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-7_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8_2024-08	E511	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-1_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-2_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-3_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-1_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-2_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-3_2024-08	E511	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-5_2024-08	E511	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-6_2024-08	E511	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-7_2024-08	E511	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8_2024-08	E511	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-1_2024-08	E511	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-2_2024-08	E511	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4_2024-08	E511	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-5_2024-08	E511	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8X_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8X_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8X_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-1_2024-08	E511	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-2_2024-08	E511	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-3_2024-08	E511	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4_2024-08	E511	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-2_2024-08	E511	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	23-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-3_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-4_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-5_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-6_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-7_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-8_2024-08	E511	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-5_2024-08	E511	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	23-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-1_2024-08	E511	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	24-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-2_2024-08	E511	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	24-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4X_2024-08	E511	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4X_2024-08	E511	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4X_2024-08	E511	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-3_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-5_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-6_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-7_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-8_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-6_2024-08	E511	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	22-Oct-2024	365 days	74 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_PERT-7_2024-08	E511	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	22-Oct-2024	365 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
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Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-3_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-4_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-5_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-6_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-7_2024-08	E511	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INV-6_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INV-8_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-1_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-2_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-3_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-1_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-D_PERT-2_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-3_2024-08	E511	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
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Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-8_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-4_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-5_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-6_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-7_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-5_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-6_2024-08	E511	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
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Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-1_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-3_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-4_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
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Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-6_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-1_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-2_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-3_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-1_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
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Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-4_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-5_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-7_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-8_2024-08	E511	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4X_2024-08	E511	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-1_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-2_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-3_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4X_2024-08	E511	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-4X_2024-08	E511	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-1_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-2_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-3_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4_2024-08	E511	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-1_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-2_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-3_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-4_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-5_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-6_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-7_2024-08	E511	07-Aug-2024	21-Oct-2024	365 days	76 days	✓	22-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8_2024-08	E511	07-Aug-2024	21-Oct-2024	365 days	76 days	✓	22-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-5_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-6_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-7_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-8_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-1_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-2_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-3_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-4_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4X_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4X_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-5_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-6_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-7_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-8_2024-08	E511	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4X_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-7_2024-08	E511	07-Aug-2024	22-Oct-2024	365 days	77 days	✓	23-Oct-2024	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8_2024-08	E511	07-Aug-2024	22-Oct-2024	365 days	77 days	✓	23-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-5_2024-08	E511	08-Aug-2024	23-Oct-2024	365 days	77 days	✓	26-Oct-2024	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-6_2024-08	E511	08-Aug-2024	23-Oct-2024	365 days	77 days	✓	26-Oct-2024	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8X_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-7_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8X_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-1_2024-08	E512A	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	27-Oct-2024	365 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4_2024-08	E512A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-5_2024-08	E512A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-6_2024-08	E512A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-7_2024-08	E512A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-8_2024-08	E512A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	25-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-4_2024-08	E512A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	27-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
Glass soil jar/Teflon lined cap MP_E1_PERT-2_2024-08	E512A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	25-Oct-2024	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-1_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-2_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-3_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-4_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-1_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-2_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-3_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-4_2024-08	E511A	15-Aug-2024	21-Oct-2024	365 days	68 days	✓	22-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-5_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-6_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-7_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-1_2024-08	E511A	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-2_2024-08	E511A	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-3_2024-08	E511A	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-4_2024-08	E511A	15-Aug-2024	22-Oct-2024	365 days	69 days	✓	23-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-5_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-6_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-7_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8_2024-08	E511A	14-Aug-2024	21-Oct-2024	365 days	69 days	✓	22-Oct-2024	365 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-1_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-2_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-3_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-1_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-2_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-3_2024-08	E511A	13-Aug-2024	21-Oct-2024	365 days	70 days	✓	22-Oct-2024	365 days	71 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-5_2024-08	E511A	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-6_2024-08	E511A	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-7_2024-08	E511A	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8_2024-08	E511A	14-Aug-2024	22-Oct-2024	365 days	70 days	✓	24-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-1_2024-08	E511A	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-2_2024-08	E511A	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4_2024-08	E511A	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-5_2024-08	E511A	12-Aug-2024	21-Oct-2024	365 days	71 days	✓	22-Oct-2024	365 days	72 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8X_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8X_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8X_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-1_2024-08	E511A	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-2_2024-08	E511A	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-3_2024-08	E511A	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4_2024-08	E511A	13-Aug-2024	22-Oct-2024	365 days	71 days	✓	24-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-2_2024-08	E511A	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	23-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-3_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-4_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-5_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-6_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-7_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-8_2024-08	E511A	11-Aug-2024	21-Oct-2024	365 days	72 days	✓	22-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-5_2024-08	E511A	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	23-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-1_2024-08	E511A	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	24-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-2_2024-08	E511A	12-Aug-2024	22-Oct-2024	365 days	72 days	✓	24-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4X_2024-08	E511A	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4X_2024-08	E511A	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4X_2024-08	E511A	13-Aug-2024	23-Oct-2024	365 days	72 days	✓	26-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-3_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-5_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-6_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-7_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-8_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	23-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-6_2024-08	E511A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	22-Oct-2024	365 days	74 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_PERT-7_2024-08	E511A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	22-Oct-2024	365 days	74 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_PERT-8_2024-08	E511A	10-Aug-2024	21-Oct-2024	365 days	73 days	✓	22-Oct-2024	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-3_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-4_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-5_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-6_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-7_2024-08	E511A	11-Aug-2024	22-Oct-2024	365 days	73 days	✓	24-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INV-4_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INV-8_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-1_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-2_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-3_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-1_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-D_PERT-2_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-3_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4_2024-08	E511A	09-Aug-2024	21-Oct-2024	365 days	74 days	✓	22-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-6_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-7_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓

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Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-8_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	23-Oct-2024	365 days	75 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-4_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-5_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-6_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
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Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-5_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-6_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-7_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓

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Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-8_2024-08	E511A	10-Aug-2024	22-Oct-2024	365 days	74 days	✓	24-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-1_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-3_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-4_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
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Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-1_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-2_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-3_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-1_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-2_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-3_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	23-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-5_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-6_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-7_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-8_2024-08	E511A	08-Aug-2024	21-Oct-2024	365 days	75 days	✓	22-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-4X_2024-08	E511A	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-1_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-2_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-3_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-4X_2024-08	E511A	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4X_2024-08	E511A	10-Aug-2024	23-Oct-2024	365 days	75 days	✓	26-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-1_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-2_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-3_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4_2024-08	E511A	09-Aug-2024	22-Oct-2024	365 days	75 days	✓	24-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-1_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-2_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-3_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-4_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-5_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-6_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-7_2024-08	E511A	07-Aug-2024	21-Oct-2024	365 days	76 days	✓	22-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-8_2024-08	E511A	07-Aug-2024	21-Oct-2024	365 days	76 days	✓	22-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-5_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-6_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-7_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-8_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	23-Oct-2024	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-1_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-2_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-3_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-4_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4X_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4X_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-5_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-6_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-7_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-8_2024-08	E511A	08-Aug-2024	22-Oct-2024	365 days	76 days	✓	24-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4X_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-7_2024-08	E511A	07-Aug-2024	22-Oct-2024	365 days	77 days	✓	23-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-8_2024-08	E511A	07-Aug-2024	22-Oct-2024	365 days	77 days	✓	23-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-5_2024-08	E511A	08-Aug-2024	23-Oct-2024	365 days	77 days	✓	26-Oct-2024	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-6_2024-08	E511A	08-Aug-2024	23-Oct-2024	365 days	77 days	✓	26-Oct-2024	365 days	79 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8X_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-7_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8X_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-1_2024-08	E475	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-4_2024-08	E475	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-5_2024-08	E475	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-7_2024-08	E475	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-8_2024-08	E475	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-4_2024-08	E475	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_E1_PERT-2_2024-08	E475	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-6_2024-08	E475	10-Aug-2024	21-Oct-2024	730 days	81 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-1_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-2_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-3_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-4_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-1_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-2_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-3_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-4_2024-08	E472	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-1_2024-08	E472	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-2_2024-08	E472	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-3_2024-08	E472	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-4_2024-08	E472	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-5_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-6_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-7_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-5_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-6_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-7_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8_2024-08	E472	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-5_2024-08	E472	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-6_2024-08	E472	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-7_2024-08	E472	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8_2024-08	E472	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-1_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-2_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-3_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-1_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-2_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-3_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4_2024-08	E472	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-1_2024-08	E472	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-2_2024-08	E472	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8X_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8X_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8X_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-1_2024-08	E472	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-2_2024-08	E472	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-3_2024-08	E472	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4_2024-08	E472	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4_2024-08	E472	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-5_2024-08	E472	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-2_2024-08	E472	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-1_2024-08	E472	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-2_2024-08	E472	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-3_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	22-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-5_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	22-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-6_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	22-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-7_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	22-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-8_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	22-Oct-2024	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4X_2024-08	E472	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-5_2024-08	E472	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4X_2024-08	E472	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4X_2024-08	E472	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-4_2024-08	E472	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-3_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-5_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-6_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-7_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-8_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-3_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-4_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-5_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-6_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-7_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-8_2024-08	E472	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-6_2024-08	E472	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-7_2024-08	E472	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-8_2024-08	E472	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-5_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-6_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-7_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-8_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-5_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-6_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-7_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-8_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-1_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-2_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-3_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-1_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-2_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-3_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4_2024-08	E472	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-6_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-7_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-8_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-5_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-6_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-7_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-8_2024-08	E472	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-1_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-2_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-3_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INV-4X_2024-08	E472	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-1_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-2_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-3_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-4X_2024-08	E472	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4X_2024-08	E472	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-1_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-2_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-3_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-4_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-1_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-2_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-3_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-4_2024-08	E472	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-5_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-6_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-8_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-1_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-3_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-4_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-5_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-6_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-1_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-2_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-3_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-4_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-5_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-6_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-1_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-2_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-3_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-4_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4X_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-5_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-6_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-7_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-8_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-4X_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-5_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-6_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-7_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-8_2024-08	E472	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-4X_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-7_2024-08	E472	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-8_2024-08	E472	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-7_2024-08	E472	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-8_2024-08	E472	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-5_2024-08	E472	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-6_2024-08	E472	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-8X_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-7_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-8_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-8X_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-7_2024-08	E472	08-Aug-2024	21-Oct-2024	730 days	83 days	✓	22-Oct-2024	730 days	84 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-1_2024-08	E475.Ag	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-4_2024-08	E475.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-5_2024-08	E475.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-6_2024-08	E475.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-7_2024-08	E475.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-8_2024-08	E475.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-4_2024-08	E475.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-2_2024-08	E475.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-1_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-2_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-3_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-4_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-1_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-2_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-3_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-4_2024-08	E472.Ag	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-1_2024-08	E472.Ag	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-2_2024-08	E472.Ag	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-3_2024-08	E472.Ag	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-4_2024-08	E472.Ag	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-5_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-6_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-7_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-5_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-6_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-7_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8_2024-08	E472.Ag	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-5_2024-08	E472.Ag	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-6_2024-08	E472.Ag	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-7_2024-08	E472.Ag	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8_2024-08	E472.Ag	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-1_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-2_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-3_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-1_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-2_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-3_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4_2024-08	E472.Ag	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-8X_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-8X_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-8X_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-1_2024-08	E472.Ag	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-2_2024-08	E472.Ag	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-3_2024-08	E472.Ag	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4_2024-08	E472.Ag	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4_2024-08	E472.Ag	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-5_2024-08	E472.Ag	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-1_2024-08	E472.Ag	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-2_2024-08	E472.Ag	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-2_2024-08	E472.Ag	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-1_2024-08	E472.Ag	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-2_2024-08	E472.Ag	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-4X_2024-08	E472.Ag	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-5_2024-08	E472.Ag	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-4X_2024-08	E472.Ag	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_PERT-4X_2024-08	E472.Ag	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-3_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-4_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-5_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_PERT-6_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-7_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-8_2024-08	E472.Ag	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-3_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-5_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-6_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-7_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-8_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-3_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-4_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-5_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-6_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-7_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-8_2024-08	E472.Ag	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-6_2024-08	E472.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-7_2024-08	E472.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-8_2024-08	E472.Ag	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-5_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-6_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-7_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-8_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-5_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-6_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-7_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-8_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-1_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-2_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-3_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-4_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-6_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-7_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-8_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-5_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-6_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-7_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-8_2024-08	E472.Ag	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-1_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-2_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-3_2024-08	E472.Ag	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-1_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-2_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-3_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4X_2024-08	E472.Ag	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-1_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-2_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-3_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-4X_2024-08	E472.Ag	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4X_2024-08	E472.Ag	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-1_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-2_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-3_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-1_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-2_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-3_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-4_2024-08	E472.Ag	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-5_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-6_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-7_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-1_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-3_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-4_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-5_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-6_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-8_2024-08	E472.Ag	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-1_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-2_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-3_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-4_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-5_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-6_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-1_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-2_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-3_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-4_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4X_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-5_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-6_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-7_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-8_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4X_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-5_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-6_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-7_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-8_2024-08	E472.Ag	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4X_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-7_2024-08	E472.Ag	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-8_2024-08	E472.Ag	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-7_2024-08	E472.Ag	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8_2024-08	E472.Ag	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-5_2024-08	E472.Ag	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-6_2024-08	E472.Ag	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8X_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-7_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8X_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-1_2024-08	E475.Ti	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4_2024-08	E475.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-5_2024-08	E475.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-6_2024-08	E475.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-7_2024-08	E475.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-8_2024-08	E475.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-4_2024-08	E475.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
Glass soil jar/Teflon lined cap MP_E1_PERT-2_2024-08	E475.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-1_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-2_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-3_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_PERT-4_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	22-Oct-2024	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-1_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-2_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-3_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INV-4_2024-08	E472.Ti	15-Aug-2024	21-Oct-2024	730 days	68 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-1_2024-08	E472.Ti	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-2_2024-08	E472.Ti	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-R1_INVTRI-3_2024-08	E472.Ti	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-4_2024-08	E472.Ti	15-Aug-2024	22-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-5_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-6_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-7_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	22-Oct-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-5_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-6_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-7_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8_2024-08	E472.Ti	14-Aug-2024	21-Oct-2024	730 days	69 days	✓	23-Oct-2024	730 days	71 days	✓

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Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-5_2024-08	E472.Ti	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-6_2024-08	E472.Ti	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-7_2024-08	E472.Ti	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8_2024-08	E472.Ti	14-Aug-2024	22-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-1_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-2_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-3_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	22-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-1_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-2_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-3_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4_2024-08	E472.Ti	13-Aug-2024	21-Oct-2024	730 days	70 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8X_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8X_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8X_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-1_2024-08	E472.Ti	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-2_2024-08	E472.Ti	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-3_2024-08	E472.Ti	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4_2024-08	E472.Ti	13-Aug-2024	22-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	72 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4_2024-08	E472.Ti	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-5_2024-08	E472.Ti	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	22-Oct-2024	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-1_2024-08	E472.Ti	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-2_2024-08	E472.Ti	12-Aug-2024	21-Oct-2024	730 days	71 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-2_2024-08	E472.Ti	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-1_2024-08	E472.Ti	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-2_2024-08	E472.Ti	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4X_2024-08	E472.Ti	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-5_2024-08	E472.Ti	12-Aug-2024	22-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	73 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4X_2024-08	E472.Ti	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4X_2024-08	E472.Ti	13-Aug-2024	23-Oct-2024	730 days	72 days	✓	24-Oct-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-3_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-4_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-5_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-6_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-7_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-8_2024-08	E472.Ti	11-Aug-2024	21-Oct-2024	730 days	72 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-3_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-5_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-6_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-7_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-U_INV-8_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
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Glass soil jar/Teflon lined cap MP_EDC-U_INVTRI-6_2024-08	E472.Ti	11-Aug-2024	22-Oct-2024	730 days	73 days	✓	23-Oct-2024	730 days	74 days	✓
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MP_HAC-U_PERT-6_2024-08	E472.Ti	10-Aug-2024	21-Oct-2024	730 days	73 days	✓	22-Oct-2024	730 days	74 days	✓
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Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-5_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-6_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
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Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-6_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-7_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_INVTRI-8_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-1_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-2_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-3_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-4_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	22-Oct-2024	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-6_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-7_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INV-8_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-5_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-6_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-7_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-U_INVTRI-8_2024-08	E472.Ti	10-Aug-2024	22-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-1_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-2_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-3_2024-08	E472.Ti	09-Aug-2024	21-Oct-2024	730 days	74 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-1_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-2_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-3_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4X_2024-08	E472.Ti	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-1_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-2_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-3_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4X_2024-08	E472.Ti	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_EDC-D_PERT-4X_2024-08	E472.Ti	10-Aug-2024	23-Oct-2024	730 days	75 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-1_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-D_INV-2_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-3_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-1_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-2_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-3_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4_2024-08	E472.Ti	09-Aug-2024	22-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	76 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-5_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-6_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-7_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	22-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-1_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-3_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-4_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-5_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_PERT-6_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_PERT-8_2024-08	E472.Ti	08-Aug-2024	21-Oct-2024	730 days	75 days	✓	23-Oct-2024	730 days	77 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-1_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-2_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-3_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-4_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-5_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-6_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-1_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-2_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-3_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-4_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-4X_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-5_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-6_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-7_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-8_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-4X_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-5_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
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Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-6_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓

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Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
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Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-8_2024-08	E472.Ti	08-Aug-2024	22-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-4X_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-7_2024-08	E472.Ti	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8_2024-08	E472.Ti	07-Aug-2024	21-Oct-2024	730 days	76 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-7_2024-08	E472.Ti	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8_2024-08	E472.Ti	07-Aug-2024	22-Oct-2024	730 days	77 days	✓	23-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-5_2024-08	E472.Ti	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-6_2024-08	E472.Ti	08-Aug-2024	23-Oct-2024	730 days	77 days	✓	24-Oct-2024	730 days	78 days	✓

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Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8X_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-7_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
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Glass soil jar/Teflon lined cap										
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Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	79 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-1_2024-08	E144A	12-Aug-2024	----	----	----		22-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-4_2024-08	E144A	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-5_2024-08	E144A	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-6_2024-08	E144A	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-7_2024-08	E144A	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-8_2024-08	E144A	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-4_2024-08	E144A	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-2_2024-08	E144A	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-1_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-2_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-3_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-4_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-1_2024-08	E144-H	15-Aug-2024	----	----	----		22-Oct-2024	----	68 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-2_2024-08	E144-H	15-Aug-2024	----	----	----		22-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-3_2024-08	E144-H	15-Aug-2024	----	----	----		22-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-4_2024-08	E144-H	15-Aug-2024	----	----	----		22-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-1_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-2_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-3_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-4_2024-08	E144-H	15-Aug-2024	----	----	----		21-Oct-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-5_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-6_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-7_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-5_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-6_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-7_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8_2024-08	E144-H	14-Aug-2024	----	----	----		21-Oct-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INV-8X_2024-08	E144-H	14-Aug-2024	----	----	----		23-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-5_2024-08	E144-H	14-Aug-2024	----	----	----		22-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-6_2024-08	E144-H	14-Aug-2024	----	----	----		22-Oct-2024	----	70 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-7_2024-08	E144-H	14-Aug-2024	----	----	----		22-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8_2024-08	E144-H	14-Aug-2024	----	----	----		22-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_INVTRI-8X_2024-08	E144-H	14-Aug-2024	----	----	----		23-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R1_PERT-8X_2024-08	E144-H	14-Aug-2024	----	----	----		23-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-1_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-2_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-3_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-1_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-2_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-3_2024-08	E144-H	13-Aug-2024	----	----	----		21-Oct-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-1_2024-08	E144-H	12-Aug-2024	----	----	----		21-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-2_2024-08	E144-H	12-Aug-2024	----	----	----		21-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-4X_2024-08	E144-H	13-Aug-2024	----	----	----		23-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-1_2024-08	E144-H	13-Aug-2024	----	----	----		22-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-2_2024-08	E144-H	13-Aug-2024	----	----	----		22-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-3_2024-08	E144-H	13-Aug-2024	----	----	----		22-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4_2024-08	E144-H	13-Aug-2024	----	----	----		22-Oct-2024	----	71 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-4X_2024-08	E144-H	13-Aug-2024	----	----	----		23-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4_2024-08	E144-H	12-Aug-2024	----	----	----		21-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-4X_2024-08	E144-H	13-Aug-2024	----	----	----		23-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-5_2024-08	E144-H	12-Aug-2024	----	----	----		21-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-2_2024-08	E144-H	12-Aug-2024	----	----	----		23-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-1_2024-08	E144-H	12-Aug-2024	----	----	----		22-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-2_2024-08	E144-H	12-Aug-2024	----	----	----		22-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-3_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-4_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-5_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-6_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-7_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_PERT-8_2024-08	E144-H	11-Aug-2024	----	----	----		21-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-5_2024-08	E144-H	12-Aug-2024	----	----	----		23-Oct-2024	----	72 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-5_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-6_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-7_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	73 days	

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Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-8_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-3_2024-08	E144-H	11-Aug-2024	----	----	----		23-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-5_2024-08	E144-H	11-Aug-2024	----	----	----		23-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-6_2024-08	E144-H	11-Aug-2024	----	----	----		23-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-7_2024-08	E144-H	11-Aug-2024	----	----	----		23-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INV-8_2024-08	E144-H	11-Aug-2024	----	----	----		23-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-3_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-4_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-5_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-6_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-7_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-U_INVTRI-8_2024-08	E144-H	11-Aug-2024	----	----	----		22-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-6_2024-08	E144-H	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-7_2024-08	E144-H	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_PERT-8_2024-08	E144-H	10-Aug-2024	----	----	----		21-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-1_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-2_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-3_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	74 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INV-4X_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-4X_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-5_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-6_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-7_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-8_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-1_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-2_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-3_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_PERT-4X_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-1_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-2_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-3_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-4_2024-08	E144-H	09-Aug-2024	----	----	----		21-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-6_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-7_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INV-8_2024-08	E144-H	10-Aug-2024	----	----	----		23-Oct-2024	----	74 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-5_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-6_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-7_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-U_INVTRI-8_2024-08	E144-H	10-Aug-2024	----	----	----		22-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-1_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-2_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-3_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-4_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-5_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-6_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-1_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-3_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-4_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-5_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-6_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-1_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-2_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-D_INVTRI-3_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-1_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-2_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-3_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-4_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-4X_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-1_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-2_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-3_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-4_2024-08	E144-H	09-Aug-2024	----	----	----		22-Oct-2024	----	75 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INVTRI-4X_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-4X_2024-08	E144-H	09-Aug-2024	----	----	----		23-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-5_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-6_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-7_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_PERT-8_2024-08	E144-H	08-Aug-2024	----	----	----		21-Oct-2024	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-7_2024-08	E144-H	07-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INV-8_2024-08	E144-H	07-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-1_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-2_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-3_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-4_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-5_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-6_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-7_2024-08	E144-H	07-Aug-2024	----	----	----		21-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8_2024-08	E144-H	07-Aug-2024	----	----	----		21-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-5_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-D_INV-6_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-7_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INV-8_2024-08	E144-H	08-Aug-2024	----	----	----		23-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-5_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-6_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-7_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_HAC-D_INVTRI-8_2024-08	E144-H	08-Aug-2024	----	----	----		22-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_E1_INV-8X_2024-08	E144-H	07-Aug-2024	----	----	----		23-Oct-2024	----	77 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-7_2024-08	E144-H	07-Aug-2024	----	----	----		23-Oct-2024	----	77 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap MP_E1_INVTRI-8_2024-08	E144-H	07-Aug-2024	----	----	----		23-Oct-2024	----	77 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_INVTRI-8X_2024-08	E144-H	07-Aug-2024	----	----	----		23-Oct-2024	----	77 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_E1_PERT-8X_2024-08	E144-H	07-Aug-2024	----	----	----		23-Oct-2024	----	77 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1721136	8	151	5.3	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1721137	8	151	5.3	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1721133	10	151	6.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1721244	8	151	5.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1721138	8	151	5.3	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1721134	8	151	5.3	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1721541	4	11	36.3	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1721136	16	151	10.6	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1721542	4	11	36.3	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1721137	16	151	10.6	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1721539	5	11	45.4	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1721133	18	151	11.9	10.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1721501	2	8	25.0	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1721244	8	151	5.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1721540	4	11	36.3	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1721138	16	151	10.6	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1721543	4	11	36.3	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1721134	16	151	10.6	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1721541	2	11	18.1	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1721136	8	151	5.3	5.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1721542	2	11	18.1	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1721137	8	151	5.3	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1721539	2	11	18.1	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1721133	8	151	5.3	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1721501	2	8	25.0	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1721244	8	151	5.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1721540	2	11	18.1	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1721138	8	151	5.3	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1721543	2	11	18.1	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1721134	8	151	5.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C1418**	Page	: 1 of 50
Amendment	: **2**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 21-Oct-2024
C-O-C number	: ----	Issue Date	: 05-Dec-2024 15:11
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 159		
No. of samples analysed	: 159		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
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Salimah Khimani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1721244)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Moisture	----	E144-H	2.0	%	72.2	67.2	7.13%	20%	----
Physical Tests (QC Lot: 1721428)											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Moisture	----	E144-H	2.0	%	64.5	65.3	1.13%	20%	----
Physical Tests (QC Lot: 1721821)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Moisture	----	E144-H	2.0	%	87.0	86.6	0.364%	20%	----
Physical Tests (QC Lot: 1723219)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Moisture	----	E144-H	2.0	%	81.9	84.9	3.54%	20%	----
Physical Tests (QC Lot: 1723483)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Moisture	----	E144-H	2.0	%	75.7	74.9	1.08%	20%	----
Physical Tests (QC Lot: 1723625)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Moisture	----	E144-H	2.0	%	77.7	75.9	2.38%	20%	----
Physical Tests (QC Lot: 1725077)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Moisture	----	E144-H	2.0	%	77.3	76.6	0.991%	20%	----
Physical Tests (QC Lot: 1725239)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Moisture	----	E144-H	2.0	%	72.0	73.9	2.62%	20%	----
Metals (QC Lot: 1721133)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Chromium	7440-47-3	E472	1.01	mg/kg	14.7	12.0	20.8%	40%	----
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Aluminum	7429-90-5	E472	27.4	mg/kg	10400	8030	25.4%	40%	----
		Antimony	7440-36-0	E472	0.055	mg/kg	0.106	0.106	0.0004	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.164	mg/kg	16.6	13.9	18.1%	40%	----
		Barium	7440-39-3	E472	0.274	mg/kg	487	488	0.343%	40%	----
		Beryllium	7440-41-7	E472	0.055	mg/kg	0.381	0.286	28.6%	40%	----
		Bismuth	7440-69-9	E472	0.055	mg/kg	0.098	0.076	0.022	Diff <2x LOR	----
		Boron	7440-42-8	E472	5.5	mg/kg	148	207	33.2%	40%	----
		Cadmium	7440-43-9	E472	0.055	mg/kg	0.842	0.958	12.9%	40%	----
		Calcium	7440-70-2	E472	110	mg/kg	150000	177000	16.6%	60%	----
		Cesium	7440-46-2	E472	0.0274	mg/kg	1.45	1.19	20.1%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1721133) - continued											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Cobalt	7440-48-4	E472	0.110	mg/kg	14.7	13.1	11.9%	40%	----
		Copper	7440-50-8	E472	1.10	mg/kg	190	158	18.7%	40%	----
		Iron	7439-89-6	E472	27.4	mg/kg	19100	14800	25.3%	40%	----
		Lead	7439-92-1	E472	0.274	mg/kg	5.39	4.34	21.6%	40%	----
		Lithium	7439-93-2	E472	2.74	mg/kg	10.2	8.33	1.86	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	11.0	mg/kg	7210	6440	11.3%	40%	----
		Manganese	7439-96-5	E472	0.274	mg/kg	15900	16000	0.777%	40%	----
		Molybdenum	7439-98-7	E472	0.219	mg/kg	2.22	2.28	2.67%	40%	----
		Nickel	7440-02-0	E472	1.10	mg/kg	23.9	19.6	19.4%	40%	----
		Phosphorus	7723-14-0	E472	55	mg/kg	1280	1150	11.4%	40%	----
		Potassium	7440-09-7	E472	110	mg/kg	3880	3410	12.8%	40%	----
		Rubidium	7440-17-7	E472	0.274	mg/kg	10.7	8.68	20.7%	40%	----
		Selenium	7782-49-2	E472	0.55	mg/kg	3.73	3.66	1.95%	40%	----
		Sodium	7440-23-5	E472	110	mg/kg	331	318	13	Diff <2x LOR	----
		Strontium	7440-24-6	E472	0.55	mg/kg	394	434	9.72%	60%	----
		Tellurium	13494-80-9	E472	0.110	mg/kg	<0.109	<0.110	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0110	mg/kg	0.140	0.116	18.9%	40%	----
		Tin	7440-31-5	E472	0.55	mg/kg	<0.54	<0.55	0.54	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0110	mg/kg	0.594	0.491	18.9%	40%	----
		Vanadium	7440-62-2	E472	0.55	mg/kg	46.7	38.2	20.1%	40%	----
		Zinc	7440-66-6	E472	5.5	mg/kg	61.1	54.0	12.3%	40%	----
		Zirconium	7440-67-7	E472	1.10	mg/kg	6.78	5.58	19.4%	40%	----
Metals (QC Lot: 1721134)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	117	258	75.1%	40%	DUP-H
Metals (QC Lot: 1721136)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0742	0.0617	18.4%	40%	----
Metals (QC Lot: 1721137)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0206	0.0171	18.4%	40%	----
Metals (QC Lot: 1721138)											
VA24C1418-021	MP_HAC-D_PERT-5_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0325	0.0654	67.1%	40%	DUP-H
Metals (QC Lot: 1721411)											

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1721411) - continued											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Aluminum	7429-90-5	E472	8.3	mg/kg	718	835	15.1%	40%	----
		Antimony	7440-36-0	E472	0.016	mg/kg	0.065	0.058	0.007	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.050	mg/kg	1.71	1.56	9.45%	40%	----
		Barium	7440-39-3	E472	0.083	mg/kg	61.8	62.1	0.602%	40%	----
		Beryllium	7440-41-7	E472	0.016	mg/kg	0.039	0.040	0.001	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.016	mg/kg	<0.017	<0.016	0.016	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.6	mg/kg	251	223	11.9%	40%	----
		Cadmium	7440-43-9	E472	0.016	mg/kg	0.102	0.080	24.1%	40%	----
		Calcium	7440-70-2	E472	33	mg/kg	213000	185000	14.1%	60%	----
		Cesium	7440-46-2	E472	0.0083	mg/kg	0.128	0.136	5.58%	40%	----
		Chromium	7440-47-3	E472	0.33	mg/kg	1.01	1.21	0.20	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.033	mg/kg	1.00	1.03	2.31%	40%	----
		Copper	7440-50-8	E472	0.33	mg/kg	32.2	27.1	17.1%	40%	----
		Iron	7439-89-6	E472	8.3	mg/kg	1170	1280	8.95%	40%	----
		Lead	7439-92-1	E472	0.083	mg/kg	0.305	0.270	0.034	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.83	mg/kg	<0.84	<0.83	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	3.3	mg/kg	2280	2290	0.367%	40%	----
		Manganese	7439-96-5	E472	0.083	mg/kg	808	728	10.5%	40%	----
		Molybdenum	7439-98-7	E472	0.066	mg/kg	1.11	1.02	9.05%	40%	----
		Nickel	7440-02-0	E472	0.33	mg/kg	2.09	2.62	22.6%	40%	----
		Phosphorus	7723-14-0	E472	16	mg/kg	646	594	8.47%	40%	----
		Potassium	7440-09-7	E472	33	mg/kg	3610	3360	7.15%	40%	----
		Rubidium	7440-17-7	E472	0.083	mg/kg	3.67	3.61	1.63%	40%	----
		Selenium	7782-49-2	E472	0.16	mg/kg	1.82	1.48	21.2%	40%	----
		Sodium	7440-23-5	E472	33	mg/kg	364	322	12.2%	40%	----
		Strontium	7440-24-6	E472	0.16	mg/kg	473	418	12.1%	60%	----
		Tellurium	13494-80-9	E472	0.033	mg/kg	<0.034	<0.033	0.033	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0033	mg/kg	0.0049	0.0040	0.0009	Diff <2x LOR	----
		Tin	7440-31-5	E472	0.16	mg/kg	<0.17	<0.16	0.16	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0033	mg/kg	0.0965	0.0964	0.0706%	40%	----
		Vanadium	7440-62-2	E472	0.16	mg/kg	4.98	5.09	2.16%	40%	----
		Zinc	7440-66-6	E472	1.6	mg/kg	8.0	7.3	0.7	Diff <2x LOR	----
		Zirconium	7440-67-7	E472	0.33	mg/kg	0.63	0.63	0.0009	Diff <2x LOR	----
Metals (QC Lot: 1721414)											

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1721414) - continued											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	72.2	78.7	8.70%	40%	----
Metals (QC Lot: 1721417)											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0058	0.0053	0.0005	Diff <2x LOR	----
Metals (QC Lot: 1721419)											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0021	0.0019	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1721420)											
VA24C1418-001	MP_HAC-R1_PERT-1_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0077	0.0079	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1721488)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	8440	8240	2.43%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.062	0.068	10.1%	40%	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	8.18	8.20	0.283%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	100	95.9	4.46%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	0.248	0.248	0.149%	40%	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	0.070	0.065	7.65%	40%	----
		Boron	7440-42-8	E472	1.0	mg/kg	168	149	12.3%	40%	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.215	0.204	5.22%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	36000	29400	20.1%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	1.03	1.14	10.0%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	20.8	20.6	1.02%	40%	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	6.36	6.44	1.22%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	29.3	28.7	2.09%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	16400	16200	1.44%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	3.75	3.74	0.311%	40%	----
		Lithium	7439-93-2	E472	0.50	mg/kg	10.3	10.1	1.26%	40%	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	5360	5110	4.80%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	640	649	1.30%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.692	0.690	0.231%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	17.0	16.7	1.64%	40%	----
		Phosphorus	7723-14-0	E472	10	mg/kg	1300	1400	7.09%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	2690	2640	1.70%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	9.68	9.62	0.629%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	0.65	0.63	2.98%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1721488) - continued											
VA24C1418-041	MP_E1_PERT-1_2024-08	Sodium	7440-23-5	E472	20	mg/kg	453	460	1.39%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	148	130	13.5%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0709	0.0686	3.33%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	0.15	0.17	0.02	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.295	0.291	1.41%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	31.4	30.0	4.79%	40%	----
		Zinc	7440-66-6	E472	1.0	mg/kg	53.1	54.2	2.16%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	5.74	5.53	3.75%	40%	----
Metals (QC Lot: 1721489)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	348	347	0.288%	40%	----
Metals (QC Lot: 1721491)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0317	0.0294	7.57%	40%	----
Metals (QC Lot: 1721492)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0041	0.0038	0.0003	Diff <2x LOR	----
Metals (QC Lot: 1721493)											
VA24C1418-041	MP_E1_PERT-1_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0536	0.0515	4.01%	40%	----
Metals (QC Lot: 1723204)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	718	684	4.96%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.026	0.023	0.003	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	4.75	4.62	2.65%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	35.9	25.3	34.9%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	0.029	0.024	0.005	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	3.6	3.5	0.1	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.427	0.336	23.8%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	2470	1980	22.2%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.125	0.115	8.00%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	2.16	2.11	2.52%	40%	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	1.34	1.30	3.53%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	38.5	38.5	0.0322%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	1760	1590	10.1%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	0.376	0.324	14.9%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1723204) - continued											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Lithium	7439-93-2	E472	0.50	mg/kg	0.75	0.76	0.005	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1360	1430	5.28%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	643	502	24.5%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.910	0.674	29.8%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	5.86	5.47	6.87%	40%	----
		Phosphorus	7723-14-0	E472	10	mg/kg	7460	7590	1.86%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	8150	8480	3.86%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	3.28	3.38	3.11%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	1.48	1.16	24.2%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	4040	4240	4.95%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	20.2	17.0	17.3%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0148	0.0137	7.53%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0787	0.0711	10.2%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	2.86	2.64	8.15%	40%	----
		Zinc	7440-66-6	E472	1.0	mg/kg	162	150	7.64%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	0.74	0.68	0.06	Diff <2x LOR	----
Metals (QC Lot: 1723205)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	29.1	28.4	2.60%	40%	----
Metals (QC Lot: 1723207)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0738	0.0504	37.6%	40%	----
Metals (QC Lot: 1723208)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0133	0.0091	37.6%	40%	----
Metals (QC Lot: 1723209)											
VA24C1418-081	MP_EDC-D_INV-1_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.136	0.127	7.05%	40%	----
Metals (QC Lot: 1723212)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	954	672	34.6%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.040	0.044	0.004	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	4.09	6.00	38.0%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	29.0	14.2	68.8%	40%	DUP-H

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1723212) - continued											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Beryllium	7440-41-7	E472	0.010	mg/kg	0.040	0.025	0.014	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	0.010	<0.010	0.0002	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	3.0	2.7	0.2	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	1.25	0.481	88.9%	40%	DUP-H
		Calcium	7440-70-2	E472	20	mg/kg	4080	6210	41.4%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.170	0.137	21.0%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	2.04	1.58	25.4%	40%	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	2.36	2.24	5.12%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	99.8	143	35.5%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	1990	1250	45.7%	40%	DUP-H
		Lead	7439-92-1	E472	0.050	mg/kg	0.638	0.420	41.3%	40%	DUP-H
		Lithium	7439-93-2	E472	0.50	mg/kg	0.93	0.68	0.25	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1170	3390	97.4%	40%	DUP-H
		Manganese	7439-96-5	E472	0.050	mg/kg	378	566	39.7%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	1.34	1.40	4.34%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	2.98	3.68	20.9%	40%	----
		Phosphorus	7723-14-0	E472	10	mg/kg	5390	9260	52.8%	40%	DUP-H
		Potassium	7440-09-7	E472	20	mg/kg	5070	5520	8.39%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	3.54	3.82	7.52%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	3.70	7.63	69.3%	40%	DUP-H
		Sodium	7440-23-5	E472	20	mg/kg	1850	2500	29.5%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	25.7	38.9	40.8%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0255	0.0149	52.6%	40%	DUP-H
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.144	0.142	1.60%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	5.19	3.25	46.0%	40%	DUP-H
		Zinc	7440-66-6	E472	1.0	mg/kg	84.8	129	41.2%	40%	DUP-H
		Zirconium	7440-67-7	E472	0.20	mg/kg	0.69	0.46	0.23	Diff <2x LOR	----
Metals (QC Lot: 1723213)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	38.6	27.1	35.0%	40%	----
Metals (QC Lot: 1723215)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0447	0.0458	2.26%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1723216)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0125	0.0128	2.26%	40%	----
Metals (QC Lot: 1723217)											
VA24C1418-066	MP_HAC-D_INV-2_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0259	0.0384	38.8%	40%	----
Metals (QC Lot: 1723450)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	45.5	67.3	38.6%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.021	0.026	0.005	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.426	0.453	6.22%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	1.84	1.93	4.72%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.011	0.014	0.003	Diff <2x LOR	----
		Calcium	7440-70-2	E472	20	mg/kg	654	818	22.3%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0085	0.0106	0.0021	Diff <2x LOR	----
		Chromium	7440-47-3	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.071	0.096	0.024	Diff <2x LOR	----
		Copper	7440-50-8	E472	0.20	mg/kg	17.8	19.5	9.50%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	134	174	25.6%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1180	1140	3.94%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	88.4	104	16.5%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	6.36	10.8	51.4%	40%	DUP-H
		Nickel	7440-02-0	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	7900	8220	3.94%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	7170	7160	0.123%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	1.51	1.54	2.36%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	10.8	12.4	13.6%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	2510	2490	0.889%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	4.73	5.23	10.1%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1723450) - continued											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Uranium	7440-61-1	E472	0.0020	mg/kg	0.0031	0.0044	0.0013	Diff <2x LOR	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.30	0.44	0.14	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	87.3	104	17.9%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1723451)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	4.02	4.70	15.4%	40%	----
Metals (QC Lot: 1723453)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0537	0.0568	5.74%	40%	----
Metals (QC Lot: 1723454)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0130	0.0138	5.74%	40%	----
Metals (QC Lot: 1723455)											
VA24C1418-101	MP_HAC-R1_INVTRI-5_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1723612)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	38.4	65.4	51.9%	40%	DUP-H
		Antimony	7440-36-0	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.505	0.683	29.9%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	7.74	28.0	113%	40%	DUP-H
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.048	0.150	102%	40%	DUP-H
		Calcium	7440-70-2	E472	20	mg/kg	1040	1310	22.7%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Chromium	7440-47-3	E472	0.20	mg/kg	0.30	0.46	0.17	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.644	1.31	68.3%	40%	DUP-H
		Copper	7440-50-8	E472	0.20	mg/kg	14.6	21.0	36.0%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	146	210	36.1%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	<0.050	0.053	0.003	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1230	1340	8.38%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	288	618	72.9%	40%	DUP-H

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1723612) - continued											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Molybdenum	7439-98-7	E472	0.040	mg/kg	5.17	5.65	9.00%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	0.61	# 1.15	0.54	Diff <2x LOR	DUP-H,J
		Phosphorus	7723-14-0	E472	10	mg/kg	9070	9470	4.31%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	7280	7800	6.97%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	1.84	2.00	8.05%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	0.57	0.52	10.8%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	2750	2900	5.32%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	6.36	9.37	38.2%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	<0.0020	0.0026	0.0006	Diff <2x LOR	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0128	0.0374	97.8%	40%	DUP-H
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.26	0.43	0.17	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	101	147	37.2%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1723613)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	1.58	2.50	0.92	Diff <2x LOR	----
Metals (QC Lot: 1723615)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0273	0.0319	15.4%	40%	----
Metals (QC Lot: 1723616)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0061	0.0071	15.4%	40%	----
Metals (QC Lot: 1723617)											
VA24C1418-121	MP_EDC-U_INVTRI-1_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0248	0.0345	32.7%	40%	----
Metals (QC Lot: 1725069)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Chromium	7440-47-3	E472	0.20	mg/kg	5.64	7.53	28.7%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	2.14	2.19	2.62%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	5.84	7.16	20.3%	40%	----
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	1070	766	33.4%	40%	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.036	0.030	0.006	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	4.29	3.60	17.7%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	59.9	57.9	3.29%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	0.043	0.030	0.013	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1725069) - continued											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Bismuth	7440-69-9	E472	0.010	mg/kg	0.013	<0.010	0.003	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	6.4	5.6	12.7%	40%	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.297	0.409	31.6%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	1660	1650	0.493%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.130	0.100	25.9%	40%	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	1.95	1.47	28.3%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	56.3	42.7	27.4%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	2160	1640	27.3%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	0.617	0.500	20.9%	40%	----
		Lithium	7439-93-2	E472	0.50	mg/kg	1.16	0.82	0.34	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1600	1560	2.18%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	445	488	9.34%	40%	----
		Phosphorus	7723-14-0	E472	10	mg/kg	7060	7490	6.01%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	10000	9610	4.03%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	4.03	3.67	9.26%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	1.69	1.28	27.4%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	2760	2760	0.298%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	11.4	11.9	3.90%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0133	0.0133	0.346%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.104	0.0733	34.4%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	4.84	3.29	38.1%	40%	----
		Zinc	7440-66-6	E472	1.0	mg/kg	107	115	6.92%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	0.92	0.62	0.30	Diff <2x LOR	----
Metals (QC Lot: 1725070)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	55.6	38.8	35.7%	40%	----
Metals (QC Lot: 1725072)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0870	0.0748	15.1%	40%	----
Metals (QC Lot: 1725073)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0197	0.0170	15.1%	40%	----
Metals (QC Lot: 1725074)											
VA24C1418-141	MP_E1_INVTRI-5_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0363	0.0299	19.4%	40%	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1721244)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1721428)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1721501)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1721821)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1723219)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1723483)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1723625)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1723638)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1725077)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1725239)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1721133)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1721133) - continued						
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1721134)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1721136)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721137)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1721138)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721411)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1721411) - continued						
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1721414)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1721417)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721419)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1721420)						

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1721420) - continued						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721488)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1721489)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1721491)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721492)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1721493)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721539)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	# 0.052	B
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1721539) - continued						
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	# 0.10	MB-LOR
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1721540)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1721541)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1721542)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1721543)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1723204)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723204) - continued						
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1723205)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1723207)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723208)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1723209)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723212)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723212) - continued						
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1723213)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1723215)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723216)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1723217)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723400)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723400) - continued						
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1723401)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723402)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1723403)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1723404)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723450)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	# 0.053	B
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1723451)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723453)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723454)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1723455)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723612)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	# 0.066	B
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1723612) - continued						
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1723613)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1723615)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1723616)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1723617)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1725069)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1725069) - continued						
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1725070)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1725072)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1725073)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1725074)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*
MB-LOR	*Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1721244)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1721428)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1721501)									
Moisture	----	E144A	2	%	100 %	99.8	90.0	110	----
Physical Tests (QCLot: 1721821)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1723219)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1723483)									
Moisture	----	E144-H	2	%	100 %	101	90.0	110	----
Physical Tests (QCLot: 1723625)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1723638)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1725077)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1725239)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1721133)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	85.8	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	88.9	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	88.6	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	85.2	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	90.4	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	87.8	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	88.1	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	83.9	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	89.0	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	86.0	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	85.2	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1721133) - continued									
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	82.5	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	81.1	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	88.6	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	91.6	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	91.3	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	87.2	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	84.4	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	90.7	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	81.8	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	90.8	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	81.9	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	83.4	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	88.1	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	84.2	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	91.2	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	88.9	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	91.6	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	85.9	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	89.5	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	86.1	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	81.5	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	91.2	80.0	120	----
Metals (QCLot: 1721134)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	# 79.3	80.0	120	MES
Metals (QCLot: 1721136)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	101	80.0	120	----
Metals (QCLot: 1721137)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	101	80.0	120	----
Metals (QCLot: 1721138)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	81.4	80.0	120	----
Metals (QCLot: 1721411)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	99.7	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	94.0	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	95.4	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	91.9	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	95.7	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1721411) - continued									
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	91.0	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	91.4	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	92.4	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	87.7	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	91.8	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	95.0	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	89.7	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	90.0	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	95.3	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	90.6	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	94.0	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	93.8	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	93.3	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	96.5	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	90.4	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	101	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	95.4	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	88.7	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	92.2	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	89.0	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	96.0	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	92.5	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	87.3	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	91.6	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	92.2	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	96.6	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	93.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	92.2	80.0	120	----
Metals (QCLot: 1721414)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	91.5	80.0	120	----
Metals (QCLot: 1721417)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	87.1	80.0	120	----
Metals (QCLot: 1721419)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	87.1	80.0	120	----
Metals (QCLot: 1721420)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	88.7	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1721488)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	86.8	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	87.3	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	87.4	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	83.6	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	86.9	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	83.1	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	94.0	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	81.0	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	85.2	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	83.0	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	84.5	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	82.0	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	95.0	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	86.8	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	85.1	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	86.2	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	83.5	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	83.5	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	88.8	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	81.2	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	91.0	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.3	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	82.1	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	84.9	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	83.9	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	88.9	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	86.0	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	85.0	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	83.3	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	83.0	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	85.7	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	92.6	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	88.4	80.0	120	----
Metals (QCLot: 1721489)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Metals (QCLot: 1721491)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1721491) - continued									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	101	80.0	120	----
Metals (QCLot: 1721492)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	101	80.0	120	----
Metals (QCLot: 1721493)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	83.6	80.0	120	----
Metals (QCLot: 1721539)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	96.8	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	101	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	94.4	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	96.3	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	97.6	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	91.1	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	96.4	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	95.0	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	95.5	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	97.5	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	94.2	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	92.5	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	95.0	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	97.0	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	98.2	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	96.6	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	100	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	93.6	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	106	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	94.5	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	92.4	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	100	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	95.4	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	96.7	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	98.9	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	99.6	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1721539) - continued									
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	99.1	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	98.4	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	96.6	80.0	120	----
Metals (QCLot: 1721540)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	90.6	80.0	120	----
Metals (QCLot: 1721541)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	99.2	80.0	120	----
Metals (QCLot: 1721542)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	99.2	80.0	120	----
Metals (QCLot: 1721543)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	92.8	80.0	120	----
Metals (QCLot: 1723204)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	96.5	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	103	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	96.9	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	99.5	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	89.8	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	100	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	110	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	98.7	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	97.0	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	96.9	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	95.3	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	96.6	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	97.8	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	99.0	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	100	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	97.3	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.1	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	92.4	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723204) - continued									
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	96.6	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	103	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	94.4	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	92.5	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	96.4	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	102	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	95.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	101	80.0	120	----
Metals (QCLot: 1723205)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	92.6	80.0	120	----
Metals (QCLot: 1723207)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	91.4	80.0	120	----
Metals (QCLot: 1723208)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.4	80.0	120	----
Metals (QCLot: 1723209)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	97.0	80.0	120	----
Metals (QCLot: 1723212)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	110	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	113	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	108	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	99.8	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	104	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	98.8	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	99.1	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	103	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	100	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	104	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	99.0	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723212) - continued									
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	108	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	117	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	106	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	102	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	98.8	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	99.8	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	99.8	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	104	80.0	120	----
Metals (QCLot: 1723213)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Metals (QCLot: 1723215)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	94.2	80.0	120	----
Metals (QCLot: 1723216)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	94.2	80.0	120	----
Metals (QCLot: 1723217)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	97.4	80.0	120	----
Metals (QCLot: 1723400)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	110	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	113	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	99.4	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	104	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	101	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	97.8	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	106	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	99.9	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723400) - continued									
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	99.9	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	101	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	98.9	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	98.5	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	120	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	103	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	107	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	103	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	99.0	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	105	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	108	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	98.4	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	106	80.0	120	----
Metals (QCLot: 1723401)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	98.9	80.0	120	----
Metals (QCLot: 1723402)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	98.4	80.0	120	----
Metals (QCLot: 1723403)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	98.4	80.0	120	----
Metals (QCLot: 1723404)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	102	80.0	120	----
Metals (QCLot: 1723450)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	94.5	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	102	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	96.4	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723450) - continued									
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	94.5	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	97.5	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.2	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	97.4	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	95.8	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	100	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	94.2	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	97.6	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	98.7	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	97.2	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	109	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	103	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	96.1	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	105	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	102	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	92.0	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	93.2	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	95.5	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	94.8	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	98.2	80.0	120	----
Metals (QCLot: 1723451)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	95.4	80.0	120	----
Metals (QCLot: 1723453)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	83.2	80.0	120	----
Metals (QCLot: 1723454)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	83.2	80.0	120	----
Metals (QCLot: 1723455)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	97.0	80.0	120	----
Metals (QCLot: 1723612)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723612) - continued									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	109	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	112	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	100	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	104	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	93.2	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	96.6	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	108	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	102	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	101	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	99.2	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	96.5	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	103	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	108	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	114	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	109	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	98.6	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	105	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	101	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	101	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	109	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	106	80.0	120	----
Metals (QCLot: 1723613)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Metals (QCLot: 1723615)									

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1723615) - continued									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	95.4	80.0	120	----
Metals (QCLot: 1723616)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	95.4	80.0	120	----
Metals (QCLot: 1723617)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.6	80.0	120	----
Metals (QCLot: 1725069)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	101	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	97.2	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	97.8	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	92.2	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	97.8	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	94.4	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	98.1	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	98.9	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	97.6	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	94.5	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	101	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	98.9	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	111	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	98.4	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	97.3	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	100	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	97.8	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	97.3	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	100	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	98.6	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1725069) - continued									
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	96.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	102	80.0	120	----
Metals (QCLot: 1725070)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	103	80.0	120	----
Metals (QCLot: 1725072)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	108	80.0	120	----
Metals (QCLot: 1725073)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	108	80.0	120	----
Metals (QCLot: 1725074)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	95.6	80.0	120	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1721133)									
QC-1721133-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	70.6	70.0	130	----
QC-1721133-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	78.2	70.0	130	----
QC-1721133-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	84.8	70.0	130	----
QC-1721133-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	83.7	70.0	130	----
QC-1721133-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	79.5	70.0	130	----
QC-1721133-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	88.1	70.0	130	----
QC-1721133-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	83.5	70.0	130	----
QC-1721133-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	104	50.0	150	----
QC-1721133-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	83.2	65.0	135	----
QC-1721133-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	77.8	70.0	130	----
QC-1721133-003	RM	Iron	7439-89-6	E472	102 mg/kg	80.7	70.0	130	----
QC-1721133-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	85.6	15.0	185	----
QC-1721133-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	75.9	70.0	130	----
QC-1721133-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	79.1	70.0	130	----
QC-1721133-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	130	70.0	130	----
QC-1721133-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	104	40.0	160	----
QC-1721133-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	83.4	70.0	130	----
QC-1721133-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	81.1	70.0	130	----
QC-1721133-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	81.2	70.0	130	----
QC-1721133-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	86.1	70.0	130	----
QC-1721133-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	80.5	70.0	130	----
QC-1721133-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	82.6	70.0	130	----
QC-1721133-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	76.1	70.0	130	----
QC-1721133-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	80.5	70.0	130	----
Metals (QCLot: 1721134)									
QC-1721134-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	98.7	70.0	130	----
Metals (QCLot: 1721136)									
QC-1721136-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	111	70.0	130	----
Metals (QCLot: 1721137)									
QC-1721137-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	111	70.0	130	----
Metals (QCLot: 1721138)									
QC-1721138-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	87.1	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1721411)									
QC-1721411-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	83.7	70.0	130	----
QC-1721411-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	83.5	70.0	130	----
QC-1721411-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	76.8	70.0	130	----
QC-1721411-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	85.3	70.0	130	----
QC-1721411-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	84.9	70.0	130	----
QC-1721411-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	81.7	70.0	130	----
QC-1721411-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	83.8	70.0	130	----
QC-1721411-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	79.2	50.0	150	----
QC-1721411-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	81.3	65.0	135	----
QC-1721411-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	83.1	70.0	130	----
QC-1721411-003	RM	Iron	7439-89-6	E472	102 mg/kg	82.5	70.0	130	----
QC-1721411-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	89.9	15.0	185	----
QC-1721411-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	82.4	70.0	130	----
QC-1721411-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	84.3	70.0	130	----
QC-1721411-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	83.8	70.0	130	----
QC-1721411-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	81.5	40.0	160	----
QC-1721411-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	88.6	70.0	130	----
QC-1721411-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	88.5	70.0	130	----
QC-1721411-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	80.2	70.0	130	----
QC-1721411-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	89.6	70.0	130	----
QC-1721411-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	83.8	70.0	130	----
QC-1721411-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	81.5	70.0	130	----
QC-1721411-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	81.7	70.0	130	----
QC-1721411-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	88.8	70.0	130	----
Metals (QCLot: 1721414)									
QC-1721414-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	81.1	70.0	130	----
Metals (QCLot: 1721417)									
QC-1721417-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	84.6	70.0	130	----
Metals (QCLot: 1721419)									
QC-1721419-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	84.6	70.0	130	----
Metals (QCLot: 1721420)									
QC-1721420-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	85.3	70.0	130	----
Metals (QCLot: 1721488)									
QC-1721488-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	87.8	70.0	130	----
QC-1721488-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	91.2	70.0	130	----
QC-1721488-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	88.0	70.0	130	----
QC-1721488-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	89.6	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1721488) - continued									
QC-1721488-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	92.0	70.0	130	----
QC-1721488-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	102	70.0	130	----
QC-1721488-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	95.0	70.0	130	----
QC-1721488-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	86.0	50.0	150	----
QC-1721488-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	92.0	65.0	135	----
QC-1721488-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	89.4	70.0	130	----
QC-1721488-003	RM	Iron	7439-89-6	E472	102 mg/kg	88.0	70.0	130	----
QC-1721488-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	99.0	15.0	185	----
QC-1721488-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	88.0	70.0	130	----
QC-1721488-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	86.6	70.0	130	----
QC-1721488-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	94.2	70.0	130	----
QC-1721488-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	94.2	40.0	160	----
QC-1721488-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	94.4	70.0	130	----
QC-1721488-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	87.8	70.0	130	----
QC-1721488-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	89.0	70.0	130	----
QC-1721488-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	98.9	70.0	130	----
QC-1721488-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	88.6	70.0	130	----
QC-1721488-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	97.5	70.0	130	----
QC-1721488-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	87.9	70.0	130	----
QC-1721488-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	91.5	70.0	130	----
Metals (QCLot: 1721489)									
QC-1721489-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	74.5	70.0	130	----
Metals (QCLot: 1721491)									
QC-1721491-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	104	70.0	130	----
Metals (QCLot: 1721492)									
QC-1721492-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	104	70.0	130	----
Metals (QCLot: 1721493)									
QC-1721493-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	96.7	70.0	130	----
Metals (QCLot: 1721539)									
QC-1721539-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	100	70.0	130	----
QC-1721539-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	98.5	70.0	130	----
QC-1721539-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	92.4	70.0	130	----
QC-1721539-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	94.1	70.0	130	----
QC-1721539-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	105	70.0	130	----
QC-1721539-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	92.4	70.0	130	----
QC-1721539-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	98.3	70.0	130	----
QC-1721539-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	96.6	50.0	150	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1721539) - continued									
QC-1721539-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	111	65.0	135	----
QC-1721539-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	109	70.0	130	----
QC-1721539-003	RM	Iron	7439-89-6	E475	102 mg/kg	102	70.0	130	----
QC-1721539-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	105	15.0	185	----
QC-1721539-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	105	70.0	130	----
QC-1721539-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	105	70.0	130	----
QC-1721539-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	104	70.0	130	----
QC-1721539-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	93.9	40.0	160	----
QC-1721539-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	103	70.0	130	----
QC-1721539-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	104	70.0	130	----
QC-1721539-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	95.3	70.0	130	----
QC-1721539-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	100	70.0	130	----
QC-1721539-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	105	70.0	130	----
QC-1721539-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	99.5	70.0	130	----
QC-1721539-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	100	70.0	130	----
QC-1721539-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	108	70.0	130	----
Metals (QCLot: 1721540)									
QC-1721540-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	98.7	70.0	130	----
Metals (QCLot: 1721541)									
QC-1721541-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	106	70.0	130	----
Metals (QCLot: 1721542)									
QC-1721542-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	106	70.0	130	----
Metals (QCLot: 1721543)									
QC-1721543-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	96.3	70.0	130	----
Metals (QCLot: 1723204)									
QC-1723204-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	95.5	70.0	130	----
QC-1723204-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	94.6	70.0	130	----
QC-1723204-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	89.8	70.0	130	----
QC-1723204-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	96.7	70.0	130	----
QC-1723204-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	94.4	70.0	130	----
QC-1723204-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	88.6	70.0	130	----
QC-1723204-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	96.0	70.0	130	----
QC-1723204-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	97.9	50.0	150	----
QC-1723204-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	99.1	65.0	135	----
QC-1723204-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	91.1	70.0	130	----
QC-1723204-003	RM	Iron	7439-89-6	E472	102 mg/kg	94.3	70.0	130	----
QC-1723204-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	87.3	15.0	185	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1723204) - continued									
QC-1723204-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	92.9	70.0	130	----
QC-1723204-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	93.9	70.0	130	----
QC-1723204-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	96.6	70.0	130	----
QC-1723204-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	91.0	40.0	160	----
QC-1723204-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	101	70.0	130	----
QC-1723204-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	98.1	70.0	130	----
QC-1723204-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	94.9	70.0	130	----
QC-1723204-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	97.4	70.0	130	----
QC-1723204-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	97.7	70.0	130	----
QC-1723204-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	93.9	70.0	130	----
QC-1723204-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	91.5	70.0	130	----
QC-1723204-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	94.4	70.0	130	----
Metals (QCLot: 1723205)									
QC-1723205-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	91.0	70.0	130	----
Metals (QCLot: 1723207)									
QC-1723207-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	92.0	70.0	130	----
Metals (QCLot: 1723208)									
QC-1723208-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	92.0	70.0	130	----
Metals (QCLot: 1723209)									
QC-1723209-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	93.9	70.0	130	----
Metals (QCLot: 1723212)									
QC-1723212-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	98.0	70.0	130	----
QC-1723212-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	102	70.0	130	----
QC-1723212-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	122	70.0	130	----
QC-1723212-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	99.2	70.0	130	----
QC-1723212-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	104	70.0	130	----
QC-1723212-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	95.5	70.0	130	----
QC-1723212-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	103	70.0	130	----
QC-1723212-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	102	50.0	150	----
QC-1723212-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	105	65.0	135	----
QC-1723212-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	108	70.0	130	----
QC-1723212-003	RM	Iron	7439-89-6	E472	102 mg/kg	99.0	70.0	130	----
QC-1723212-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	130	15.0	185	----
QC-1723212-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	97.9	70.0	130	----
QC-1723212-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	104	70.0	130	----
QC-1723212-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	103	70.0	130	----
QC-1723212-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	104	40.0	160	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 1723212) - continued									
QC-1723212-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	106	70.0	130	----
QC-1723212-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	102	70.0	130	----
QC-1723212-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	103	70.0	130	----
QC-1723212-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	102	70.0	130	----
QC-1723212-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	103	70.0	130	----
QC-1723212-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	98.9	70.0	130	----
QC-1723212-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	96.0	70.0	130	----
QC-1723212-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	102	70.0	130	----
Metals (QCLot: 1723213)									
QC-1723213-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	92.3	70.0	130	----
Metals (QCLot: 1723215)									
QC-1723215-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	97.6	70.0	130	----
Metals (QCLot: 1723216)									
QC-1723216-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	97.6	70.0	130	----
Metals (QCLot: 1723217)									
QC-1723217-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	99.8	70.0	130	----
Metals (QCLot: 1723400)									
QC-1723400-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	104	70.0	130	----
QC-1723400-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	101	70.0	130	----
QC-1723400-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	103	70.0	130	----
QC-1723400-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	106	70.0	130	----
QC-1723400-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	101	70.0	130	----
QC-1723400-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	97.5	70.0	130	----
QC-1723400-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	101	70.0	130	----
QC-1723400-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	115	50.0	150	----
QC-1723400-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	99.2	65.0	135	----
QC-1723400-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	97.8	70.0	130	----
QC-1723400-003	RM	Iron	7439-89-6	E475	102 mg/kg	98.8	70.0	130	----
QC-1723400-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	97.3	15.0	185	----
QC-1723400-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	100	70.0	130	----
QC-1723400-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	104	70.0	130	----
QC-1723400-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	100	70.0	130	----
QC-1723400-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	104	40.0	160	----
QC-1723400-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	108	70.0	130	----
QC-1723400-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	105	70.0	130	----
QC-1723400-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	102	70.0	130	----
QC-1723400-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	100.0	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 1723400) - continued									
QC-1723400-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	104	70.0	130	----
QC-1723400-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	98.0	70.0	130	----
QC-1723400-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	99.9	70.0	130	----
QC-1723400-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	99.6	70.0	130	----
Metals (QCLot: 1723401)									
QC-1723401-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	99.7	70.0	130	----
Metals (QCLot: 1723402)									
QC-1723402-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	99.5	70.0	130	----
Metals (QCLot: 1723403)									
QC-1723403-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	99.5	70.0	130	----
Metals (QCLot: 1723404)									
QC-1723404-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	101	70.0	130	----
Metals (QCLot: 1723450)									
QC-1723450-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	100	70.0	130	----
QC-1723450-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	105	70.0	130	----
QC-1723450-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	122	70.0	130	----
QC-1723450-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	103	70.0	130	----
QC-1723450-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	101	70.0	130	----
QC-1723450-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	127	70.0	130	----
QC-1723450-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	107	70.0	130	----
QC-1723450-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	104	50.0	150	----
QC-1723450-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	101	65.0	135	----
QC-1723450-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	100	70.0	130	----
QC-1723450-003	RM	Iron	7439-89-6	E472	102 mg/kg	99.7	70.0	130	----
QC-1723450-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	99.6	15.0	185	----
QC-1723450-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	103	70.0	130	----
QC-1723450-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	107	70.0	130	----
QC-1723450-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	109	70.0	130	----
QC-1723450-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	98.1	40.0	160	----
QC-1723450-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	116	70.0	130	----
QC-1723450-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	108	70.0	130	----
QC-1723450-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	108	70.0	130	----
QC-1723450-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	106	70.0	130	----
QC-1723450-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	106	70.0	130	----
QC-1723450-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	106	70.0	130	----
QC-1723450-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	98.0	70.0	130	----
QC-1723450-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	106	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1723451)									
QC-1723451-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1723453)									
QC-1723453-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	91.2	70.0	130	----
Metals (QCLot: 1723454)									
QC-1723454-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	91.2	70.0	130	----
Metals (QCLot: 1723455)									
QC-1723455-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	104	70.0	130	----
Metals (QCLot: 1723612)									
QC-1723612-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	101	70.0	130	----
QC-1723612-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	96.8	70.0	130	----
QC-1723612-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	104	70.0	130	----
QC-1723612-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	98.8	70.0	130	----
QC-1723612-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	92.3	70.0	130	----
QC-1723612-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	103	70.0	130	----
QC-1723612-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	96.9	70.0	130	----
QC-1723612-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	101	50.0	150	----
QC-1723612-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	96.0	65.0	135	----
QC-1723612-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	93.6	70.0	130	----
QC-1723612-003	RM	Iron	7439-89-6	E472	102 mg/kg	90.3	70.0	130	----
QC-1723612-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	92.9	15.0	185	----
QC-1723612-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	95.6	70.0	130	----
QC-1723612-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	101	70.0	130	----
QC-1723612-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	98.7	70.0	130	----
QC-1723612-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	106	40.0	160	----
QC-1723612-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	106	70.0	130	----
QC-1723612-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	99.2	70.0	130	----
QC-1723612-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	100	70.0	130	----
QC-1723612-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	95.3	70.0	130	----
QC-1723612-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	97.1	70.0	130	----
QC-1723612-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	96.5	70.0	130	----
QC-1723612-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	95.7	70.0	130	----
QC-1723612-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	96.7	70.0	130	----
Metals (QCLot: 1723613)									
QC-1723613-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	94.4	70.0	130	----
Metals (QCLot: 1723615)									
QC-1723615-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	93.6	70.0	130	----
Metals (QCLot: 1723616)									

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1723616) - continued									
QC-1723616-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	93.6	70.0	130	----
Metals (QCLot: 1723617)									
QC-1723617-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	95.6	70.0	130	----
Metals (QCLot: 1725069)									
QC-1725069-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	94.1	70.0	130	----
QC-1725069-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	95.4	70.0	130	----
QC-1725069-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	94.1	70.0	130	----
QC-1725069-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	94.7	70.0	130	----
QC-1725069-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	98.5	70.0	130	----
QC-1725069-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	97.6	70.0	130	----
QC-1725069-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	97.6	70.0	130	----
QC-1725069-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	88.2	50.0	150	----
QC-1725069-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	123	65.0	135	----
QC-1725069-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	94.5	70.0	130	----
QC-1725069-003	RM	Iron	7439-89-6	E472	102 mg/kg	103	70.0	130	----
QC-1725069-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	98.7	15.0	185	----
QC-1725069-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	96.3	70.0	130	----
QC-1725069-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	100	70.0	130	----
QC-1725069-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	95.8	70.0	130	----
QC-1725069-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	95.2	40.0	160	----
QC-1725069-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	98.6	70.0	130	----
QC-1725069-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	93.5	70.0	130	----
QC-1725069-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	94.5	70.0	130	----
QC-1725069-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	97.3	70.0	130	----
QC-1725069-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	98.1	70.0	130	----
QC-1725069-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	92.2	70.0	130	----
QC-1725069-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	97.9	70.0	130	----
QC-1725069-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	96.5	70.0	130	----
Metals (QCLot: 1725070)									
QC-1725070-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	89.5	70.0	130	----
Metals (QCLot: 1725072)									
QC-1725072-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	107	70.0	130	----
Metals (QCLot: 1725073)									
QC-1725073-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	107	70.0	130	----
Metals (QCLot: 1725074)									
QC-1725074-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	96.6	70.0	130	----

FISH TISSUE QUALITY

ALS Laboratory Report VA24B0407

(Finalized June 7, 2024)

ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **VA24B0407**	Page	: 1 of 74
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-May-2024 09:05
PO	: 5590012190	Date Analysis Commenced	: 18-May-2024
C-O-C number	: ----	Issue Date	: 07-Jun-2024 23:57
Sampler	: A. Hong, S. Latimer		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 140		
No. of samples analysed	: 140		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Analyst	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-M-1_2024-04	MP_POL_RB-M-2_2024-04	MP_POL_RB-M-3_2024-04	MP_POL_RB-M-4_2024-04	MP_POL_RB-M-5_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-001	VA24B0407-002	VA24B0407-003	VA24B0407-004	VA24B0407-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		80.1	77.6	77.7	77.8	78.6
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.4	4.1	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.032	0.075	0.074	0.085	0.061
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.109	0.119	0.067	<0.050	0.086
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		1410	683	733	715	604
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.120	0.0447	0.0525	0.0481	0.0981
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.110	0.077	0.148	0.065	0.096
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.031	<0.020	0.024	0.020	0.024
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.77	2.30	2.49	2.38	2.69
Iron	7439-89-6	E440/VA	3.0	mg/kg		35.6	32.0	41.3	29.9	32.9
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1360	1360	1300	1290	1230
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.660	0.588	0.623	0.472	0.449
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		1.54	0.365	0.367	0.519	0.517
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.306	0.0817	0.0818	0.115	0.110
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		14000	12800	13000	12300	11900
Potassium	7440-09-7	E440/VA	20	mg/kg		24000	22000	21800	19900	20200
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		17.5	8.38	9.25	8.65	14.0
Selenium	7782-49-2	E440/VA	0.050	mg/kg		6.20	3.40	3.86	3.11	5.48
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-M-1_2024-04	MP_POL_RB-M-2_2024-04	MP_POL_RB-M-3_2024-04	MP_POL_RB-M-4_2024-04	MP_POL_RB-M-5_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-001	VA24B0407-002	VA24B0407-003	VA24B0407-004	VA24B0407-005
						Result	Result	Result	Result	Result
Metals										
Sodium	7440-23-5	E440/VA	20	mg/kg		1970	1560	2020	1930	2520
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.66	0.622	0.797	0.621	0.748
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0058	0.0074	0.0090	0.0082	0.0085
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.30	0.36	0.27	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		16.5	15.2	15.6	17.5	19.3
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-M-6_2024-04	MP_POL_RB-M-7_2024-04	MP_POL_RB-M-8_2024-04	MP_POL_RB-O-1_2024-04	MP_POL_RB-O-2_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-006	VA24B0407-007	VA24B0407-008	VA24B0407-009	VA24B0407-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		80.2	78.4	78.3	61.7	62.7
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	2.0	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.119	0.119	0.100	0.035	0.060
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.280	0.125	<0.050	0.196	0.161
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		646	2870	611	1270	1190
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0707	0.0441	0.0520	0.0358	0.0118
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.071	0.069	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.031	<0.020	0.021	0.122	0.070
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.06	1.83	2.52	8.52	6.40
Iron	7439-89-6	E440/VA	3.0	mg/kg		50.8	28.2	27.5	45.3	45.2
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	0.023	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1380	1380	1280	1680	1550
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.503	1.04	0.535	3.04	4.76
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.757	0.395	0.302	0.0208	<0.0050
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.150	0.0852	0.0655	0.0080	0.0017
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	0.031	0.058
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		13500	14300	13000	12100	12200
Potassium	7440-09-7	E440/VA	20	mg/kg		22600	21900	22400	7620	7840
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		13.3	9.02	11.0	7.07	3.72
Selenium	7782-49-2	E440/VA	0.050	mg/kg		4.17	3.85	3.73	14.4	8.42
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		2400	2060	1920	2170	2280

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-M-6_2024-04	MP_POL_RB-M-7_2024-04	MP_POL_RB-M-8_2024-04	MP_POL_RB-O-1_2024-04	MP_POL_RB-O-2_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-006	VA24B0407-007	VA24B0407-008	VA24B0407-009	VA24B0407-010
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.666	4.07	0.599	2.99	3.02
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0084	0.0051	0.0066	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		22.4	19.9	19.2	63.1	64.3
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-O-3_2024-04	MP_POL_RB-O-4_2024-04	MP_POL_RB-O-5_2024-04	MP_POL_RB-O-6_2024-04	MP_POL_RB-O-7_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-011	VA24B0407-012	VA24B0407-013	VA24B0407-014	VA24B0407-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		62.2	60.9	62.3	63.8	64.5
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.044	0.069	0.039	0.071	0.052
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.202	0.218	0.403	0.217	0.151
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		1280	1360	1130	1180	1350
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0141	0.0112	0.0226	0.0145	0.0150
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.056	0.080	0.083	0.099	0.090
Copper	7440-50-8	E440/VA	0.10	mg/kg		7.94	8.82	9.15	6.95	8.32
Iron	7439-89-6	E440/VA	3.0	mg/kg		52.1	45.2	44.7	63.2	52.0
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1650	1500	1570	1350	1570
Manganese	7439-96-5	E440/VA	0.050	mg/kg		4.48	3.91	2.02	4.18	3.99
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		<0.0050	0.0066	0.0051	0.0232	0.0094
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0016	0.0026	0.0019	0.0084	0.0033
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.050	0.056	0.060	0.046	0.038
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12700	11800	11900	11200	12100
Potassium	7440-09-7	E440/VA	20	mg/kg		7980	7400	7360	5980	7190
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		3.87	3.63	6.00	4.01	3.66
Selenium	7782-49-2	E440/VA	0.050	mg/kg		8.66	8.54	11.0	8.51	7.14
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.0082	<0.0050	0.0060	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		2080	1980	1970	2920	2710

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-O-3_2024-04	MP_POL_RB-O-4_2024-04	MP_POL_RB-O-5_2024-04	MP_POL_RB-O-6_2024-04	MP_POL_RB-O-7_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-011	VA24B0407-012	VA24B0407-013	VA24B0407-014	VA24B0407-015
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		3.78	3.23	4.62	3.22	3.41
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	0.10	<0.10	0.12
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		58.9	57.4	50.9	58.2	66.3
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-O-8_2024-04	MP_POL_RB-Li-1_2024-04	MP_POL_RB-Li-2_2024-04	MP_POL_RB-Li-3_2024-04	MP_POL_RB-Li-4_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-016	VA24B0407-017	VA24B0407-018	VA24B0407-019	VA24B0407-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		60.9	80.3	77.0	----	----
Moisture	----	E144-H/VA	2.0	%		----	----	----	76.1	75.3
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	10.7	23.3	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	<5.0	7.4
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	0.020	0.017
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	0.011	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.054	0.065	0.080	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.069	0.122
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.139	0.087
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.153	0.246	0.233	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	<1.0
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	0.245	0.0930	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.251	0.060
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	417	240
Calcium	7440-70-2	E440/VA	20	mg/kg		1240	428	339	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.0430	0.0315
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0142	0.118	0.0334	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.259	0.495	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	0.25	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.119	0.076
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.074	0.202	0.110	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		8.27	53.0	13.2	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	146	11.1
Iron	7439-89-6	E440/VA	3.0	mg/kg		40.2	2860	1290	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-O-8_2024-04	MP_POL_RB-Li-1_2024-04	MP_POL_RB-Li-2_2024-04	MP_POL_RB-Li-3_2024-04	MP_POL_RB-Li-4_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-016	VA24B0407-017	VA24B0407-018	VA24B0407-019	VA24B0407-020
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	2350	762
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	0.152	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	691	700
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1510	834	793	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	5.33	4.90
Manganese	7439-96-5	E440/VA	0.050	mg/kg		4.28	6.15	5.77	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	0.221	0.496
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		<0.0050	1.51	0.361	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.0527	0.122
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0010	0.298	0.0830	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.040	1.35	0.583	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	1.28	0.686
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	0.23	<0.20
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	0.31	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	13700	13600
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12300	14700	14300	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	12500	12200
Potassium	7440-09-7	E440/VA	20	mg/kg		7470	13700	14000	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	7.36	7.15
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		4.84	14.8	7.03	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		8.56	26.3	9.61	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	54.6	10.6
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	0.477	0.107
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.126	0.0549	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	6370	5480
Sodium	7440-23-5	E440/VA	20	mg/kg		1730	9460	7010	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		3.03	0.652	0.540	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-O-8_2024-04	MP_POL_RB-Li-1_2024-04	MP_POL_RB-Li-2_2024-04	MP_POL_RB-Li-3_2024-04	MP_POL_RB-Li-4_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-016	VA24B0407-017	VA24B0407-018	VA24B0407-019	VA24B0407-020
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	0.80	0.41
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.150	0.209
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	0.135	0.112	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	0.35	1.42	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	<0.50	0.54
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0051	0.0040
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0136	0.0064	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	0.55	0.28
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	1.20	0.39	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		57.2	167	147	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	175	118
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Li-5_2024-04	MP_POL_RB-Li-6_2024-04	MP_POL_RB-Li-7_2024-04	MP_POL_RB-Li-8_2024-04	MP_POL_RB-Ki-1_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-021	VA24B0407-022	VA24B0407-023	VA24B0407-024	VA24B0407-025
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		75.8	77.0	----	----	80.7
Moisture	----	E144-H/VA	2.0	%		----	----	74.8	76.6	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		10.3	<2.0	----	----	22.6
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	<5.0	<5.0	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	0.012
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.082	0.190	----	----	0.303
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	0.142	0.078	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	0.113	<0.050	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.072	<0.050	----	----	0.574
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	<1.0	<1.0	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	----	----	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.234	0.0764	----	----	0.658
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	0.116	0.208	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	403	416	----
Calcium	7440-70-2	E440/VA	20	mg/kg		343	527	----	----	660
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	0.0379	0.0345	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0663	0.0498	----	----	0.103
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.431	0.127	----	----	0.637
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	<0.20	<0.20	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	0.113	0.095	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.127	0.074	----	----	3.35
Copper	7440-50-8	E440/VA	0.10	mg/kg		37.6	17.4	----	----	6.48
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	31.0	20.3	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		2510	1090	----	----	1000

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Li-5_2024-04	MP_POL_RB-Li-6_2024-04	MP_POL_RB-Li-7_2024-04	MP_POL_RB-Li-8_2024-04	MP_POL_RB-Ki-1_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-021	VA24B0407-022	VA24B0407-023	VA24B0407-024	VA24B0407-025
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	770	990	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	----	----	0.180
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	<0.050	<0.050	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	<0.50	<0.50	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	----	----	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	670	708	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		876	1050	----	----	633
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	5.13	5.00	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		7.32	6.75	----	----	3.93
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	0.319	0.246	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.285	0.333	----	----	2.61
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	0.0805	0.0576	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0689	0.0766	----	----	0.505
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.17	0.894	----	----	0.432
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	0.808	0.915	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	<0.20	0.25	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.21	<0.20	----	----	0.70
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	13300	13000	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		14800	16800	----	----	11300
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	11100	12700	----
Potassium	7440-09-7	E440/VA	20	mg/kg		13500	15600	----	----	11500
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	6.12	8.40	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		12.8	13.7	----	----	10.5
Selenium	7782-49-2	E440/VA	0.050	mg/kg		21.8	13.6	----	----	17.7
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	16.1	15.3	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	0.172	0.232	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.204	0.141	----	----	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	5880	6350	----
Sodium	7440-23-5	E440/VA	20	mg/kg		7020	6350	----	----	9390
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.627	0.858	----	----	1.30

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Li-5_2024-04	MP_POL_RB-Li-6_2024-04	MP_POL_RB-Li-7_2024-04	MP_POL_RB-Li-8_2024-04	MP_POL_RB-Ki-1_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-021	VA24B0407-022	VA24B0407-023	VA24B0407-024	VA24B0407-025
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	0.67	0.54	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	<0.020	<0.020	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	----	----	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	0.0978	0.0845	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.169	0.175	----	----	0.0529
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	<0.10	<0.10	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	----	----	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.29	<0.25	----	----	1.57
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	<0.50	<0.50	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	0.0027	0.0027	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0087	0.0029	----	----	0.0255
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	0.32	0.42	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.81	0.30	----	----	1.22
Zinc	7440-66-6	E440/VA	0.50	mg/kg		214	145	----	----	103
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	163	153	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	<0.20	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	----	----	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-2_2024-04	MP_POL_RB-Ki-3_2024-04	MP_POL_RB-Ki-4_2024-04	MP_POL_RB-Ki-5_2024-04	MP_POL_RB-Ki-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-026	VA24B0407-027	VA24B0407-028	VA24B0407-029	VA24B0407-030
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	----	82.0	----
Moisture	----	E144A/VA	2.0	%		----	----	76.9	----	79.3
Moisture	----	E144-H/VA	2.0	%		78.4	80.9	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	----	10.4	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	6.5	----	9.2
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		6.4	11.6	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	----	0.011	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	----	0.344	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.189	0.239	----	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	0.458	----	0.461
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	0.267	----	0.290
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.184	0.384	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	----	0.318	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	----	<0.010	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	<1.0	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	----	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	----	0.848	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	0.801	----	0.711
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.511	0.518	----	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	978	----	736
Calcium	7440-70-2	E472/VA	20	mg/kg		529	463	----	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-2_2024-04	MP_POL_RB-Ki-3_2024-04	MP_POL_RB-Ki-4_2024-04	MP_POL_RB-Ki-5_2024-04	MP_POL_RB-Ki-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-026	VA24B0407-027	VA24B0407-028	VA24B0407-029	VA24B0407-030
						Result	Result	Result	Result	Result
Metals										
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	----	940	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.0239	----	0.0413
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0292	0.0444	----	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	----	0.0675	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	----	0.472	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	<0.20	----	0.26
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.23	<0.20	----	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	1.24	----	1.01
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.07	1.07	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	----	1.43	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	----	4.99	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	5.80	----	4.38
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.98	5.42	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	----	791	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	896	----	967
Iron	7439-89-6	E472/VA	5.0	mg/kg		975	1070	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	----	0.031	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	<0.050	----	0.094
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.112	0.123	----	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	<0.50	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	----	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	567	----	654
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		549	687	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	----	755	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	3.09	----	3.12
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2.11	2.98	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	----	2.66	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.322	0.349	----	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	----	0.451	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-2_2024-04	MP_POL_RB-Ki-3_2024-04	MP_POL_RB-Ki-4_2024-04	MP_POL_RB-Ki-5_2024-04	MP_POL_RB-Ki-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-026	VA24B0407-027	VA24B0407-028	VA24B0407-029	VA24B0407-030
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.582	----	0.520
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0694	0.0668	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	----	0.0810	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.134	----	0.108
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	----	0.428	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.390	----	0.336
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.206	0.281	----	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	0.30	----	0.34
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.28	0.54	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	----	0.51	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		10700	13100	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	----	13500	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	9060	----	11300
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	9340	----	11600
Potassium	7440-09-7	E472/VA	20	mg/kg		10600	13100	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	----	14100	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	5.18	----	9.43
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.45	7.09	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	----	11.7	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	----	14.2	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	12.6	----	11.8
Selenium	7782-49-2	E472/VA	0.10	mg/kg		8.88	10.6	----	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	<0.0050	----	<0.0050
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	----	<0.0050	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	8680	----	8930
Sodium	7440-23-5	E472/VA	20	mg/kg		8720	9720	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	----	11100	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	----	3.01	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	1.53	----	2.17

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-2_2024-04	MP_POL_RB-Ki-3_2024-04	MP_POL_RB-Ki-4_2024-04	MP_POL_RB-Ki-5_2024-04	MP_POL_RB-Ki-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-026	VA24B0407-027	VA24B0407-028	VA24B0407-029	VA24B0407-030
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.92	1.24	----	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	----	<0.020	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0589	----	0.0385
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0371	0.0511	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	----	0.0339	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	----	<0.10	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	----	0.76	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	0.54	----	0.63
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	0.92	----	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.0097	----	0.0117
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0132	0.0146	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	----	0.0187	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	0.52	----	0.55
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.36	0.48	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	----	0.75	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	----	240	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	240	----	128
Zinc	7440-66-6	E472/VA	1.0	mg/kg		132	176	----	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	<0.20	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	----	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-7_2024-04	MP_POL_RB-Ki-8_2024-04	MP_BOL_RB-M-1_2024-04	MP_BOL_RB-M-2_2024-04	MP_BOL_RB-M-3_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-031	VA24B0407-032	VA24B0407-033	VA24B0407-034	VA24B0407-035
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	80.0	83.7	79.3
Moisture	----	E144-H/VA	2.0	%		77.4	79.4	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	2.1	3.7	<2.0
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		<5.0	6.2	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.048	0.047	0.023
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.339	0.141	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.184	0.497	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	0.205	0.154	0.083
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	<0.0050	<0.0050	<0.0050
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.544	0.478	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		489	648	----	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	2370	539	512
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0360	0.0380	----	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.0611	0.0547	0.0448
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	0.079	0.079	0.083
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.703	0.581	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	1.80	2.84	2.19
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.81	6.14	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	39.7	36.2	32.0

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-7_2024-04	MP_POL_RB-Ki-8_2024-04	MP_BOL_RB-M-1_2024-04	MP_BOL_RB-M-2_2024-04	MP_BOL_RB-M-3_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-031	VA24B0407-032	VA24B0407-033	VA24B0407-034	VA24B0407-035
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E472/VA	5.0	mg/kg		758	859	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	0.130	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		578	599	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	1230	1080	1170
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2.22	2.67	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	0.991	0.800	0.557
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.373	0.248	----	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	0.597	0.569	0.462
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0841	0.0511	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.120	0.0926	0.0957
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.377	0.349	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.23	<0.20	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		10800	11700	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	13800	11300	12000
Potassium	7440-09-7	E472/VA	20	mg/kg		10800	12300	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	21800	18600	20600
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		5.88	7.93	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	11.3	8.95	9.45
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	2.76	1.95	3.01
Selenium	7782-49-2	E472/VA	0.10	mg/kg		11.2	11.0	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.0715	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		7120	8620	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	2050	5160	1220
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	3.71	0.826	0.612

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_RB-Ki-7_2024-04	MP_POL_RB-Ki-8_2024-04	MP_BOL_RB-M-1_2024-04	MP_BOL_RB-M-2_2024-04	MP_BOL_RB-M-3_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-031	VA24B0407-032	VA24B0407-033	VA24B0407-034	VA24B0407-035
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		1.29	1.04	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0462	0.0385	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0144	0.0078	0.0085
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	<0.25	0.39	<0.25
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0042	0.0116	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.38	0.37	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	18.1	17.9	13.7
Zinc	7440-66-6	E472/VA	1.0	mg/kg		223	175	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-M-4_2024-04	MP_BOL_RB-M-5_2024-04	MP_BOL_RB-M-6_2024-04	MP_BOL_RB-M-7_2024-04	MP_BOL_RB-M-8_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-036	VA24B0407-037	VA24B0407-038	VA24B0407-039	VA24B0407-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		78.7	78.4	77.6	79.0	80.2
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		10.0	3.1	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.050	0.037	0.043	0.035	0.046
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.439	0.211	<0.050	0.126	<0.050
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		1210	2810	495	1820	558
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0659	0.0442	0.0482	0.0416	0.0559
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.089	0.056	<0.050	0.092	0.068
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.74	2.52	2.06	1.46	1.99
Iron	7439-89-6	E440/VA	3.0	mg/kg		51.9	44.3	30.7	17.7	20.8
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1270	1180	1160	1150	1270
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.00	1.10	0.505	0.709	0.704
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.440	0.288	0.424	0.434	0.345
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0936	0.0621	0.0948	0.0913	0.0683
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12700	12300	11100	11800	13000
Potassium	7440-09-7	E440/VA	20	mg/kg		20500	18400	18900	18900	22600
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		9.34	9.50	8.15	10.4	12.8
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.16	2.62	2.02	2.13	3.02
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1890	1220	1600	1590	1480

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-M-4_2024-04	MP_BOL_RB-M-5_2024-04	MP_BOL_RB-M-6_2024-04	MP_BOL_RB-M-7_2024-04	MP_BOL_RB-M-8_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-036	VA24B0407-037	VA24B0407-038	VA24B0407-039	VA24B0407-040
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.75	4.14	0.585	2.75	0.550
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0084	0.0084	0.0098	0.0066	0.0073
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.93	0.34	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		15.7	24.8	15.6	13.7	14.3
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-O-1_2024-04	MP_BOL_RB-O-2_2024-04	MP_BOL_RB-O-3_2024-04	MP_BOL_RB-O-4_2024-04	MP_BOL_RB-O-5_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-041	VA24B0407-042	VA24B0407-043	VA24B0407-044	VA24B0407-045
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		64.6	71.1	66.7	64.0	65.4
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.042	0.025	<0.020	0.032	0.022
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.632	0.436	0.602	0.528	0.408
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		1320	1230	1190	1230	1240
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0168	0.0141	0.0114	0.0138	0.0137
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.062	0.054	0.062	0.047	0.047
Copper	7440-50-8	E440/VA	0.10	mg/kg		8.32	8.27	7.90	9.41	9.05
Iron	7439-89-6	E440/VA	3.0	mg/kg		43.2	52.9	60.8	72.2	48.9
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1530	1360	1590	1560	1510
Manganese	7439-96-5	E440/VA	0.050	mg/kg		7.62	3.99	4.45	6.16	3.97
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0129	0.0168	0.0220	0.0197	0.0133
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0046	0.0049	0.0073	0.0071	0.0046
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.047	0.025	0.034	0.035	0.034
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11600	10300	11600	11300	10700
Potassium	7440-09-7	E440/VA	20	mg/kg		8160	6990	7260	7260	7030
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		4.57	3.93	3.78	3.86	4.22
Selenium	7782-49-2	E440/VA	0.050	mg/kg		6.67	3.63	5.59	4.92	5.11
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.0108	0.0063	0.0082	0.0070
Sodium	7440-23-5	E440/VA	20	mg/kg		2380	3650	2920	2610	2180

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-O-1_2024-04	MP_BOL_RB-O-2_2024-04	MP_BOL_RB-O-3_2024-04	MP_BOL_RB-O-4_2024-04	MP_BOL_RB-O-5_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-041	VA24B0407-042	VA24B0407-043	VA24B0407-044	VA24B0407-045
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		4.00	3.81	3.71	3.81	4.28
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		0.16	<0.10	<0.10	0.16	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		74.6	68.4	82.5	72.8	65.8
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-O-6_2024-04	MP_BOL_RB-O-7_2024-04	MP_BOL_RB-O-8_2024-04	MP_BOL_RB-Li-1_2024-04	MP_BOL_RB-Li-2_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-046	VA24B0407-047	VA24B0407-048	VA24B0407-049	VA24B0407-050
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		64.2	70.8	64.9	78.9	82.7
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	2.7	2.2
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.050	0.026	<0.020	0.128	0.034
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.594	0.386	0.525	0.080	0.139
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	0.175	0.155
Calcium	7440-70-2	E440/VA	20	mg/kg		1260	1480	1520	329	488
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0148	0.0204	0.0126	0.0491	0.0511
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	0.195	0.109
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.081	0.120	0.060	0.086	0.086
Copper	7440-50-8	E440/VA	0.10	mg/kg		12.6	8.90	8.07	252	141
Iron	7439-89-6	E440/VA	3.0	mg/kg		80.3	64.6	32.2	2700	2120
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1510	1560	1420	746	1110
Manganese	7439-96-5	E440/VA	0.050	mg/kg		7.60	5.63	7.96	6.12	9.72
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0186	0.0169	0.0105	0.444	0.563
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0066	0.0049	0.0037	0.0934	0.0972
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.042	0.046	0.026	1.53	0.900
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11000	12000	10900	13700	18600
Potassium	7440-09-7	E440/VA	20	mg/kg		7560	7990	6580	12700	14800
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		3.71	5.26	4.41	8.48	9.30
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.98	4.78	4.79	18.8	19.3
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0111	0.0291	<0.0050	1.82	1.89
Sodium	7440-23-5	E440/VA	20	mg/kg		2750	4330	2640	8560	8830

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-O-6_2024-04	MP_BOL_RB-O-7_2024-04	MP_BOL_RB-O-8_2024-04	MP_BOL_RB-Li-1_2024-04	MP_BOL_RB-Li-2_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-046	VA24B0407-047	VA24B0407-048	VA24B0407-049	VA24B0407-050
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		4.06	4.01	4.19	0.612	0.817
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	0.217	0.144
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	0.31	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	0.0054	0.0033
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.38	0.17
Zinc	7440-66-6	E440/VA	0.50	mg/kg		76.2	85.0	70.6	176	208
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-3_2024-04	MP_BOL_RB-Li-4_2024-04	MP_BOL_RB-Li-5_2024-04	MP_BOL_RB-Li-6_2024-04	MP_BOL_RB-Li-7_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-051	VA24B0407-052	VA24B0407-053	VA24B0407-054	VA24B0407-055
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		79.8	----	----	79.8	78.6
Moisture	----	E144A/VA	2.0	%		----	74.7	----	----	----
Moisture	----	E144-H/VA	2.0	%		----	----	75.6	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		4.3	----	----	2.1	<2.0
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	<5.0	----	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	6.6	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	<0.010	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	<0.020	----	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.037	----	----	0.091	<0.020
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	0.042	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	0.122	----	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	0.146	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	0.147	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.112	----	----	0.081	<0.050
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	<0.010	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	<0.010	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	<0.010	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	<1.0	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	----	----	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.129	----	----	0.177	0.0564
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	0.134	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	0.118	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	342	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	296	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-3_2024-04	MP_BOL_RB-Li-4_2024-04	MP_BOL_RB-Li-5_2024-04	MP_BOL_RB-Li-6_2024-04	MP_BOL_RB-Li-7_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-051	VA24B0407-052	VA24B0407-053	VA24B0407-054	VA24B0407-055
						Result	Result	Result	Result	Result
Metals										
Calcium	7440-70-2	E440/VA	20	mg/kg		337	----	----	390	328
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	0.0332	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	0.0377	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0315	----	----	0.0346	0.0378
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.287	----	----	0.122	0.069
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	0.32	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	<0.20	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	0.096	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	0.092	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.088	----	----	0.119	0.058
Copper	7440-50-8	E440/VA	0.10	mg/kg		110	----	----	269	14.7
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	178	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	59.3	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		1870	----	----	3710	647
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	2860	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	1300	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	----	----	<0.020	<0.020
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	<0.050	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	<0.050	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	<0.50	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	<0.50	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	629	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	712	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		769	----	----	748	910
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	6.16	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	6.56	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		6.19	----	----	6.66	8.47
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	0.372	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.630	----	----	0.629	0.275

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-3_2024-04	MP_BOL_RB-Li-4_2024-04	MP_BOL_RB-Li-5_2024-04	MP_BOL_RB-Li-6_2024-04	MP_BOL_RB-Li-7_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-051	VA24B0407-052	VA24B0407-053	VA24B0407-054	VA24B0407-055
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	0.393	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	0.0908	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.127	----	----	0.127	0.0589
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	0.0996	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.02	----	----	2.04	0.453
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	1.38	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	0.948	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	<0.20	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	<0.20	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	----	----	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	13800	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		14500	----	----	14200	16300
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	12600	----	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	11000	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	12200	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		13200	----	----	13200	17200
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	6.90	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	9.36	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		9.16	----	----	6.92	11.4
Selenium	7782-49-2	E440/VA	0.050	mg/kg		19.2	----	----	46.0	6.02
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	43.4	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	14.8	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	2.58	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	0.864	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		1.80	----	----	2.84	0.406
Sodium	7440-23-5	E475/VA	20	mg/kg		----	6100	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	4440	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		7270	----	----	7860	6120
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.671	----	----	0.884	0.430
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	0.80	----	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-3_2024-04	MP_BOL_RB-Li-4_2024-04	MP_BOL_RB-Li-5_2024-04	MP_BOL_RB-Li-6_2024-04	MP_BOL_RB-Li-7_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-051	VA24B0407-052	VA24B0407-053	VA24B0407-054	VA24B0407-055
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	0.68	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	<0.020	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	<0.020	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	----	----	<0.020	<0.020
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	0.204	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	0.157	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.189	----	----	0.261	0.104
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	<0.10	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	----	----	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.35	----	----	0.26	<0.25
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	<0.50	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	<0.50	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	0.0097	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	0.0026	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0045	----	----	0.0049	<0.0020
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	0.34	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	0.20	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.30	----	----	0.39	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		180	----	----	162	92.5
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	172	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	216	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	<0.20	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	<0.20	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	----	----	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-8_2024-04	MP_BOL_RB-Ki-1_2024-04	MP_BOL_RB-Ki-2_2024-04	MP_BOL_RB-Ki-3_2024-04	MP_BOL_RB-Ki-4_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-056	VA24B0407-057	VA24B0407-058	VA24B0407-059	VA24B0407-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.7	80.0	85.8	----	----
Moisture	----	E144A/VA	2.0	%		----	----	----	----	75.1
Moisture	----	E144-H/VA	2.0	%		----	----	----	83.9	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	4.3	3.3	----	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	10.3
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	5.8	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	0.011	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		<0.020	0.167	0.102	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.225	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.541
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	1.08
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.891	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		<0.050	0.365	0.300	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	----	----	1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0560	0.212	0.227	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	----	----	0.480
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.726	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	----	----	672
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	667	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-8_2024-04	MP_BOL_RB-Ki-1_2024-04	MP_BOL_RB-Ki-2_2024-04	MP_BOL_RB-Ki-3_2024-04	MP_BOL_RB-Ki-4_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-056	VA24B0407-057	VA24B0407-058	VA24B0407-059	VA24B0407-060
						Result	Result	Result	Result	Result
Metals										
Calcium	7440-70-2	E440/VA	20	mg/kg		302	470	1200	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	----	----	0.0297
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.0396	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0382	0.0380	0.0576	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.322	0.136	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	----	----	0.38
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	0.39	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	----	----	0.425
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	1.04	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.052	0.588	0.249	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		44.6	4.10	4.63	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	----	----	5.44
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	6.65	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		647	590	704	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	----	----	1050
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	996	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	0.034	<0.020	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	----	----	<0.050
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	0.058	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	----	----	661
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	665	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		846	547	850	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	----	----	2.82
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	3.30	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		5.57	1.88	2.67	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	0.608	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.264	0.439	0.489	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-8_2024-04	MP_BOL_RB-Ki-1_2024-04	MP_BOL_RB-Ki-2_2024-04	MP_BOL_RB-Ki-3_2024-04	MP_BOL_RB-Ki-4_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-056	VA24B0407-057	VA24B0407-058	VA24B0407-059	VA24B0407-060
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	----	----	0.488
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.0980	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0588	0.0878	0.0695	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	----	----	0.122
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.451	0.264	0.264	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.600
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	0.417	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	0.45
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	0.37	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	0.35	<0.20	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	12800	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		14300	9720	14500	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	10300
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	9740
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	12600	----
Potassium	7440-09-7	E440/VA	20	mg/kg		14200	10300	14100	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	5.73
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	8.00	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		10.8	6.69	9.17	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		7.09	6.30	5.54	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	10.5
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	9.42	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	0.0058
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	0.0198	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.305	<0.0050	0.0116	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	8030
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	11500	----
Sodium	7440-23-5	E440/VA	20	mg/kg		5730	12100	11300	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.441	1.20	2.83	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	2.30

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Li-8_2024-04	MP_BOL_RB-Ki-1_2024-04	MP_BOL_RB-Ki-2_2024-04	MP_BOL_RB-Ki-3_2024-04	MP_BOL_RB-Ki-4_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-056	VA24B0407-057	VA24B0407-058	VA24B0407-059	VA24B0407-060
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	2.19	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.0501
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.0448	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0927	0.0172	0.0284	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	0.38	0.34	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	0.97
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	0.55	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0127
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0104	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0057	0.0024	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	0.51
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	0.34	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.18	<0.10	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		131	51.6	96.1	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	250
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	216	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Ki-5_2024-04	MP_BOL_RB-Ki-6_2024-04	MP_BOL_RB-Ki-7_2024-04	MP_BOL_RB-Ki-8_2024-04	MP_POL_LSU-M-1_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-061	VA24B0407-062	VA24B0407-063	VA24B0407-064	VA24B0407-065
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	79.7	82.1	77.9	78.6
Moisture	----	E144A/VA	2.0	%		73.6	----	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	5.0	<2.0	3.5	15.9
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		6.6	----	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	----	----	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	0.092	0.100	0.031	0.197
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.149	----	----	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.421	----	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	0.316	0.218	0.242	0.667
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	----	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	0.224	0.302	0.237	<0.0050
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.422	----	----	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		598	----	----	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	350	685	396	1030
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0362	----	----	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	0.0260	0.0454	0.0440	0.100
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	0.177	0.282	0.111	0.127
Chromium	7440-47-3	E475/VA	0.20	mg/kg		<0.20	----	----	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.663	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	0.799	0.536	0.224	0.025
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	3.67	4.99	3.95	2.23
Copper	7440-50-8	E475/VA	0.20	mg/kg		5.70	----	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	923	732	405	56.8

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Ki-5_2024-04	MP_BOL_RB-Ki-6_2024-04	MP_BOL_RB-Ki-7_2024-04	MP_BOL_RB-Ki-8_2024-04	MP_POL_LSU-M-1_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-061	VA24B0407-062	VA24B0407-063	VA24B0407-064	VA24B0407-065
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E475/VA	5.0	mg/kg		869	----	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	0.046	<0.020	<0.020	0.029
Lead	7439-92-1	E475/VA	0.050	mg/kg		0.094	----	----	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	----	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		664	----	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	488	762	742	1440
Manganese	7439-96-5	E475/VA	0.050	mg/kg		3.06	----	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	1.79	2.58	4.12	2.11
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	0.651	0.300	0.223	0.203
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.379	----	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	0.132	0.0537	0.0494	0.0434
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.100	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	0.186	0.278	0.208	0.023
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.391	----	----	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		0.31	----	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	0.22	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	9130	13500	12400	12000
Phosphorus	7723-14-0	E475/VA	20	mg/kg		10200	----	----	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		10300	----	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	10100	15500	12800	20400
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		7.24	----	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	5.43	10.9	9.74	12.4
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	4.80	6.60	5.65	7.24
Selenium	7782-49-2	E475/VA	0.10	mg/kg		10.1	----	----	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0110	----	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	<0.0050	0.0184	<0.0050	<0.0050
Sodium	7440-23-5	E475/VA	20	mg/kg		4750	----	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	9830	10200	7220	1980
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	1.10	1.54	0.826	1.45

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-Ki-5_2024-04	MP_BOL_RB-Ki-6_2024-04	MP_BOL_RB-Ki-7_2024-04	MP_BOL_RB-Ki-8_2024-04	MP_POL_LSU-M-1_2024-04
					Client sampling date / time	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-061	VA24B0407-062	VA24B0407-063	VA24B0407-064	VA24B0407-065
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E475/VA	0.10	mg/kg		1.78	----	----	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	----	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0607	----	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	0.0189	0.0274	0.0195	<0.0020
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	----	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	0.45	<0.25	<0.25	1.37
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		0.53	----	----	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0076	----	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	0.0056	0.0045	0.0024	<0.0020
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		0.17	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	0.12	0.13	<0.10	0.14
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	73.2	129	114	24.3
Zinc	7440-66-6	E475/VA	1.0	mg/kg		294	----	----	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	----	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-M-2_2024-04	MP_POL_LSU-M-3_2024-04	MP_POL_LSU-M-4_2024-04	MP_POL_LSU-M-5_2024-04	MP_POL_LSU-M-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-066	VA24B0407-067	VA24B0407-068	VA24B0407-069	VA24B0407-070
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.5	75.2	77.8	77.0	78.0
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		4.4	5.5	3.2	<2.0	3.4
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.083	0.178	0.216	0.249	0.228
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.411	0.255	0.621	0.283	0.753
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		471	757	1430	2030	926
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0802	0.0734	0.0948	0.103	0.129
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.063	0.216	<0.050	0.112	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	0.024	<0.020	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.87	4.00	2.41	1.79	1.76
Iron	7439-89-6	E440/VA	3.0	mg/kg		34.2	31.4	27.9	18.3	19.0
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1220	1260	1450	1340	1360
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.30	1.12	2.27	1.78	2.16
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.195	0.163	0.229	0.421	0.219
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0439	0.0405	0.0510	0.0969	0.0481
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.023	0.023	0.021	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		10600	10400	13000	12300	11700
Potassium	7440-09-7	E440/VA	20	mg/kg		18200	16500	21400	19400	19900
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		7.80	5.57	10.7	10.1	10.6
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.16	5.65	5.97	6.04	6.66
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1800	1250	1630	1890	1680

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-M-2_2024-04	MP_POL_LSU-M-3_2024-04	MP_POL_LSU-M-4_2024-04	MP_POL_LSU-M-5_2024-04	MP_POL_LSU-M-6_2024-04
					Client sampling date / time	25-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-066	VA24B0407-067	VA24B0407-068	VA24B0407-069	VA24B0407-070
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.489	0.861	2.18	3.25	1.41
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	0.0026	0.0059	<0.0020	0.0033
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.44	0.46	0.27	<0.25	0.32
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		46.1	38.0	52.6	36.8	40.1
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-M-7_2024-04	MP_POL_LSU-M-8_2024-04	MP_POL_LSU-O-1_2024-04	MP_POL_LSU-O-2_2024-04	MP_POL_LSU-O-3_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-071	VA24B0407-072	VA24B0407-073	VA24B0407-074	VA24B0407-075
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		79.2	76.3	63.3	62.8	61.2
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	8.0	16.4	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.169	0.220	0.077	0.048	0.059
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.159	0.322	0.471	0.191	0.081
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0071	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		1290	638	512	494	461
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.136	0.0792	0.0132	0.0108	0.0100
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.079	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	0.032	0.126	0.055	0.074
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.24	2.41	3.97	3.80	2.87
Iron	7439-89-6	E440/VA	3.0	mg/kg		14.4	30.6	63.2	35.2	36.7
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1310	1420	622	689	552
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.26	1.35	19.9	11.7	16.9
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.687	0.106	0.0056	0.0054	<0.0050
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.143	0.0252	0.0021	0.0020	0.0015
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	0.020	0.074	0.075	0.067
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12600	11200	11500	11700	11400
Potassium	7440-09-7	E440/VA	20	mg/kg		22800	18400	5600	5720	5430
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		13.4	6.63	4.69	3.27	2.24
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.97	6.47	8.56	6.41	8.84
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1640	1170	1590	1440	1350

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-M-7_2024-04	MP_POL_LSU-M-8_2024-04	MP_POL_LSU-O-1_2024-04	MP_POL_LSU-O-2_2024-04	MP_POL_LSU-O-3_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-071	VA24B0407-072	VA24B0407-073	VA24B0407-074	VA24B0407-075
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.81	0.768	0.814	0.584	0.507
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	0.0022	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	0.44	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	0.61	1.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		19.4	36.2	78.7	83.9	71.4
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-O-4_2024-04	MP_POL_LSU-O-5_2024-04	MP_POL_LSU-O-6_2024-04	MP_POL_LSU-O-7_2024-04	MP_POL_LSU-O-8_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-076	VA24B0407-077	VA24B0407-078	VA24B0407-079	VA24B0407-080
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		63.0	63.8	62.6	63.6	62.3
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	13.9	<2.0	<2.0	2.2
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.112	0.127	0.076	0.112	0.132
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.152	0.332	0.204	0.146	0.162
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	0.0081	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		502	551	494	581	495
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0143	0.0178	0.0153	0.0152	0.0110
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.077	0.072	0.100	0.084	0.178
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.38	4.66	3.54	3.15	3.58
Iron	7439-89-6	E440/VA	3.0	mg/kg		35.3	71.6	40.7	35.2	44.9
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		637	683	701	704	571
Manganese	7439-96-5	E440/VA	0.050	mg/kg		17.0	16.0	19.2	22.9	29.2
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0058	0.0083	<0.0050	0.0111	<0.0050
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0022	0.0030	0.0013	0.0040	0.0015
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.075	0.072	0.066	0.090	0.069
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11300	12000	11400	11600	11800
Potassium	7440-09-7	E440/VA	20	mg/kg		5880	6490	5700	6240	5750
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		4.10	4.43	3.77	4.51	2.48
Selenium	7782-49-2	E440/VA	0.050	mg/kg		6.51	8.14	8.24	7.31	9.93
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1450	1440	1450	1600	1260

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-O-4_2024-04	MP_POL_LSU-O-5_2024-04	MP_POL_LSU-O-6_2024-04	MP_POL_LSU-O-7_2024-04	MP_POL_LSU-O-8_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-076	VA24B0407-077	VA24B0407-078	VA24B0407-079	VA24B0407-080
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.471	0.600	0.572	0.722	0.675
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0022	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	1.12	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.18	<0.10	0.15	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		92.2	91.4	77.5	87.7	86.8
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-1_2024-04	MP_POL_LSU-Li-2_2024-04	MP_POL_LSU-Li-3_2024-04	MP_POL_LSU-Li-4_2024-04	MP_POL_LSU-Li-5_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-081	VA24B0407-082	VA24B0407-083	VA24B0407-084	VA24B0407-085
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.7	77.9	75.0	70.4	77.9
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		16.0	17.9	142	4.4	2.1
Antimony	7440-36-0	E440/VA	0.010	mg/kg		0.010	0.020	0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.142	0.178	0.213	0.343	0.319
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.639	0.423	1.82	0.326	0.226
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0891	0.134	0.148	0.0661	0.205
Calcium	7440-70-2	E440/VA	20	mg/kg		239	326	411	240	378
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0199	0.0280	0.0297	0.0239	0.0398
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.161	0.090	0.258	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.100	0.143	0.260	0.078	0.120
Copper	7440-50-8	E440/VA	0.10	mg/kg		45.9	36.2	32.5	39.6	47.2
Iron	7439-89-6	E440/VA	3.0	mg/kg		489	320	568	388	345
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.035	<0.020	0.052	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1020	1230	872	708	1040
Manganese	7439-96-5	E440/VA	0.050	mg/kg		15.8	18.9	15.9	11.8	17.0
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0496	0.0388	0.0416	0.0341	0.0707
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0110	0.0086	0.0104	0.0101	0.0156
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.33	0.949	0.934	0.701	1.10
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	0.25	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		16800	20000	13800	12400	16600
Potassium	7440-09-7	E440/VA	20	mg/kg		13400	17200	12400	10100	14500
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		10.9	9.68	5.21	6.50	10.8
Selenium	7782-49-2	E440/VA	0.050	mg/kg		10.3	9.92	8.89	6.91	11.4
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0399	0.0126	0.0348	0.0186	0.0143
Sodium	7440-23-5	E440/VA	20	mg/kg		5060	4190	3860	3120	4530

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-1_2024-04	MP_POL_LSU-Li-2_2024-04	MP_POL_LSU-Li-3_2024-04	MP_POL_LSU-Li-4_2024-04	MP_POL_LSU-Li-5_2024-04
					Client sampling date / time	25-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-081	VA24B0407-082	VA24B0407-083	VA24B0407-084	VA24B0407-085
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.986	0.970	2.16	0.763	1.52
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	0.0030	0.0036	0.0043
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		1.11	1.22	9.62	0.42	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0024	0.0074	<0.0020	0.0029
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.26	0.56	0.80	0.23	0.36
Zinc	7440-66-6	E440/VA	0.50	mg/kg		101	110	88.6	98.4	129
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.40	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-6_2024-04	MP_POL_LSU-Li-7_2024-04	MP_POL_LSU-Li-8_2024-04	MP_POL_LSU-Ki-1_2024-04	MP_POL_LSU-Ki-2_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-086	VA24B0407-087	VA24B0407-088	VA24B0407-089	VA24B0407-090
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		67.6	79.0	70.9	----	----
Moisture	----	E144-H/VA	2.0	%		----	----	----	76.4	79.4
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		458	3.4	7.6	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	32.0	22.0
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Antimony	7440-36-0	E440/VA	0.010	mg/kg		0.013	0.018	<0.010	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.417	0.396	0.219	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.201	0.165
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	1.29	1.79
Barium	7440-39-3	E440/VA	0.050	mg/kg		4.84	0.213	0.145	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		0.014	<0.010	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	0.013	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	<1.0
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.131	0.768	0.147	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.782	0.666
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	488	561
Calcium	7440-70-2	E440/VA	20	mg/kg		580	243	260	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.0292	0.0338
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0727	0.0305	0.0160	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.401	0.270	0.052	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.913	0.256
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.405	0.124	0.213	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		33.5	71.6	36.3	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	7.24	6.64
Iron	7439-89-6	E440/VA	3.0	mg/kg		738	604	176	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-6_2024-04	MP_POL_LSU-Li-7_2024-04	MP_POL_LSU-Li-8_2024-04	MP_POL_LSU-Ki-1_2024-04	MP_POL_LSU-Ki-2_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-086	VA24B0407-087	VA24B0407-088	VA24B0407-089	VA24B0407-090
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	635	430
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.116	<0.020	<0.020	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	0.230	0.125
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	559	623
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		900	1320	689	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	8.59	6.75
Manganese	7439-96-5	E440/VA	0.050	mg/kg		33.9	15.2	7.81	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	0.0697	0.0460
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0287	0.128	0.0285	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.0165	0.0094
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0093	0.0269	0.0083	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.862	2.06	0.688	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	1.75	1.05
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	0.22	0.22
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.34	<0.20	<0.20	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	11300	12600
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11000	22700	11300	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	9220	10300
Potassium	7440-09-7	E440/VA	20	mg/kg		9320	19100	9660	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	9.16	6.09
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		6.26	14.0	4.04	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		7.51	14.1	8.38	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	9.41	8.52
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	<0.0050	<0.0050
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0179	0.0688	0.0507	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	5840	7530
Sodium	7440-23-5	E440/VA	20	mg/kg		3160	3540	3040	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		4.19	0.494	0.824	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-6_2024-04	MP_POL_LSU-Li-7_2024-04	MP_POL_LSU-Li-8_2024-04	MP_POL_LSU-Ki-1_2024-04	MP_POL_LSU-Ki-2_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	25-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-086	VA24B0407-087	VA24B0407-088	VA24B0407-089	VA24B0407-090
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	1.24	1.21
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.0063	0.0035
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0049	0.0039	0.0024	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		35.7	0.36	0.74	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	2.90	1.44
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0156	0.0085
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0251	0.0027	0.0027	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	0.99	2.24
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		2.21	0.89	0.11	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		85.3	120	86.1	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	127	218
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.40 DLM	<0.20	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-3_2024-04	MP_POL_LSU-Ki-4_2024-04	MP_POL_LSU-Ki-5_2024-04	MP_POL_LSU-Ki-6_2024-04	MP_POL_LSU-Ki-7_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-091	VA24B0407-092	VA24B0407-093	VA24B0407-094	VA24B0407-095
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	74.4	77.2	----
Moisture	----	E144A/VA	2.0	%		54.6	----	----	----	----
Moisture	----	E144-H/VA	2.0	%		----	66.5	----	----	79.9
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	3.0	6.4	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		<5.0	----	----	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	<5.0	----	----	<5.0
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	<0.010	----	----	<0.010
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	----	----	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.317	0.366	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.507	----	----	0.239
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.203	----	----	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.499	----	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	1.14	----	----	1.26
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	0.852	2.03	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	----	----	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	----	----	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	----	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	<1.0	----	----	<1.0
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	1.05	1.01	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.551	----	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	0.311	----	----	4.77
Calcium	7440-70-2	E475/VA	20	mg/kg		210	----	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	324	----	----	481

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-3_2024-04	MP_POL_LSU-Ki-4_2024-04	MP_POL_LSU-Ki-5_2024-04	MP_POL_LSU-Ki-6_2024-04	MP_POL_LSU-Ki-7_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-091	VA24B0407-092	VA24B0407-093	VA24B0407-094	VA24B0407-095
						Result	Result	Result	Result	Result
Metals										
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	530	576	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0098	----	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0194	----	----	0.0431
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.0321	0.0401	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	0.085	0.148	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		<0.20	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	<0.20	----	----	<0.20
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.335	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.388	----	----	0.600
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	0.376	0.667	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	6.81	6.10	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		2.20	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	3.33	----	----	7.04
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	314	334	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		137	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	208	----	----	330
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	<0.050	----	----	<0.050
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	----	----	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		229	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	335	----	----	716
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	585	609	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		2.47	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	4.44	----	----	5.42
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	7.73	8.41	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.0277	----	----	0.233
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	0.0879	0.0581	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-3_2024-04	MP_POL_LSU-Ki-4_2024-04	MP_POL_LSU-Ki-5_2024-04	MP_POL_LSU-Ki-6_2024-04	MP_POL_LSU-Ki-7_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-091	VA24B0407-092	VA24B0407-093	VA24B0407-094	VA24B0407-095
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.024	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0093	----	----	0.0467
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.0225	0.0132	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0110	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	0.726	0.792	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.258	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.387	----	----	1.04
Nickel	7440-02-0	E475/VA	0.20	mg/kg		0.27	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.24	----	----	0.51
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	0.23	0.30	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	7350	----	----	15000
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	10600	11300	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		4680	----	----	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		3800	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	5310	----	----	12400
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	9060	10200	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		1.76	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	3.63	----	----	9.26
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	6.49	6.86	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	7.17	9.03	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		3.62	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	4.82	----	----	10.4
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		<0.0050	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	<0.0050	----	----	<0.0050
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	<0.0050	<0.0050	----
Sodium	7440-23-5	E475/VA	20	mg/kg		2060	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	3280	----	----	7020
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	7020	6680	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	1.02	1.30	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.37	----	----	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-3_2024-04	MP_POL_LSU-Ki-4_2024-04	MP_POL_LSU-Ki-5_2024-04	MP_POL_LSU-Ki-6_2024-04	MP_POL_LSU-Ki-7_2024-04
					Client sampling date / time	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-091	VA24B0407-092	VA24B0407-093	VA24B0407-094	VA24B0407-095
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	0.66	----	----	1.04
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	----	----	0.047
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0059	----	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0100	----	----	0.0129
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0072	0.0112	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	----	----	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	0.34	0.57	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	<0.50	----	----	0.77
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		<0.0020	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0021	----	----	0.0130
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	0.0029	0.0047	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		0.11	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.75	----	----	5.37
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	1.04	1.07	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	179	169	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		113	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	183	----	----	156
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	----	----	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-8_2024-04	MP_BOL_LSU-M-1_2024-04	MP_BOL_LSU-M-2_2024-04	MP_BOL_LSU-M-3_2024-04	MP_BOL_LSU-M-4_2024-04
					Client sampling date / time	27-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-096	VA24B0407-097	VA24B0407-098	VA24B0407-099	VA24B0407-100
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		52.1	73.0	76.8	77.5	76.2
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		29.4	<2.0	2.9	3.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		0.013	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.172	0.033	0.074	0.195	0.114
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.648	0.277	0.248	0.176	0.255
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.543	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		290	321	560	382	530
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0113	0.0593	0.124	0.176	0.149
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.055	<0.050	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.629	0.022	<0.020	0.021	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.62	2.40	1.74	2.88	2.13
Iron	7439-89-6	E440/VA	3.0	mg/kg		209	46.6	29.8	37.5	28.6
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		289	1020	1220	1180	1140
Manganese	7439-96-5	E440/VA	0.050	mg/kg		3.33	0.728	1.33	0.902	1.11
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0204	0.412	0.767	0.693	0.776
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0098	0.111	0.178	0.156	0.184
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.233	<0.020	<0.020	0.023	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.32	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		5370	9660	10800	10900	10900
Potassium	7440-09-7	E440/VA	20	mg/kg		4500	14400	18600	18200	18300
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		1.94	5.50	8.39	14.4	10.8
Selenium	7782-49-2	E440/VA	0.050	mg/kg		4.02	1.81	2.16	2.81	2.29
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		2400	1150	1320	1350	1310

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Ki-8_2024-04	MP_BOL_LSU-M-1_2024-04	MP_BOL_LSU-M-2_2024-04	MP_BOL_LSU-M-3_2024-04	MP_BOL_LSU-M-4_2024-04
					Client sampling date / time	27-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-096	VA24B0407-097	VA24B0407-098	VA24B0407-099	VA24B0407-100
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.678	0.301	0.841	0.339	0.805
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0043	<0.0020	<0.0020	0.0025	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	0.32	0.55	0.41	0.16
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		1.76	<0.25	0.32	0.29	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0024	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.25	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		92.7	15.4	13.5	14.9	15.3
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-M-5_2024-04	MP_BOL_LSU-M-6_2024-05	MP_BOL_LSU-M-7_2024-05	MP_BOL_LSU-M-8_2024-05	MP_BOL_LSU-O-1_2024-04
					Client sampling date / time	28-Apr-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	28-Apr-2024 00:00
						VA24B0407-101	VA24B0407-102	VA24B0407-103	VA24B0407-104	VA24B0407-105
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.2	77.8	72.3	74.7	64.6
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.4	<2.0	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.189	0.341	0.094	0.054	0.023
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.180	0.144	0.174	0.107	0.270
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	0.0052
Calcium	7440-70-2	E440/VA	20	mg/kg		714	472	308	321	666
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.174	0.196	0.103	0.0974	0.0109
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	0.024	0.032
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.89	1.62	2.60	3.09	3.04
Iron	7439-89-6	E440/VA	3.0	mg/kg		25.9	15.2	40.8	50.2	52.8
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1230	1320	995	1060	708
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.86	0.670	0.740	0.688	15.0
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.700	0.402	0.515	0.631	0.0167
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.160	0.0892	0.143	0.160	0.0059
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	0.056
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11100	11100	9160	9560	11400
Potassium	7440-09-7	E440/VA	20	mg/kg		19200	19800	14300	15700	6510
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		11.2	13.6	9.83	9.71	3.03
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.36	2.99	2.14	2.26	4.00
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	0.0062
Sodium	7440-23-5	E440/VA	20	mg/kg		1330	1380	1070	1510	1590

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-M-5_2024-04	MP_BOL_LSU-M-6_2024-05	MP_BOL_LSU-M-7_2024-05	MP_BOL_LSU-M-8_2024-05	MP_BOL_LSU-O-1_2024-04
					Client sampling date / time	28-Apr-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	28-Apr-2024 00:00
						VA24B0407-101	VA24B0407-102	VA24B0407-103	VA24B0407-104	VA24B0407-105
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.12	0.512	0.377	0.353	0.802
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	0.0036	0.0046	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		0.32	0.30	0.42	0.19	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		12.0	19.6	15.2	14.3	83.2
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-O-2_2024-04	MP_BOL_LSU-O-3_2024-04	MP_BOL_LSU-O-4_2024-04	MP_BOL_LSU-O-5_2024-04	MP_BOL_LSU-O-6_2024-05
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	02-May-2024 00:00
						VA24B0407-106	VA24B0407-107	VA24B0407-108	VA24B0407-109	VA24B0407-110
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		65.8	65.3	66.5	64.9	71.3
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.053	0.101	0.109	0.072	0.230
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.234	0.195	0.304	0.232	0.185
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0054	0.0060	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		650	579	874	608	1480
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0165	0.0276	0.0254	0.0183	0.0427
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	0.066
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.053	0.063	0.060	0.063	0.067
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.41	3.34	3.96	3.31	6.71
Iron	7439-89-6	E440/VA	3.0	mg/kg		56.5	44.3	54.5	42.1	84.3
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		791	747	813	725	961
Manganese	7439-96-5	E440/VA	0.050	mg/kg		21.5	12.0	8.46	9.96	4.65
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0232	0.0240	0.0266	0.0204	0.0285
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0079	0.0083	0.0089	0.0072	0.0082
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.047	0.068	0.072	0.079	0.095
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11400	11300	12000	10800	8390
Potassium	7440-09-7	E440/VA	20	mg/kg		6780	6990	6990	6100	9570
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		4.42	6.97	5.42	4.80	8.05
Selenium	7782-49-2	E440/VA	0.050	mg/kg		3.84	4.80	3.88	4.25	2.40
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1640	1670	1900	1810	2790

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-O-2_2024-04	MP_BOL_LSU-O-3_2024-04	MP_BOL_LSU-O-4_2024-04	MP_BOL_LSU-O-5_2024-04	MP_BOL_LSU-O-6_2024-05
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	02-May-2024 00:00
						VA24B0407-106	VA24B0407-107	VA24B0407-108	VA24B0407-109	VA24B0407-110
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.689	0.726	1.22	0.820	1.27
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	0.34
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	0.27
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		82.6	80.5	84.4	68.6	127
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-O-7_2024-05	MP_BOL_LSU-O-8_2024-05	MP_BOL_LSU-Li-1_2024-04	MP_BOL_LSU-Li-2_2024-04	MP_BOL_LSU-Li-3_2024-04
					Client sampling date / time	02-May-2024 00:00	02-May-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-111	VA24B0407-112	VA24B0407-113	VA24B0407-114	VA24B0407-115
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		65.8	65.6	75.4	76.0	75.5
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	3.7	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	0.015	0.032	0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.091	0.057	0.087	0.170	0.115
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.269	0.198	0.078	0.151	0.061
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	0.0069	0.272	0.334	0.329
Calcium	7440-70-2	E440/VA	20	mg/kg		668	763	190	191	156
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0218	0.0216	0.0183	0.0244	0.0304
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	0.074
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.050	0.059	0.064	0.083	0.092
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.66	3.94	9.05	36.8	28.6
Iron	7439-89-6	E440/VA	3.0	mg/kg		53.5	57.0	176	123	104
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		738	795	915	1020	945
Manganese	7439-96-5	E440/VA	0.050	mg/kg		15.1	16.4	11.9	13.4	10.6
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0154	0.0224	0.138	0.199	0.162
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0053	0.0077	0.0340	0.0477	0.0395
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.057	0.054	1.14	1.60	1.19
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11200	11500	15400	17300	15800
Potassium	7440-09-7	E440/VA	20	mg/kg		6600	6980	14000	14800	14600
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		5.73	5.15	7.54	10.5	13.6
Selenium	7782-49-2	E440/VA	0.050	mg/kg		4.42	4.29	5.44	7.17	5.80
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.0078	0.0088	0.109	0.0400
Sodium	7440-23-5	E440/VA	20	mg/kg		1740	1600	2980	3090	2740

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-O-7_2024-05	MP_BOL_LSU-O-8_2024-05	MP_BOL_LSU-Li-1_2024-04	MP_BOL_LSU-Li-2_2024-04	MP_BOL_LSU-Li-3_2024-04
					Client sampling date / time	02-May-2024 00:00	02-May-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-111	VA24B0407-112	VA24B0407-113	VA24B0407-114	VA24B0407-115
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.858	0.776	0.428	0.408	0.289
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	0.0022	<0.0020	<0.0020	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.20	0.18
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	0.26	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	0.0031	0.0045	0.0026
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	0.26	0.36	0.32
Zinc	7440-66-6	E440/VA	0.50	mg/kg		69.9	81.0	65.4	82.3	79.0
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Li-4_2024-04	MP_BOL_LSU-Li-5_2024-04	MP_BOL_LSU-Li-6_2024-05	MP_BOL_LSU-Li-7_2024-05	MP_BOL_LSU-Li-8_2024-05
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00
						VA24B0407-116	VA24B0407-117	VA24B0407-118	VA24B0407-119	VA24B0407-120
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		74.8	78.4	67.9	75.7	76.0
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.4	8.3	<2.0	5.7	18.5
Antimony	7440-36-0	E440/VA	0.010	mg/kg		0.013	0.014	<0.010	0.015	0.029
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.108	0.162	0.096	0.136	0.134
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.316	1.07	0.077	0.135	0.392
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.267	0.342	0.0388	0.432	0.588
Calcium	7440-70-2	E440/VA	20	mg/kg		276	664	88	204	277
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0267	0.0296	0.0190	0.0352	0.0419
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	0.058
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.069	0.119	0.032	0.106	0.108
Copper	7440-50-8	E440/VA	0.10	mg/kg		16.4	14.3	16.4	21.4	17.8
Iron	7439-89-6	E440/VA	3.0	mg/kg		211	176	86.9	396	300
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		864	1100	502	953	1050
Manganese	7439-96-5	E440/VA	0.050	mg/kg		12.6	32.8	5.26	15.0	15.7
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.136	0.137	0.0662	0.134	0.173
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0343	0.0296	0.0212	0.0325	0.0414
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.12	1.09	0.563	1.31	1.01
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		14300	17400	8370	15700	17000
Potassium	7440-09-7	E440/VA	20	mg/kg		13200	17000	9010	16400	15200
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		9.44	14.2	7.89	13.1	11.6
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.84	6.46	4.81	6.48	6.73
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0158	0.0189	0.0238	0.0305	0.0443
Sodium	7440-23-5	E440/VA	20	mg/kg		2950	3680	1990	2570	4040

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Li-4_2024-04	MP_BOL_LSU-Li-5_2024-04	MP_BOL_LSU-Li-6_2024-05	MP_BOL_LSU-Li-7_2024-05	MP_BOL_LSU-Li-8_2024-05
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00
						VA24B0407-116	VA24B0407-117	VA24B0407-118	VA24B0407-119	VA24B0407-120
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.15	3.60	0.183	0.434	0.765
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		<0.0020	0.0036	<0.0020	0.0038	0.0044
Tin	7440-31-5	E440/VA	0.10	mg/kg		0.18	0.23	0.14	0.18	0.13
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	0.48	<0.25	0.35	0.84
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0036	0.0063	<0.0020	0.0044	0.0050
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.26	0.27	<0.10	0.29	0.33
Zinc	7440-66-6	E440/VA	0.50	mg/kg		74.2	71.3	49.6	72.8	76.6
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Ki-1_2024-04	MP_BOL_LSU-Ki-2_2024-04	MP_BOL_LSU-Ki-3_2024-04	MP_BOL_LSU-Ki-4_2024-04	MP_BOL_LSU-Ki-5_2024-04
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-121	VA24B0407-122	VA24B0407-123	VA24B0407-124	VA24B0407-125
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		81.3	77.0	78.1	76.5	78.7
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		3.0	17.0	8.4	4.2	69.7
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	0.013
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.099	0.091	0.200	0.148	0.379
Barium	7440-39-3	E440/VA	0.050	mg/kg		2.48	3.79	1.75	1.81	7.39
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		2.26	1.83	2.03	1.43	0.483
Calcium	7440-70-2	E440/VA	20	mg/kg		1540	4970	1240	1850	3650
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0244	0.0257	0.0568	0.0336	0.0360
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.140	0.105	0.091	0.052	0.197
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.161	0.178	0.286	0.178	0.237
Copper	7440-50-8	E440/VA	0.10	mg/kg		6.24	5.44	6.89	7.73	13.2
Iron	7439-89-6	E440/VA	3.0	mg/kg		248	318	353	384	403
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	0.026	<0.020	<0.020	0.038
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		611	557	660	614	843
Manganese	7439-96-5	E440/VA	0.050	mg/kg		15.3	85.2	29.3	27.8	132
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.370	0.310	0.302	0.296	0.157
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0692	0.0710	0.0661	0.0697	0.0334
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.02	0.622	1.03	0.717	0.700
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.39	0.46	0.38	0.27	0.35
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12700	12200	13300	12400	12500
Potassium	7440-09-7	E440/VA	20	mg/kg		9610	8230	11000	9820	10600
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		4.72	5.32	10.6	7.26	8.61
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.57	4.86	6.79	5.46	5.44
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	0.0166
Sodium	7440-23-5	E440/VA	20	mg/kg		9580	8310	6200	6160	6800

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Ki-1_2024-04	MP_BOL_LSU-Ki-2_2024-04	MP_BOL_LSU-Ki-3_2024-04	MP_BOL_LSU-Ki-4_2024-04	MP_BOL_LSU-Ki-5_2024-04
					Client sampling date / time	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00	28-Apr-2024 00:00
						VA24B0407-121	VA24B0407-122	VA24B0407-123	VA24B0407-124	VA24B0407-125
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		2.96	13.6	3.16	6.12	21.9
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		0.041	0.033	0.023	0.032	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0072	0.0072	0.0143	0.0074	0.0042
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.39	1.05	0.93	0.42	4.47
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0167	0.0195	0.0178	0.0118	0.0266
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		1.74	1.82	1.45	1.02	0.70
Zinc	7440-66-6	E440/VA	0.50	mg/kg		88.5	73.2	103	71.8	71.8
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Ki-6_2024-05	MP_BOL_LSU-Ki-7_2024-05	MP_BOL_LSU-Ki-8_2024-05	MP_POL_RB-M-4X _2024-04	MP_POL_LSU-M-7X_2024-04
					Client sampling date / time	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-126	VA24B0407-127	VA24B0407-128	VA24B0407-129	VA24B0407-130
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		73.2	70.6	86.7	75.1	79.6
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		3.1	<2.0	4.3	2.1	2.3
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	0.013	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.160	0.139	0.114	0.074	0.155
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.688	1.21	7.45	0.104	0.342
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.508	1.94	2.61	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		285	830	12000	419	3790
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0416	0.0322	0.0404	0.0422	0.128
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.084	<0.050	0.069	0.251	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.729	0.427	0.288	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		4.04	3.96	7.90	2.09	1.30
Iron	7439-89-6	E440/VA	3.0	mg/kg		295	316	362	31.1	28.4
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	0.030	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		509	400	746	1150	1280
Manganese	7439-96-5	E440/VA	0.050	mg/kg		5.57	10.9	174	0.461	3.68
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.121	0.216	0.342	0.476	0.725
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0325	0.0633	0.0453	0.119	0.148
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.556	0.450	0.515	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.23	0.48	0.65	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		10800	8550	19000	10800	14300
Potassium	7440-09-7	E440/VA	20	mg/kg		9390	6850	9520	16800	22800
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		8.37	6.36	7.16	7.48	13.0
Selenium	7782-49-2	E440/VA	0.050	mg/kg		5.20	5.21	6.16	2.85	6.30
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0071	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		4660	5650	18100	1760	1640

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_LSU-Ki-6_2024-05	MP_BOL_LSU-Ki-7_2024-05	MP_BOL_LSU-Ki-8_2024-05	MP_POL_RB-M-4X _2024-04	MP_POL_LSU-M-7X_2024-04
					Client sampling date / time	02-May-2024 00:00	02-May-2024 00:00	02-May-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00
						VA24B0407-126	VA24B0407-127	VA24B0407-128	VA24B0407-129	VA24B0407-130
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.603	1.83	30.6	0.353	7.10
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	0.050	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0136	0.0104	0.0092	0.0062	<0.0020
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	0.31	0.56	0.36
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.43	0.25	0.46	<0.25	0.39
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0035	0.0123	0.0205	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.25	0.87	1.51	<0.10	0.13
Zinc	7440-66-6	E440/VA	0.50	mg/kg		106	75.4	117	17.7	20.0
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-M-4X _2024-04	MP_POL_ RB-O-4X_2024-04	MP_POL_LSU-O-7X_2024-04	MP_BOL_RB-O-4X _2024-04	MP_POL_RB-Li-4X_2024-04
					Client sampling date / time	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-131	VA24B0407-132	VA24B0407-133	VA24B0407-134	VA24B0407-135
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		78.1	60.3	63.9	63.5	----
Moisture	----	E144-H/VA	2.0	%		----	----	----	----	76.8
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	<2.0	<2.0	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	----	<5.0
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	----	<0.010
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.050	0.056	0.103	0.032	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	----	0.095
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	----	<0.050
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.060	0.196	0.133	0.505	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	----	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	----	<1.0
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0068	<0.0050	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	----	0.036
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	----	277
Calcium	7440-70-2	E440/VA	20	mg/kg		387	1280	554	1180	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	----	0.0436
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0594	0.0099	0.0157	0.0132	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	----	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	----	0.079
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	0.082	0.081	0.048	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.98	8.55	3.04	8.73	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	----	13.6

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-M-4X _2024-04	MP_POL_ RB-O-4X_2024-04	MP_POL_LSU-O-7X_2024-04	MP_BOL_RB-O-4X _2024-04	MP_POL_RB-Li-4X_2024-04
					Client sampling date / time	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-131	VA24B0407-132	VA24B0407-133	VA24B0407-134	VA24B0407-135
						Result	Result	Result	Result	Result
Metals										
Iron	7439-89-6	E440/VA	3.0	mg/kg		34.6	39.7	34.8	56.1	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	----	428
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	----	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	----	764
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1170	1490	686	1520	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	----	3.70
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.530	3.66	22.6	6.42	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	----	0.493
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.381	0.0054	0.0099	0.0134	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	----	0.114
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0835	0.0022	0.0036	0.0049	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	0.047	0.078	0.029	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	----	0.430
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	----	<0.20
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	----	14500
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12300	12000	11600	11900	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	----	13100
Potassium	7440-09-7	E440/VA	20	mg/kg		20000	7030	6090	6880	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	----	8.21
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		9.67	3.59	4.52	3.67	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.08	8.13	6.98	4.81	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	----	7.64
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	----	0.120
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.0079	<0.0050	0.0077	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	----	6180

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_BOL_RB-M-4X _2024-04	MP_POL_ RB-O-4X_2024-04	MP_POL_LSU-O-7X_2024-04	MP_BOL_RB-O-4X _2024-04	MP_POL_RB-Li-4X_2024-04
					Client sampling date / time	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00
						VA24B0407-131	VA24B0407-132	VA24B0407-133	VA24B0407-134	VA24B0407-135
						Result	Result	Result	Result	Result
Metals										
Sodium	7440-23-5	E440/VA	20	mg/kg		1770	1760	1480	2550	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.430	3.07	0.682	3.78	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	----	0.38
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	----	0.120
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0086	<0.0020	<0.0020	<0.0020	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		0.24	0.10	<0.10	<0.10	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	----	<0.50
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	----	0.0021
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	----	0.18
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	0.14	<0.10	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		15.3	56.9	86.0	70.6	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	----	126
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-7X_2024-04	MP_BOL_RB-Li-4X_2024-04	MP_POL_RB-Ki-4X_2024-04	MP_POL_LSU-Ki-7X_2024-04	MP_BOL_RB-Ki-4X _2024-04
					Client sampling date / time	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-136	VA24B0407-137	VA24B0407-138	VA24B0407-139	VA24B0407-140
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		76.4	----	----	----	----
Moisture	----	E144A/VA	2.0	%		----	74.4	76.6	----	77.7
Moisture	----	E144-H/VA	2.0	%		----	----	----	78.4	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	----	----	----	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	<5.0	17.2	----	7.5
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	6.2	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		0.016	----	----	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	<0.020	0.027	----	<0.020
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.340	----	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.226	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	0.138	0.381	----	0.505
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	0.172	0.301	----	1.16
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.651	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.152	----	----	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	<0.010	<0.010	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	<0.010	0.020	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	----	----	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	<1.0	1.4	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	----	----	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.641	----	----	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	0.146	0.340	----	0.634
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	5.90	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	458	639	----	643
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	391	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-7X_2024-04	MP_BOL_RB-Li-4X_2024-04	MP_POL_RB-Ki-4X_2024-04	MP_POL_LSU-Ki-7X_2024-04	MP_BOL_RB-Ki-4X _2024-04
					Client sampling date / time	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-136	VA24B0407-137	VA24B0407-138	VA24B0407-139	VA24B0407-140
						Result	Result	Result	Result	Result
Metals										
Calcium	7440-70-2	E440/VA	20	mg/kg		205	----	----	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	0.0305	0.0277	----	0.0406
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.0440	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0295	----	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.068	----	----	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	0.37	5.37	----	0.23
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	0.098	0.703	----	0.643
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.665	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.102	----	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		63.6	----	----	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	126	3.90	----	6.21
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	6.87	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		491	----	----	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	4520	957	----	921
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	316	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	----	----	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	<0.050	0.058	----	<0.050
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	<0.050	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	<0.50	<0.50	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	850	622	----	712
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	706	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1160	----	----	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	8.64	2.22	----	3.23
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	5.41	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		13.6	----	----	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	0.260	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.113	----	----	----	----

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-7X_2024-04	MP_BOL_RB-Li-4X_2024-04	MP_POL_RB-Ki-4X_2024-04	MP_POL_LSU-Ki-7X_2024-04	MP_BOL_RB-Ki-4X _2024-04
					Client sampling date / time	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-136	VA24B0407-137	VA24B0407-138	VA24B0407-139	VA24B0407-140
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	0.492	0.556	----	0.515
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.0563	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0267	----	----	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	0.126	0.130	----	0.114
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		1.76	----	----	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	1.76	0.299	----	0.583
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	1.21	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	<0.20	2.33	----	0.43
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	0.51	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	15000	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		20100	----	----	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	14800	11500	----	11600
Potassium	7440-09-7	E475/VA	20	mg/kg		----	11500	11200	----	10800
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	12100	----
Potassium	7440-09-7	E440/VA	20	mg/kg		16900	----	----	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	7.05	5.94	----	6.54
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	9.31	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		12.0	----	----	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		12.1	----	----	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	28.5	10.8	----	10.4
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	10.8	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	1.65	<0.0050	----	0.0053
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	<0.0050	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0679	----	----	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	6390	7660	----	10300
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	5780	----
Sodium	7440-23-5	E440/VA	20	mg/kg		2980	----	----	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.399	----	----	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	1.05	1.14	----	2.35

Analytical Results

Sub-Matrix: **Tissue**
(Matrix: **Biota**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_POL_LSU-Li-7X_2024-04	MP_BOL_RB-Li-4X_2024-04	MP_POL_RB-Ki-4X_2024-04	MP_POL_LSU-Ki-7X_2024-04	MP_BOL_RB-Ki-4X _2024-04
					Client sampling date / time	27-Apr-2024 00:00	26-Apr-2024 00:00	25-Apr-2024 00:00	27-Apr-2024 00:00	26-Apr-2024 00:00
						VA24B0407-136	VA24B0407-137	VA24B0407-138	VA24B0407-139	VA24B0407-140
						Result	Result	Result	Result	Result
Metals										
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	0.76	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	<0.020	<0.020	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	0.053	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	----	----	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	0.226	0.0537	----	0.0456
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.0146	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0040	----	----	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	<0.10	0.20	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		0.39	----	----	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	----	----	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	<0.50	1.40	----	0.58
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	1.00	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	0.0146	0.0091	----	0.0122
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0116	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	----	----	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	0.48	0.65	----	0.42
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	5.61	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.65	----	----	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		102	----	----	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	206	203	----	221
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	140	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	<0.20	<0.20	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24B0407**	Page	: 1 of 102
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-May-2024 09:05
PO	: 5590012190	Issue Date	: 07-Jun-2024 23:57
C-O-C number	: ----		
Sampler	: A. Hong, S. Latimer		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 140		
No. of samples analysed	: 140		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Metals	QC-MRG5-1459461 001	----	Zirconium	7440-67-7	E440	0.33 B mg/kg	0.2 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E512	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E512	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E512	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E512	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E512	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E512	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4_2024-04	E512	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4X_2024-04	E512	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-6_2024-04	E512	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-4_2024-04	E511	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7_2024-04	E511	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7X_2024-04	E511	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Ki-3_2024-04	E511	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Li-5_2024-04	E511	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-1_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E511	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-6_2024-05	E510	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-7_2024-05	E510	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-8_2024-05	E510	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-8_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-6_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-7_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-8_2024-05	E510	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-1_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-2_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-3_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-4_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-5_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-1_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-2_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-3_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-4_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
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LDPE bag MP_BOL_LSU-O-5_2024-04	E510	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-1_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-2_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-5_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-6_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-1_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓

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LDPE bag MP_POL_RB-M-2_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
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LDPE bag MP_POL_RB-M-4_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
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LDPE bag MP_POL_RB-M-6_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-7_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-8_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-1_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-2_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓

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Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-3_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-4_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
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LDPE bag MP_POL_RB-O-7_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-8_2024-04	E510	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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LDPE bag MP_BOL_RB-Ki-2_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-6_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓

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Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-3_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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LDPE bag MP_BOL_RB-Li-7_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-8_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-1_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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LDPE bag MP_BOL_RB-M-2_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓

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LDPE bag MP_BOL_RB-M-3_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-5_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-6_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-7_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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LDPE bag MP_BOL_RB-O-2_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-5_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-6_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-7_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-8_2024-04	E510	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-5_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-6_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-8_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-3_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-4_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-5_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-6_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-8_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-3_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-4_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-5_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-6_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-8_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-3_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-4_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-5_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-6_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-8_2024-04	E510	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-2_2024-04	E510	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-1_2024-04	E510	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-5_2024-04	E510	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E510	26-Apr-2024	30-May-2024	365 days	35 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-1_2024-04	E510	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-2_2024-04	E510	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-1_2024-04	E510	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-1_2024-04	E510	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-2_2024-04	E510	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Ki-2_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Ki-3_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Ki-4_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Ki-5_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Li-1_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Li-2_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Li-3_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Li-4_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag										
MP_BOL_LSU-Li-5_2024-04	E510	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E510	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7X_2024-04	E510	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7X_2024-04	E510	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4X _2024-04	E510	26-Apr-2024	04-Jun-2024	365 days	39 days	✓	05-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4X _2024-04	E510	26-Apr-2024	04-Jun-2024	365 days	39 days	✓	05-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_ RB-O-4X_2024-04	E510	25-Apr-2024	04-Jun-2024	365 days	40 days	✓	05-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4X _2024-04	E510	25-Apr-2024	04-Jun-2024	365 days	40 days	✓	05-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E512A	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E512A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E512A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E512A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E512A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E512A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4_2024-04	E512A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4X_2024-04	E512A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_POL_RB-Ki-6_2024-04	E512A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_LSU-Ki-4_2024-04	E511A	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_LSU-Ki-7_2024-04	E511A	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_LSU-Ki-7X_2024-04	E511A	27-Apr-2024	06-Jun-2024	365 days	41 days	✓	07-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_BOL_RB-Ki-3_2024-04	E511A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_BOL_RB-Li-5_2024-04	E511A	26-Apr-2024	06-Jun-2024	365 days	42 days	✓	07-Jun-2024	365 days	42 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_LSU-Ki-1_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E511A	25-Apr-2024	06-Jun-2024	365 days	43 days	✓	07-Jun-2024	365 days	43 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-6_2024-05	E510A	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-7_2024-05	E510A	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-8_2024-05	E510A	02-May-2024	30-May-2024	365 days	29 days	✓	03-Jun-2024	365 days	33 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-8_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-6_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-7_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-8_2024-05	E510A	02-May-2024	04-Jun-2024	365 days	33 days	✓	05-Jun-2024	365 days	34 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-1_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-2_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-3_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-4_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-M-5_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-1_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-2_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-3_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-4_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-O-5_2024-04	E510A	28-Apr-2024	30-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	37 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Li-1_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Li-2_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Li-5_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Li-6_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-1_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-2_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-3_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-4_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-5_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-6_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-7_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-8_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-1_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-2_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-3_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-4_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-5_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-6_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓

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Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-7_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-O-8_2024-04	E510A	25-Apr-2024	27-May-2024	365 days	33 days	✓	31-May-2024	365 days	37 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Ki-2_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Ki-6_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Ki-7_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-1_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-2_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-3_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-6_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-7_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Li-8_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-1_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-2_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-3_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-4_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-5_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-6_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-7_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-8_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-1_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-2_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
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Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-6_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-7_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓

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Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-8_2024-04	E510A	26-Apr-2024	29-May-2024	365 days	33 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-Ki-5_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-Ki-6_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
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LDPE bag MP_POL_LSU-Li-8_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
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LDPE bag MP_POL_LSU-M-7_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-M-8_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-3_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-4_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓

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Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-5_2024-04	E510A	27-Apr-2024	30-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	38 days	✓
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Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-M-2_2024-04	E510A	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Ki-1_2024-04	E510A	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-Ki-5_2024-04	E510A	25-Apr-2024	29-May-2024	365 days	34 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E510A	26-Apr-2024	30-May-2024	365 days	35 days	✓	03-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-Li-1_2024-04	E510A	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-Li-2_2024-04	E510A	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-M-1_2024-04	E510A	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-1_2024-04	E510A	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-2_2024-04	E510A	25-Apr-2024	30-May-2024	365 days	36 days	✓	03-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-2_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-3_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-4_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Ki-5_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-1_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-2_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-3_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-4_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_LSU-Li-5_2024-04	E510A	28-Apr-2024	04-Jun-2024	365 days	37 days	✓	05-Jun-2024	365 days	38 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E510A	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-M-7X_2024-04	E510A	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_LSU-O-7X_2024-04	E510A	27-Apr-2024	04-Jun-2024	365 days	38 days	✓	05-Jun-2024	365 days	39 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-M-4X _2024-04	E510A	26-Apr-2024	04-Jun-2024	365 days	39 days	✓	05-Jun-2024	365 days	40 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_BOL_RB-O-4X _2024-04	E510A	26-Apr-2024	04-Jun-2024	365 days	39 days	✓	05-Jun-2024	365 days	40 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_ RB-O-4X_2024-04	E510A	25-Apr-2024	04-Jun-2024	365 days	40 days	✓	05-Jun-2024	365 days	41 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_POL_RB-M-4X _2024-04	E510A	25-Apr-2024	04-Jun-2024	365 days	40 days	✓	05-Jun-2024	365 days	41 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E475	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E475	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E475	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E475	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E475	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E475	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_POL_RB-Ki-4_2024-04	E475	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_POL_RB-Ki-4X_2024-04	E475	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag										
MP_POL_RB-Ki-6_2024-04	E475	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_POL_LSU-Ki-4_2024-04	E472	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_POL_LSU-Ki-7_2024-04	E472	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_POL_LSU-Ki-7X_2024-04	E472	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_BOL_RB-Ki-3_2024-04	E472	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_BOL_RB-Li-5_2024-04	E472	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag										
MP_POL_LSU-Ki-1_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E472	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-6_2024-05	E440	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-7_2024-05	E440	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-8_2024-05	E440	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-1_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-2_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-5_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-6_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-1_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-2_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-3_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-5_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-6_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-7_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-8_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-1_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-2_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-3_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-4_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-5_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-6_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-7_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-8_2024-04	E440	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-8_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-1_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-2_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-3_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-4_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-5_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-1_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-2_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-3_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-4_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-5_2024-04	E440	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-6_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-7_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-8_2024-05	E440	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-2_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-6_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-7_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-1_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-2_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-3_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-6_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-7_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-8_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-1_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-2_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-3_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-5_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-6_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-7_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-8_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-1_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-2_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-3_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-5_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-6_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-7_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-8_2024-04	E440	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-5_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-6_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-8_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-3_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-4_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-5_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-6_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-8_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-2_2024-04	E440	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-3_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-4_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-5_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-6_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-8_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-3_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-4_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-5_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-6_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-8_2024-04	E440	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-1_2024-04	E440	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-5_2024-04	E440	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E440	26-Apr-2024	30-May-2024	730 days	35 days	✓	31-May-2024	730 days	36 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-1_2024-04	E440	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-2_2024-04	E440	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-1_2024-04	E440	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-1_2024-04	E440	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-2_2024-04	E440	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-2_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-3_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-4_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-5_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-1_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-2_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-3_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-4_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-5_2024-04	E440	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E440	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7X_2024-04	E440	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7X_2024-04	E440	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4X _2024-04	E440	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4X _2024-04	E440	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_ RB-O-4X_2024-04	E440	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4X _2024-04	E440	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E475.Ag	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E475.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E475.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E475.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E475.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E475.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4_2024-04	E475.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4X_2024-04	E475.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-6_2024-04	E475.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-4_2024-04	E472.Ag	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7_2024-04	E472.Ag	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7X_2024-04	E472.Ag	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Ki-3_2024-04	E472.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Li-5_2024-04	E472.Ag	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-1_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E472.Ag	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-6_2024-05	E440.Ag	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-7_2024-05	E440.Ag	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-8_2024-05	E440.Ag	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-1_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-2_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-5_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-6_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-1_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-2_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-3_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-5_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-6_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-7_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-8_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-1_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-2_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-3_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-4_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-5_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-6_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-7_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-8_2024-04	E440.Ag	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-8_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-1_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-2_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-3_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-4_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-5_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-1_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-2_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-3_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-4_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-5_2024-04	E440.Ag	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-6_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-7_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-8_2024-05	E440.Ag	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-2_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-6_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-7_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-1_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-2_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-3_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-6_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-7_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-8_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-1_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-2_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-3_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-5_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-6_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-7_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-8_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
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Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-2_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-3_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-5_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-6_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-7_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-8_2024-04	E440.Ag	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-5_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-6_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Ki-8_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-3_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-4_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-5_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-6_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-8_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-2_2024-04	E440.Ag	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-3_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-4_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-5_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-6_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-8_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-3_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-4_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-5_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-6_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-8_2024-04	E440.Ag	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-1_2024-04	E440.Ag	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-5_2024-04	E440.Ag	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E440.Ag	26-Apr-2024	30-May-2024	730 days	35 days	✓	31-May-2024	730 days	36 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-1_2024-04	E440.Ag	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-2_2024-04	E440.Ag	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-1_2024-04	E440.Ag	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-1_2024-04	E440.Ag	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-2_2024-04	E440.Ag	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-2_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-3_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-4_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-5_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-1_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-2_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-3_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-4_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-5_2024-04	E440.Ag	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E440.Ag	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7X_2024-04	E440.Ag	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7X_2024-04	E440.Ag	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4X _2024-04	E440.Ag	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4X _2024-04	E440.Ag	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_ RB-O-4X_2024-04	E440.Ag	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4X _2024-04	E440.Ag	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E475.Ti	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E475.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E475.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E475.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E475.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E475.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4_2024-04	E475.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-4X_2024-04	E475.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_POL_RB-Ki-6_2024-04	E475.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-4_2024-04	E472.Ti	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7_2024-04	E472.Ti	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-7X_2024-04	E472.Ti	27-Apr-2024	06-Jun-2024	730 days	41 days	✓	07-Jun-2024	730 days	42 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Ki-3_2024-04	E472.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_BOL_RB-Li-5_2024-04	E472.Ti	26-Apr-2024	06-Jun-2024	730 days	42 days	✓	07-Jun-2024	730 days	43 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-1_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E472.Ti	25-Apr-2024	06-Jun-2024	730 days	43 days	✓	07-Jun-2024	730 days	44 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-6_2024-05	E440.Ti	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-7_2024-05	E440.Ti	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-8_2024-05	E440.Ti	02-May-2024	30-May-2024	730 days	29 days	✓	31-May-2024	730 days	30 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-1_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-2_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-5_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Li-6_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-1_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-2_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-3_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-5_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-6_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-7_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-8_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-1_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓

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Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-2_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-3_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-4_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-5_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-6_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-7_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-O-8_2024-04	E440.Ti	25-Apr-2024	27-May-2024	730 days	33 days	✓	27-May-2024	730 days	33 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓

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LDPE bag MP_BOL_LSU-Ki-8_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-1_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-2_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-3_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-4_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-M-5_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
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Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-1_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-2_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-3_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-4_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
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LDPE bag MP_BOL_LSU-O-5_2024-04	E440.Ti	28-Apr-2024	30-May-2024	730 days	33 days	✓	31-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-O-6_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
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LDPE bag MP_BOL_LSU-O-8_2024-05	E440.Ti	02-May-2024	04-Jun-2024	730 days	33 days	✓	04-Jun-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-2_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
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Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-3_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-6_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-7_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Li-8_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

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Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-1_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-2_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-3_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-5_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-6_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-7_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-8_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-1_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓

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LDPE bag MP_BOL_RB-O-2_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-3_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4_2024-04	E440.Ti	26-Apr-2024	29-May-2024	730 days	33 days	✓	29-May-2024	730 days	34 days	✓
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LDPE bag MP_POL_LSU-M-2_2024-04	E440.Ti	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
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Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7_2024-04	E440.Ti	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-8_2024-04	E440.Ti	27-Apr-2024	30-May-2024	730 days	34 days	✓	31-May-2024	730 days	35 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-1_2024-04	E440.Ti	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-Ki-5_2024-04	E440.Ti	25-Apr-2024	29-May-2024	730 days	34 days	✓	29-May-2024	730 days	35 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E440.Ti	26-Apr-2024	30-May-2024	730 days	35 days	✓	31-May-2024	730 days	36 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-1_2024-04	E440.Ti	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-2_2024-04	E440.Ti	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-1_2024-04	E440.Ti	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-1_2024-04	E440.Ti	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-2_2024-04	E440.Ti	25-Apr-2024	30-May-2024	730 days	36 days	✓	31-May-2024	730 days	37 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-2_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-3_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-4_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Ki-5_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-1_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-2_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-3_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-4_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_LSU-Li-5_2024-04	E440.Ti	28-Apr-2024	04-Jun-2024	730 days	37 days	✓	04-Jun-2024	730 days	38 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E440.Ti	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-M-7X_2024-04	E440.Ti	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_LSU-O-7X_2024-04	E440.Ti	27-Apr-2024	04-Jun-2024	730 days	38 days	✓	04-Jun-2024	730 days	39 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-M-4X _2024-04	E440.Ti	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_BOL_RB-O-4X _2024-04	E440.Ti	26-Apr-2024	04-Jun-2024	730 days	39 days	✓	04-Jun-2024	730 days	40 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_ RB-O-4X_2024-04	E440.Ti	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_POL_RB-M-4X _2024-04	E440.Ti	25-Apr-2024	04-Jun-2024	730 days	40 days	✓	04-Jun-2024	730 days	41 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL_LSU-Ki-3_2024-04	E144A	27-Apr-2024	----	----	----		01-Jun-2024	----	35 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL_RB-Ki-4_2024-04	E144A	26-Apr-2024	----	----	----		01-Jun-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL_RB-Ki-4X _2024-04	E144A	26-Apr-2024	----	----	----		01-Jun-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL_RB-Ki-5_2024-04	E144A	26-Apr-2024	----	----	----		01-Jun-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL_RB-Li-4_2024-04	E144A	26-Apr-2024	----	----	----		01-Jun-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_BOL_RB-Li-4X_2024-04	E144A	26-Apr-2024	----	----	----		01-Jun-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL_RB-Ki-4_2024-04	E144A	25-Apr-2024	----	----	----		01-Jun-2024	----	37 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL_RB-Ki-4X_2024-04	E144A	25-Apr-2024	----	----	----		01-Jun-2024	----	37 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_POL_RB-Ki-6_2024-04	E144A	25-Apr-2024	----	----	----		01-Jun-2024	----	37 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_LSU-Ki-4_2024-04	E144-H	27-Apr-2024	----	----	----		30-May-2024	----	34 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_LSU-Ki-7_2024-04	E144-H	27-Apr-2024	----	----	----		30-May-2024	----	34 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_LSU-Ki-7X_2024-04	E144-H	27-Apr-2024	----	----	----		30-May-2024	----	34 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_BOL_RB-Ki-3_2024-04	E144-H	26-Apr-2024	----	----	----		30-May-2024	----	35 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_BOL_RB-Li-5_2024-04	E144-H	26-Apr-2024	----	----	----		30-May-2024	----	35 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_LSU-Ki-1_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_LSU-Ki-2_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Ki-2_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Ki-3_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Ki-7_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Ki-8_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Li-3_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Li-4_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Li-4X_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Li-7_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_POL_RB-Li-8_2024-04	E144-H	25-Apr-2024	----	----	----		30-May-2024	----	36 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-6_2024-05	E144	02-May-2024	----	----	----		18-May-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-7_2024-05	E144	02-May-2024	----	----	----		18-May-2024	----	16 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-8_2024-05	E144	02-May-2024	----	----	----		18-May-2024	----	16 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-1_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-2_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-3_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-4_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-M-5_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-1_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-2_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-3_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-4_2024-04	E144	28-Apr-2024	----	----	----		18-May-2024	----	20 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-3_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-4_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-5_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-6_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-7_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-3_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-4_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-5_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-6_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-7_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-8_2024-04	E144	27-Apr-2024	----	----	----		18-May-2024	----	21 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-6_2024-05	E144	02-May-2024	----	----	----		24-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-7_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-8_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-6_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-7_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-8_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-6_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-7_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-8_2024-05	E144	02-May-2024	----	----	----		23-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-2_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-3_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-4_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-5_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-6_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-7_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-8_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-1_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-2_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-3_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-4_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-5_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-6_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-7_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-8_2024-04	E144	26-Apr-2024	----	----	----		18-May-2024	----	22 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-1_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-2_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-1_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-2_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-1_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-2_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-3_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-4_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-5_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-6_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-7_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-8_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-1_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-2_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-3_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-4_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-5_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-6_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-7_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-O-8_2024-04	E144	25-Apr-2024	----	----	----		18-May-2024	----	23 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-1_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-2_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-3_2024-04	E144	28-Apr-2024	----	----	----		24-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-4_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Ki-5_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-1_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-2_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-3_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-4_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-Li-5_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_LSU-O-5_2024-04	E144	28-Apr-2024	----	----	----		23-May-2024	----	26 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Ki-5_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Ki-6_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Ki-8_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-3_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-4_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-5_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-6_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-7_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-7X_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-8_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-7X_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-M-8_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-O-7X_2024-04	E144	27-Apr-2024	----	----	----		23-May-2024	----	27 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Ki-1_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Ki-2_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Ki-6_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Ki-7_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Ki-8_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-1_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-2_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-3_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-6_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-7_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-Li-8_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-1_2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-M-4X _2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_BOL_RB-O-4X _2024-04	E144	26-Apr-2024	----	----	----		23-May-2024	----	28 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_ RB-O-4X_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-1_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_LSU-Li-2_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Ki-1_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Ki-5_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Li-1_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Li-2_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Li-5_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-Li-6_2024-04	E144	25-Apr-2024	----	----	----		23-May-2024	----	29 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_POL_RB-M-4X _2024-04	E144	25-Apr-2024	----	----	----		24-May-2024	----	29 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1477776	1	16	6.2	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1459465	7	125	5.6	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1477777	1	16	6.2	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1459464	7	125	5.6	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1477778	1	16	6.2	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1459463	8	125	6.4	5.0	✓
Moisture Content by Gravimetry	E144	1449809	7	123	5.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1467259	1	16	6.2	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1477774	1	16	6.2	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1459462	7	115	6.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1477775	1	16	6.2	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1459461	7	115	6.0	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1477758	2	9	22.2	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1477776	2	16	12.5	10.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1459465	14	125	11.2	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1477759	2	9	22.2	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1477777	2	16	12.5	10.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1459464	14	125	11.2	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1477760	2	9	22.2	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1477778	2	16	12.5	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1459463	14	125	11.2	10.0	✓
Moisture Content by Gravimetry	E144	1449809	7	123	5.6	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1471107	1	9	11.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1467259	1	16	6.2	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1477756	2	9	22.2	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1477774	2	16	12.5	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1459462	14	115	12.1	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1477757	2	9	22.2	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1477775	2	16	12.5	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1459461	14	115	12.1	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1477758	1	9	11.1	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1477776	1	16	6.2	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1459465	7	125	5.6	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1477759	1	9	11.1	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1477777	1	16	6.2	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1459464	7	125	5.6	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1477760	1	9	11.1	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1477778	1	16	6.2	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1459463	7	125	5.6	5.0	✓
Moisture Content by Gravimetry	E144	1449809	7	123	5.6	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1471107	1	9	11.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1467259	1	16	6.2	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1477756	1	9	11.1	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1477774	1	16	6.2	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1459462	7	115	6.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1477757	1	9	11.1	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1477775	1	16	6.2	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1459461	7	115	6.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of soil, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Routine)	E510 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Routine)	E510A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion	EP440 ALS Environmental - Vancouver	Biota	EPA 200.3	This method uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24B0407**	Page	: 1 of 46
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 10-May-2024 09:05
PO	: 5590012190	Date Analysis Commenced	: 18-May-2024
C-O-C number	: ----	Issue Date	: 07-Jun-2024 23:57
Sampler	: A. Hong, S. Latimer		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 140		
No. of samples analysed	: 140		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Analyst	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1449809)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Moisture	----	E144	0.50	%	80.1	79.9	0.245%	20%	----
Physical Tests (QC Lot: 1449813)											
VA24B0407-038	MP_BOL_RB-M-6_2024-04	Moisture	----	E144	0.50	%	77.6	77.4	0.300%	20%	----
Physical Tests (QC Lot: 1449819)											
VA24B0407-073	MP_POL_LSU-O-1_2024-04	Moisture	----	E144	0.50	%	63.3	63.3	0.0383%	20%	----
Physical Tests (QC Lot: 1455792)											
VA24B0407-133	MP_POL_LSU-O-7X_2024-04	Moisture	----	E144	0.50	%	63.9	63.8	0.0984%	20%	----
Physical Tests (QC Lot: 1455817)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Moisture	----	E144	0.50	%	64.9	66.7	2.82%	20%	----
Physical Tests (QC Lot: 1455840)											
VA24B0407-132	MP_POL_RB-O-4X_2024-04	Moisture	----	E144	0.50	%	60.3	60.1	0.276%	20%	----
Physical Tests (QC Lot: 1457279)											
VA24A9033-004	Anonymous	Moisture	----	E144	0.50	%	59.5	58.6	1.41%	20%	----
Physical Tests (QC Lot: 1467259)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Moisture	----	E144-H	2.0	%	76.1	75.9	0.304%	20%	----
Metals (QC Lot: 1459461)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.30	<0.25	0.05	Diff <2x LOR	----
Metals (QC Lot: 1459462)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1459463)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
VA24B0407-001	MP_POL_RB-M-1_2024-04	Aluminum	7429-90-5	E440	2.0	mg/kg	2.4	<2.0	0.4	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.032	0.033	0.001	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.109	0.083	0.026	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1459463) - continued											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Calcium	7440-70-2	E440	20	mg/kg	1410	1160	19.2%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.120	0.126	4.56%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.110	0.143	0.033	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.031	0.032	0.001	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	1.77	1.81	1.98%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	35.6	34.0	4.33%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1360	1420	4.28%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	0.660	0.547	18.7%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	14000	14100	0.973%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	24000	24500	1.85%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	17.5	17.8	1.41%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	6.20	6.37	2.71%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1970	1980	0.524%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	1.66	1.37	19.2%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0058	0.0062	0.0004	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	16.5	16.3	0.994%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1459464)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Mercury	7439-97-6	E510A	0.0013	mg/kg wwt	0.306	0.321	4.66%	40%	----
Metals (QC Lot: 1459465)											
VA24B0407-001	MP_POL_RB-M-1_2024-04	Mercury	7439-97-6	E510	0.0066	mg/kg	1.54	1.61	4.66%	40%	----
Metals (QC Lot: 1460749)											
VA24A9034-004	Anonymous	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0084	0.0086	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1460750)											
VA24A9034-004	Anonymous	Aluminum	7429-90-5	E440	2.0	mg/kg	72.9	67.5	7.67%	40%	----
		Antimony	7440-36-0	E440	0.010	mg/kg	0.022	0.017	0.005	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1460750) - continued											
VA24A9034-004	Anonymous	Arsenic	7440-38-2	E440	0.020	mg/kg	0.072	0.061	0.011	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	4.92	4.70	4.62%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	51.6	49.7	3.78%	40%	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0587	0.0494	17.2%	40%	----
		Calcium	7440-70-2	E440	20	mg/kg	3970	3750	5.83%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0064	0.0056	0.0007	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.272	0.256	6.24%	40%	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.076	0.066	0.010	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	10.3	9.78	5.27%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	131	118	10.6%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	0.098	0.103	4.31%	40%	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	2030	1950	3.83%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	69.0	68.4	0.960%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.593	0.576	3.04%	40%	----
		Nickel	7440-02-0	E440	0.20	mg/kg	0.38	0.37	0.01	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	2440	2420	0.572%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	13300	12600	5.35%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	0.597	0.559	6.57%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	0.056	0.058	0.001	Diff <2x LOR	----
		Sodium	7440-23-5	E440	20	mg/kg	172	163	4.93%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	57.5	53.4	7.24%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0030	0.0026	0.0003	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	0.33	0.28	0.05	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	18.6	17.6	5.55%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1460752)											
VA24A9034-004	Anonymous	Mercury	7439-97-6	E510A	0.0011	mg/kg wwt	0.0032	0.0033	0.00006	Diff <2x LOR	----
Metals (QC Lot: 1460753)											

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1460753) - continued											
VA24B0407-066	MP_POL_LSU-M-2_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1460754)											
VA24B0407-066	MP_POL_LSU-M-2_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.44	0.43	0.007	Diff <2x LOR	----
Metals (QC Lot: 1460834)											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.0108	0.0106	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1460835)											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1460836)											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.025	0.025	0.0002	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.436	0.396	9.71%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	1230	1170	4.53%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0141	0.0143	0.0002	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.054	0.048	0.006	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	8.27	7.69	7.32%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	52.9	49.0	7.56%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1360	1290	5.85%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	3.99	3.70	7.57%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.025	0.024	0.0009	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	10300	9640	6.75%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	6990	6600	5.79%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	3.93	3.75	4.73%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	3.63	3.58	1.46%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	3650	3430	6.28%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1460836) - continued											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Strontium	7440-24-6	E440	0.050	mg/kg	3.81	3.69	3.24%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	68.4	64.0	6.59%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1460837)											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Mercury	7439-97-6	E510A	0.0010	mg/kg wwt	0.0049	0.0050	0.0001	Diff <2x LOR	----
Metals (QC Lot: 1460838)											
VA24B0407-042	MP_BOL_RB-O-2_2024-04	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0168	0.0172	0.0004	Diff <2x LOR	----
Metals (QC Lot: 1462539)											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1462540)											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1462541)											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.059	0.062	0.004	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.081	0.087	0.005	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	461	468	1.38%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0100	0.0097	0.0003	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.074	0.077	0.003	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	2.87	2.89	0.501%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	36.7	37.7	2.72%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1462541) - continued											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Magnesium	7439-95-4	E440	2.0	mg/kg	552	587	6.23%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	16.9	17.6	4.25%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.067	0.066	0.0008	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	11400	11400	0.108%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	5430	5560	2.25%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	2.24	2.22	0.687%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	8.84	9.18	3.76%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1350	1330	1.48%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.507	0.504	0.588%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	71.4	72.8	2.02%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1462542)											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Mercury	7439-97-6	E510A	0.0015	mg/kg wwt	0.0015	0.0016	0.0016	Diff <2x LOR	----
Metals (QC Lot: 1462543)											
VA24B0407-075	MP_POL_LSU-O-3_2024-04	Mercury	7439-97-6	E510	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1462556)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1462557)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1462558)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.072	0.070	0.003	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.232	0.234	0.002	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1462558) - continued											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0060	0.0052	0.0008	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	608	617	1.49%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0183	0.0184	0.00006	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.063	0.062	0.0008	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	3.31	3.39	2.27%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	42.1	43.8	3.78%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	725	740	1.91%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	9.96	9.92	0.402%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.079	0.069	0.010	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	10800	10800	0.211%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	6100	6260	2.59%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	4.80	4.91	2.23%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	4.25	4.24	0.228%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1810	1870	3.38%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.820	0.802	2.18%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	68.6	71.8	4.68%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1462559)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Mercury	7439-97-6	E510A	0.0014	mg/kg wwt	0.0072	0.0069	2.94%	40%	----
Metals (QC Lot: 1462560)											
VA24B0407-109	MP_BOL_LSU-O-5_2024-04	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0204	0.0198	0.0006	Diff <2x LOR	----
Metals (QC Lot: 1462562)											

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1462562) - continued											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.0078	0.0081	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1462563)											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1462564)											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.057	0.048	0.008	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.198	0.190	0.008	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0069	0.0062	0.0006	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	763	731	4.28%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0216	0.0214	0.0003	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.059	0.058	0.001	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	3.94	3.82	3.07%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	57.0	50.9	11.4%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	795	770	3.12%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	16.4	15.7	4.18%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.054	0.046	0.008	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	11500	11600	0.311%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	6980	6970	0.170%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	5.15	5.22	1.31%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	4.29	4.25	0.848%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1600	1610	0.426%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.776	0.744	4.28%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0022	0.0021	0.00008	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1462564) - continued											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	81.0	79.4	1.97%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1462565)											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Mercury	7439-97-6	E510A	0.0014	mg/kg wwt	0.0077	0.0071	8.28%	40%	----
Metals (QC Lot: 1462566)											
VA24B0407-112	MP_BOL_LSU-O-8_2024-05	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0224	0.0206	0.0018	Diff <2x LOR	----
Metals (QC Lot: 1462572)											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.0077	0.0080	0.0003	Diff <2x LOR	----
Metals (QC Lot: 1462573)											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1462574)											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.032	0.028	0.004	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.505	0.547	7.93%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	1180	1130	3.96%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0132	0.0130	0.0002	Diff <2x LOR	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.048	0.047	0.0008	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	8.73	8.99	2.87%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	56.1	55.5	1.15%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1520	1490	2.26%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	6.42	6.39	0.572%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1462574) - continued											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Molybdenum	7439-98-7	E440	0.020	mg/kg	0.029	0.030	0.0009	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	11900	11900	0.0137%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	6880	6950	0.895%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	3.67	3.71	0.939%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	4.81	4.77	0.836%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	2550	2580	1.28%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	3.78	3.78	0.0482%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	70.6	71.1	0.655%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1462575)											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Mercury	7439-97-6	E510A	0.0012	mg/kg wwt	0.0049	0.0050	0.00010	Diff <2x LOR	----
Metals (QC Lot: 1462576)											
VA24B0407-134	MP_BOL_RB-O-4X_2024-04	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0134	0.0137	0.0003	Diff <2x LOR	----
Metals (QC Lot: 1477774)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.477	0.359	28.3%	40%	----
Metals (QC Lot: 1477775)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
Metals (QC Lot: 1477776)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Mercury	7439-97-6	E511	0.0050	mg/kg	0.221	0.227	2.68%	40%	----
Metals (QC Lot: 1477777)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0527	0.0541	2.68%	40%	----
Metals (QC Lot: 1477778)											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Aluminum	7429-90-5	E472	5.0	mg/kg	<5.0	5.1	0.07	Diff <2x LOR	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.020	<0.010	0.010	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.069	0.064	0.005	Diff <2x LOR	----
		Barium	7440-39-3	E472	0.050	mg/kg	0.139	0.081	0.058	Diff <2x LOR	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1477778) - continued											
VA24B0407-019	MP_POL_RB-Li-3_2024-04	Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.251	0.255	1.50%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	417	486	15.2%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0430	0.0416	3.26%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	0.25	0.23	0.02	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.119	0.108	10.1%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	146	110	27.3%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	2350	2520	6.86%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	691	689	0.233%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	5.33	5.75	7.62%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	1.28	1.36	6.24%	40%	----
		Nickel	7440-02-0	E472	0.20	mg/kg	0.23	0.23	0.005	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	13700	13900	1.42%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	12500	12400	0.882%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	7.36	7.34	0.188%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	54.6	39.4	32.2%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	6370	6220	2.30%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	0.80	0.92	13.7%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.150	0.159	6.33%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0051	0.0048	0.0003	Diff <2x LOR	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.55	0.57	2.53%	40%	----
		Zinc	7440-66-6	E472	1.0	mg/kg	175	173	1.16%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1449809)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1449813)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1449819)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1455792)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1455817)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1455840)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1457279)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1467259)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1471107)						
Moisture	----	E144A	2	%	<2.0	----
Metals (QCLot: 1459461)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1459462)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1459463)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1459463) - continued						
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	# 0.33	B
Metals (QCLot: 1459464)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1459465)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1460749)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1460750)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1460750) - continued						
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1460752)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1460753)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1460754)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1460834)						

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1460834) - continued						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1460835)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1460836)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1460836) - continued						
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1460837)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1460838)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462539)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462540)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1462541)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1462541) - continued						
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1462542)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1462543)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462556)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462557)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1462558)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1462558) - continued						
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1462559)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1462560)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462562)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462563)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1462564)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1462564) - continued						
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1462565)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1462566)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462572)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1462573)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1462574)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1462574) - continued						
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1462575)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1462576)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1477756)						

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1477756) - continued						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1477757)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1477758)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1477759)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1477760)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1477760) - continued						
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1477774)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1477775)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1477776)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1477777)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1477778)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1477778) - continued						
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1449809)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1449813)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1449819)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1455792)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1455817)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1455840)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1457279)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1467259)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1471107)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1459461)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	106	80.0	120	----
Metals (QCLot: 1459462)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	90.7	80.0	120	----
Metals (QCLot: 1459463)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	98.0	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	98.4	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	101	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1459463) - continued									
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	97.8	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	105	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	103	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	99.5	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	104	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	103	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	101	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	100	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	104	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	98.6	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	103	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	98.0	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	91.2	80.0	120	----
Metals (QCLot: 1459464)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	101	80.0	120	----
Metals (QCLot: 1459465)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	101	80.0	120	----
Metals (QCLot: 1460749)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	101	80.0	120	----
Metals (QCLot: 1460750)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	107	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	97.0	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1460750) - continued									
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	96.0	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	95.6	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	99.1	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	98.9	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	103	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	99.4	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	100	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	99.3	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	103	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	112	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	115	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	99.3	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	103	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	107	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	97.1	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	108	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	100	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	98.5	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	94.9	80.0	120	----
Metals (QCLot: 1460752)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	101	80.0	120	----
Metals (QCLot: 1460753)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	90.2	80.0	120	----
Metals (QCLot: 1460754)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	107	80.0	120	----
Metals (QCLot: 1460834)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	94.9	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1460835)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	102	80.0	120	----
Metals (QCLot: 1460836)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	104	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	103	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	98.3	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	102	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	108	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	110	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	107	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	101	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	104	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	108	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	108	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	102	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	105	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	102	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	94.3	80.0	120	----
Metals (QCLot: 1460837)									

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1460837) - continued									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	105	80.0	120	----
Metals (QCLot: 1460838)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	105	80.0	120	----
Metals (QCLot: 1462539)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	84.6	80.0	120	----
Metals (QCLot: 1462540)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	102	80.0	120	----
Metals (QCLot: 1462541)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	108	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	106	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	105	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	107	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	105	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	107	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	99.2	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	106	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	112	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	104	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	101	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	109	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	103	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	97.9	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1462541) - continued									
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	107	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	106	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	98.1	80.0	120	----
Metals (QCLot: 1462542)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	102	80.0	120	----
Metals (QCLot: 1462543)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	102	80.0	120	----
Metals (QCLot: 1462556)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	85.8	80.0	120	----
Metals (QCLot: 1462557)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	94.6	80.0	120	----
Metals (QCLot: 1462558)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	101	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	108	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	105	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	106	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	98.9	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	103	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	115	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	103	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	112	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	103	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1462558) - continued									
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	103	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	103	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	100	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	113	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	98.1	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	96.9	80.0	120	----
Metals (QCLot: 1462559)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	98.8	80.0	120	----
Metals (QCLot: 1462560)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	98.8	80.0	120	----
Metals (QCLot: 1462562)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	93.2	80.0	120	----
Metals (QCLot: 1462563)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	101	80.0	120	----
Metals (QCLot: 1462564)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	101	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	98.0	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	106	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	98.2	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	99.9	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	105	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	105	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	98.6	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	106	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	97.2	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	110	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1462564) - continued									
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	106	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	105	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	106	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	100	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	94.7	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	97.4	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	99.5	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	89.1	80.0	120	----
Metals (QCLot: 1462565)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	92.0	80.0	120	----
Metals (QCLot: 1462566)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	92.0	80.0	120	----
Metals (QCLot: 1462572)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	94.4	80.0	120	----
Metals (QCLot: 1462573)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	101	80.0	120	----
Metals (QCLot: 1462574)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	97.1	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	105	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	103	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	100	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	107	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1462574) - continued									
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	103	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	96.7	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	104	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	99.1	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	109	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	99.0	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	100	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	111	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	102	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	99.4	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	102	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	98.9	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	100	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	104	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	97.6	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	96.6	80.0	120	----
Metals (QCLot: 1462575)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.4	80.0	120	----
Metals (QCLot: 1462576)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	91.4	80.0	120	----
Metals (QCLot: 1477756)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	94.0	80.0	120	----
Metals (QCLot: 1477757)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	103	80.0	120	----
Metals (QCLot: 1477758)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	92.9	80.0	120	----
Metals (QCLot: 1477759)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	92.9	80.0	120	----
Metals (QCLot: 1477760)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1477760) - continued									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	105	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	107	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	100	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	99.9	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	100	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	89.0	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	100	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	112	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	95.7	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	98.0	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	96.0	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	100	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	99.4	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	113	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	96.1	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	104	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	97.9	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	109	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	106	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	100	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	106	80.0	120	----
Metals (QCLot: 1477774)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	86.9	80.0	120	----
Metals (QCLot: 1477775)									

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1477775) - continued									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	99.6	80.0	120	----
Metals (QCLot: 1477776)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	96.1	80.0	120	----
Metals (QCLot: 1477777)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	96.1	80.0	120	----
Metals (QCLot: 1477778)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	96.3	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	101	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	98.2	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	95.8	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	99.3	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	94.9	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	107	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	96.2	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	97.3	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	96.8	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	96.6	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	99.8	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	101	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	98.0	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	102	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.6	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	96.0	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	101	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	104	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	95.0	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	94.8	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	95.4	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	105	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1477778) - continued									
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	98.9	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	99.2	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1459461)									
QC-1459461-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	104	70.0	130	----
Metals (QCLot: 1459462)									
QC-1459462-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	97.7	70.0	130	----
Metals (QCLot: 1459463)									
QC-1459463-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	98.1	70.0	130	----
QC-1459463-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	97.2	70.0	130	----
QC-1459463-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	111	70.0	130	----
QC-1459463-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	103	70.0	130	----
QC-1459463-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	99.2	70.0	130	----
QC-1459463-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	109	70.0	130	----
QC-1459463-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	99.5	70.0	130	----
QC-1459463-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	109	70.0	130	----
QC-1459463-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	105	65.0	135	----
QC-1459463-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	95.8	70.0	130	----
QC-1459463-003	RM	Iron	7439-89-6	E440	102 mg/kg	102	70.0	130	----
QC-1459463-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	99.6	70.0	130	----
QC-1459463-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	99.3	70.0	130	----
QC-1459463-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	105	70.0	130	----
QC-1459463-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	101	70.0	130	----
QC-1459463-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	104	40.0	160	----
QC-1459463-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	98.3	70.0	130	----
QC-1459463-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	101	70.0	130	----
QC-1459463-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	100	70.0	130	----
QC-1459463-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	103	70.0	130	----
QC-1459463-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	99.5	70.0	130	----
QC-1459463-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	99.7	70.0	130	----
QC-1459463-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	97.7	70.0	130	----
QC-1459463-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	99.0	70.0	130	----
Metals (QCLot: 1459464)									
QC-1459464-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	103	70.0	130	----
Metals (QCLot: 1459465)									
QC-1459465-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	103	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1460749)									
QC-1460749-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	105	70.0	130	----
Metals (QCLot: 1460750)									
QC-1460750-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	86.3	70.0	130	----
QC-1460750-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	90.3	70.0	130	----
QC-1460750-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	89.4	70.0	130	----
QC-1460750-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	92.5	70.0	130	----
QC-1460750-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	89.4	70.0	130	----
QC-1460750-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	96.5	70.0	130	----
QC-1460750-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	95.4	70.0	130	----
QC-1460750-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	99.4	70.0	130	----
QC-1460750-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	98.3	65.0	135	----
QC-1460750-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	91.7	70.0	130	----
QC-1460750-003	RM	Iron	7439-89-6	E440	102 mg/kg	94.0	70.0	130	----
QC-1460750-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	107	70.0	130	----
QC-1460750-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	91.4	70.0	130	----
QC-1460750-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	92.1	70.0	130	----
QC-1460750-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	96.4	70.0	130	----
QC-1460750-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	96.1	40.0	160	----
QC-1460750-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	93.2	70.0	130	----
QC-1460750-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	95.6	70.0	130	----
QC-1460750-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	90.3	70.0	130	----
QC-1460750-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	98.3	70.0	130	----
QC-1460750-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	96.9	70.0	130	----
QC-1460750-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	93.8	70.0	130	----
QC-1460750-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	86.9	70.0	130	----
QC-1460750-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	92.8	70.0	130	----
Metals (QCLot: 1460752)									
QC-1460752-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	105	70.0	130	----
Metals (QCLot: 1460753)									
QC-1460753-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	93.3	70.0	130	----
Metals (QCLot: 1460754)									
QC-1460754-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	88.8	70.0	130	----
Metals (QCLot: 1460834)									
QC-1460834-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	96.0	70.0	130	----
Metals (QCLot: 1460835)									
QC-1460835-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	87.4	70.0	130	----
Metals (QCLot: 1460836)									

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1460836) - continued									
QC-1460836-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	84.1	70.0	130	----
QC-1460836-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	86.6	70.0	130	----
QC-1460836-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	86.2	70.0	130	----
QC-1460836-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	96.2	70.0	130	----
QC-1460836-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	89.2	70.0	130	----
QC-1460836-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	100	70.0	130	----
QC-1460836-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	97.7	70.0	130	----
QC-1460836-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	91.1	70.0	130	----
QC-1460836-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	90.4	65.0	135	----
QC-1460836-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	89.3	70.0	130	----
QC-1460836-003	RM	Iron	7439-89-6	E440	102 mg/kg	88.2	70.0	130	----
QC-1460836-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	104	70.0	130	----
QC-1460836-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	86.4	70.0	130	----
QC-1460836-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	96.1	70.0	130	----
QC-1460836-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	93.7	70.0	130	----
QC-1460836-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	89.9	40.0	160	----
QC-1460836-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	90.0	70.0	130	----
QC-1460836-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	92.3	70.0	130	----
QC-1460836-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	89.0	70.0	130	----
QC-1460836-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	95.7	70.0	130	----
QC-1460836-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	93.7	70.0	130	----
QC-1460836-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	96.6	70.0	130	----
QC-1460836-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	80.0	70.0	130	----
QC-1460836-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	91.8	70.0	130	----
Metals (QCLot: 1460837)									
QC-1460837-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	107	70.0	130	----
Metals (QCLot: 1460838)									
QC-1460838-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	107	70.0	130	----
Metals (QCLot: 1462539)									
QC-1462539-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	91.1	70.0	130	----
Metals (QCLot: 1462540)									
QC-1462540-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	85.2	70.0	130	----
Metals (QCLot: 1462541)									
QC-1462541-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	93.9	70.0	130	----
QC-1462541-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	98.0	70.0	130	----
QC-1462541-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	105	70.0	130	----
QC-1462541-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	101	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1462541) - continued									
QC-1462541-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	105	70.0	130	----
QC-1462541-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	110	70.0	130	----
QC-1462541-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	102	70.0	130	----
QC-1462541-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	106	70.0	130	----
QC-1462541-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	103	65.0	135	----
QC-1462541-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	96.3	70.0	130	----
QC-1462541-003	RM	Iron	7439-89-6	E440	102 mg/kg	95.9	70.0	130	----
QC-1462541-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	99.6	70.0	130	----
QC-1462541-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	95.2	70.0	130	----
QC-1462541-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	104	70.0	130	----
QC-1462541-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	95.8	70.0	130	----
QC-1462541-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	120	40.0	160	----
QC-1462541-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	98.0	70.0	130	----
QC-1462541-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	95.6	70.0	130	----
QC-1462541-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	98.1	70.0	130	----
QC-1462541-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	100	70.0	130	----
QC-1462541-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	99.0	70.0	130	----
QC-1462541-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	101	70.0	130	----
QC-1462541-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	94.8	70.0	130	----
QC-1462541-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	100	70.0	130	----
Metals (QCLot: 1462542)									
QC-1462542-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	104	70.0	130	----
Metals (QCLot: 1462543)									
QC-1462543-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	104	70.0	130	----
Metals (QCLot: 1462556)									
QC-1462556-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	90.5	70.0	130	----
Metals (QCLot: 1462557)									
QC-1462557-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	86.0	70.0	130	----
Metals (QCLot: 1462558)									
QC-1462558-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	96.9	70.0	130	----
QC-1462558-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	93.8	70.0	130	----
QC-1462558-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	101	70.0	130	----
QC-1462558-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	104	70.0	130	----
QC-1462558-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	101	70.0	130	----
QC-1462558-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	108	70.0	130	----
QC-1462558-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	96.8	70.0	130	----
QC-1462558-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	109	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1462558) - continued									
QC-1462558-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	102	65.0	135	----
QC-1462558-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	98.1	70.0	130	----
QC-1462558-003	RM	Iron	7439-89-6	E440	102 mg/kg	97.8	70.0	130	----
QC-1462558-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	99.0	70.0	130	----
QC-1462558-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	98.8	70.0	130	----
QC-1462558-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	104	70.0	130	----
QC-1462558-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	100	70.0	130	----
QC-1462558-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	103	40.0	160	----
QC-1462558-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	96.0	70.0	130	----
QC-1462558-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	96.7	70.0	130	----
QC-1462558-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	98.4	70.0	130	----
QC-1462558-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	100	70.0	130	----
QC-1462558-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	95.3	70.0	130	----
QC-1462558-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	97.8	70.0	130	----
QC-1462558-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	95.9	70.0	130	----
QC-1462558-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	95.2	70.0	130	----
Metals (QCLot: 1462559)									
QC-1462559-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	103	70.0	130	----
Metals (QCLot: 1462560)									
QC-1462560-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	103	70.0	130	----
Metals (QCLot: 1462562)									
QC-1462562-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	98.9	70.0	130	----
Metals (QCLot: 1462563)									
QC-1462563-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	89.5	70.0	130	----
Metals (QCLot: 1462564)									
QC-1462564-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	84.3	70.0	130	----
QC-1462564-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	97.1	70.0	130	----
QC-1462564-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	98.3	70.0	130	----
QC-1462564-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	102	70.0	130	----
QC-1462564-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	99.8	70.0	130	----
QC-1462564-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	101	70.0	130	----
QC-1462564-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	101	70.0	130	----
QC-1462564-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	100	70.0	130	----
QC-1462564-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	103	65.0	135	----
QC-1462564-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	94.6	70.0	130	----
QC-1462564-003	RM	Iron	7439-89-6	E440	102 mg/kg	96.3	70.0	130	----
QC-1462564-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	96.2	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1462564) - continued									
QC-1462564-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	93.0	70.0	130	----
QC-1462564-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	98.1	70.0	130	----
QC-1462564-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	93.1	70.0	130	----
QC-1462564-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	92.8	40.0	160	----
QC-1462564-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	97.4	70.0	130	----
QC-1462564-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	97.5	70.0	130	----
QC-1462564-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	96.8	70.0	130	----
QC-1462564-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	99.4	70.0	130	----
QC-1462564-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	98.2	70.0	130	----
QC-1462564-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	96.4	70.0	130	----
QC-1462564-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	88.5	70.0	130	----
QC-1462564-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	97.6	70.0	130	----
Metals (QCLot: 1462565)									
QC-1462565-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	99.8	70.0	130	----
Metals (QCLot: 1462566)									
QC-1462566-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	99.8	70.0	130	----
Metals (QCLot: 1462572)									
QC-1462572-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	97.6	70.0	130	----
Metals (QCLot: 1462573)									
QC-1462573-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	95.5	70.0	130	----
Metals (QCLot: 1462574)									
QC-1462574-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	96.4	70.0	130	----
QC-1462574-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	96.0	70.0	130	----
QC-1462574-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	123	70.0	130	----
QC-1462574-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	97.1	70.0	130	----
QC-1462574-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	100	70.0	130	----
QC-1462574-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	124	70.0	130	----
QC-1462574-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	100	70.0	130	----
QC-1462574-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	95.6	70.0	130	----
QC-1462574-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	97.8	65.0	135	----
QC-1462574-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	93.3	70.0	130	----
QC-1462574-003	RM	Iron	7439-89-6	E440	102 mg/kg	98.9	70.0	130	----
QC-1462574-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	98.8	70.0	130	----
QC-1462574-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	96.0	70.0	130	----
QC-1462574-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	98.7	70.0	130	----
QC-1462574-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	94.2	70.0	130	----
QC-1462574-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	97.8	40.0	160	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1462574) - continued									
QC-1462574-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	99.1	70.0	130	----
QC-1462574-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	96.3	70.0	130	----
QC-1462574-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	95.6	70.0	130	----
QC-1462574-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	98.5	70.0	130	----
QC-1462574-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	96.2	70.0	130	----
QC-1462574-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	98.7	70.0	130	----
QC-1462574-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	93.5	70.0	130	----
QC-1462574-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	99.1	70.0	130	----
Metals (QCLot: 1462575)									
QC-1462575-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	99.1	70.0	130	----
Metals (QCLot: 1462576)									
QC-1462576-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	99.1	70.0	130	----
Metals (QCLot: 1477756)									
QC-1477756-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	94.7	70.0	130	----
Metals (QCLot: 1477757)									
QC-1477757-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	87.6	70.0	130	----
Metals (QCLot: 1477758)									
QC-1477758-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	90.6	70.0	130	----
Metals (QCLot: 1477759)									
QC-1477759-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	90.6	70.0	130	----
Metals (QCLot: 1477760)									
QC-1477760-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	87.9	70.0	130	----
QC-1477760-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	96.9	70.0	130	----
QC-1477760-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	89.1	70.0	130	----
QC-1477760-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	94.1	70.0	130	----
QC-1477760-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	97.0	70.0	130	----
QC-1477760-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	82.7	70.0	130	----
QC-1477760-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	97.1	70.0	130	----
QC-1477760-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	87.3	50.0	150	----
QC-1477760-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	98.9	65.0	135	----
QC-1477760-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	91.9	70.0	130	----
QC-1477760-003	RM	Iron	7439-89-6	E475	102 mg/kg	92.8	70.0	130	----
QC-1477760-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	96.1	15.0	185	----
QC-1477760-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	90.3	70.0	130	----
QC-1477760-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	92.3	70.0	130	----
QC-1477760-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	95.7	70.0	130	----
QC-1477760-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	94.1	40.0	160	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1477760) - continued									
QC-1477760-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	99.9	70.0	130	----
QC-1477760-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	97.2	70.0	130	----
QC-1477760-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	96.8	70.0	130	----
QC-1477760-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	100	70.0	130	----
QC-1477760-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	96.0	70.0	130	----
QC-1477760-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	89.9	70.0	130	----
QC-1477760-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	89.5	70.0	130	----
QC-1477760-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	98.1	70.0	130	----
Metals (QCLot: 1477774)									
QC-1477774-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	99.7	70.0	130	----
Metals (QCLot: 1477775)									
QC-1477775-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	90.7	70.0	130	----
Metals (QCLot: 1477776)									
QC-1477776-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	96.7	70.0	130	----
Metals (QCLot: 1477777)									
QC-1477777-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	96.7	70.0	130	----
Metals (QCLot: 1477778)									
QC-1477778-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	93.9	70.0	130	----
QC-1477778-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	102	70.0	130	----
QC-1477778-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	92.9	70.0	130	----
QC-1477778-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	95.7	70.0	130	----
QC-1477778-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	99.4	70.0	130	----
QC-1477778-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	87.1	70.0	130	----
QC-1477778-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	103	70.0	130	----
QC-1477778-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	98.9	50.0	150	----
QC-1477778-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	108	65.0	135	----
QC-1477778-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	96.4	70.0	130	----
QC-1477778-003	RM	Iron	7439-89-6	E472	102 mg/kg	98.6	70.0	130	----
QC-1477778-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	99.2	15.0	185	----
QC-1477778-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	94.0	70.0	130	----
QC-1477778-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	96.6	70.0	130	----
QC-1477778-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	101	70.0	130	----
QC-1477778-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	99.2	40.0	160	----
QC-1477778-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	102	70.0	130	----
QC-1477778-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	99.5	70.0	130	----
QC-1477778-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	99.4	70.0	130	----
QC-1477778-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	106	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1477778) - continued									
QC-1477778-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	99.9	70.0	130	----
QC-1477778-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	97.0	70.0	130	----
QC-1477778-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	95.2	70.0	130	----
QC-1477778-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	103	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Page 1 of 12

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:
For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): 407
ALS Contact: Cari Dang
Sampler: S. Latimer, A. Hong

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440-Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440-Ti)	
1	MP_POL_RB-M-1_2024-04	25 -Apr-24	N/a	Tissue	R	R	R	R	R	R	
	MP_POL_RB-M-2_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	
	MP_POL_RB-M-3_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-4_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-5_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-6_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-7_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-8_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-1_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-2_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-3_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
12	MP_POL_RB-O-4_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1

Environmental Division
Vancouver
Work Order Reference
VA24B0407

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			-1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S Latimer	Date: 3-May-24	Time: 7:30	Received by:	Date:	Time:	Received by: JC	Date: 10 May 2024	Time: 905am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Coc pages 1 to 12

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler: S. Latimer, A. Hong

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440-Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440-Ti)	Number of Containers
13	MP_POL_RB-O-5_2024-04	25-Apr-24	n/a	Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-6_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-7_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-O-8_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-1_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-2_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-3_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-4_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-5_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-6_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li-7_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
24	MP_POL_RB-Li-8_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 3-May-24	Time: 7:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number:

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: VA24-MPMC100-004
Job #:
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang | Sampler: S. Latimer, A. Hong

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440 Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440 Ti)							Number of Containers
25	MP_POL_RB-Ki-1_2024-04	25-Apr-24	n/a	Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-2_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-3_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-4_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-5_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-6_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-7_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_POL_RB-Ki-8_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_BOL_RB-M-1_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_BOL_RB-M-2_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R							1
	MP_BOL_RB-M-3_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R							1
36	MP_BOL_RB-M-4_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R							1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 3-May-24	Time: 7:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

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Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: S. Latimer, A. Hong

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

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Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440 Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440 Ti)	Number of Containers
37	MP_BOL_RB-M-5_2024-04	26-Apr-24	NP	Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-M-6_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-M-7_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-M-8_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-1_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-2_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-3_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-4_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-5_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-6_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O-7_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
48	MP_BOL_RB-O-8_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 3-May-24	Time: 7:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler: S. Latimer, A. Hong

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
49	MP_BOL_RB-Li-1_2024-04	26 -Apr-24	NA	Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-2_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-3_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-4_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-5_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-6_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-7_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li-8_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-1_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-2_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-3_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
60	MP_BOL_RB-Ki-4_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
S. Latimer	3-may-24	7:30						

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Chain of Custody (COC) / Analytical Request Form

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Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco

Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: VA24-MPMC100-004

Job #:

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#:

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang | Sampler: S. Latimer, A. Hong

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
61	MP_BOL_RB-Ki-5_2024-04	26-Apr-24	N/A	Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-6_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-7_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Ki-8_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-1_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
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	MP_POL_LSU-M-3_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-4_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-5_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-6_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-7_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
72	MP_POL_LSU-M-8_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
S. Latimer	3-May-24	7:30

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time

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Contact:	Gabriel Holmes
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	Company address below will appear on the final report
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City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler: S. Latimer, A. Hong

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

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4 day [P4]	☐	1 Business day [E1]	☐
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2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

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Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

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73	MP_POL_LSU-O-1_2024-04	25 -Apr-24	NA	Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-2_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-3_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-4_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-5_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-6_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-7_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-O-8_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-Li-1_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-Li-2_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-Li-3_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
84	MP_POL_LSU-Li-4_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S.Latimer	Date: 3-May-24	Time: 7:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
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PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

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Date and Time Required for all E&P TATs:

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Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
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AFE/Cost Center:	PO#
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Requisitioner:	
Location:	

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ALS Contact: Can Dang | Sampler: S. Latimer, A. Hong

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	MP_POL_LSU-Ki-7_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
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Drinking Water (DW) Samples[1] (client use)

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Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
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Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

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ALS Account # / Quote #:	VA24-MPMC100-004
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ALS Contact: Can Dang Sampler: S. Latimer, A. Hong

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PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
97	MP_BOL_LSU-M-1_2024-04	28-Apr-24	NP	Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-2_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-3_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-4_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-5_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-6_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-7_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-M-8_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-1_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-2_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-3_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1
108	MP_BOL_LSU-O-4_2024-04	28-Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
S. Latimer	3-May-24	7:30						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☐ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:			
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): | **ALS Contact:** Can Dang | **Sampler:** S. Latimer, A. Hong

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
109	MP_BOL_LSU-O-5_2024-04	28 -Apr-24	NA	Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-6_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-7_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-O-8_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-1_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-2_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-3_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-4_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-5_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-6_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Li-7_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
120	MP_BOL_LSU-Li-8_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
S. Latimer	3-May-24	7:30						

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number:

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com; alalonde@dwbco
Email 2	kbatchelar@minnow.ca; slatimer@minnow.ca
Email 3	simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	kivens@mountpolley.com

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Can Dang Sampler: S. Latimer, A. Hong

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440-Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440-Ti)	Number of Containers
121	MP_BOL_LSU-Ki-1_2024-04	28 -Apr-24	NA	Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-2_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-3_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-4_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-5_2024-04	28 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-6_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-7_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_BOL_LSU-Ki-8_2024-05	2-May-24 ~~Apr-24~~		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-M-4 X_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LSU-M-7X_2024-04	27 -Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-M-4X_2024-04	26 -Apr-24		Tissue	R	R	R	R	R	R	1
132	MP_POL_RB-O-4X_2024-04	25 -Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)		
Released by:	Date:	Time:
S. Latimer	3-may-24	7:30

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

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ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

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COC Number:

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Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbco

Email 2: kbatchelar@minnow.ca; slatimer@minnow.ca

Email 3: simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com

Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: Can Dang Sampler: S. Latimer, A. Hong

Analysis Request

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133	MP_POL_LS4-O 7X_2024-04	27-Apr-24	NA	Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-O 4X_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Li 4X_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LS4-Li 7X_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_BOL_RB-Li 4X_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_RB-Ki 4X_2024-04	25-Apr-24		Tissue	R	R	R	R	R	R	1
	MP_POL_LS4-Ki 7X_2024-04	27-Apr-24		Tissue	R	R	R	R	R	R	1
140	MP_BOL_RB-Ki 4X_2024-04	26-Apr-24		Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample insufficient for routine digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., microdigestion and HR-ICPMS).

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: 3-may-24	Time: 7:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1: If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

FISH TISSUE QUALITY

ALS Laboratory Report VA24C1393

(Finalized December 2, 2024)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C1393**		
Amendment	:	**1**		
Client	:	**Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Mr. Gabriel Holmes	Account Manager	: Can Dang
Address	:	306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	1-289-775-1547	Telephone	: +1 604 253 4188
Project	:	24-04 Task 6	Date Samples Received	: 21-Aug-2024 09:45
PO	:	5590017616	Date Analysis Commenced	: 07-Oct-2024
C-O-C number	:	----	Issue Date	: 02-Dec-2024 11:37
Sampler	:	----		
Site	:	----		
Quote number	:	VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	:	27		
No. of samples analysed	:	27		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
%	percent

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (02/11/2024): This report has been amended as a result of a request to change sample identification numbers for the samples ALS identify as VA24C1393-009. -010 and -011. All analysis results are as per the previous report.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R2S4_RB-WB-1_2024-08	MP_HAC-R2S4_RB-WB-2_2024-08	MP_HAC-R2S4_RB-WB-11_2024-08	MP_HAC-R2S4_RB-WB-12_2024-08	MP_HAC-R2S4_RB-WB-19_2024-08
					Client sampling date / time	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1393-001	VA24C1393-002	VA24C1393-003	VA24C1393-004	VA24C1393-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		73.5	72.2	72.2	71.5	73.1
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		47.0	61.4	164	19.7	34.5
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.136	0.135	0.192	0.128	0.110
Barium	7440-39-3	E472/VA	0.050	mg/kg		3.58	7.18	10.9	1.97	2.92
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.159	0.108	0.182	0.083	0.140
Calcium	7440-70-2	E472/VA	20	mg/kg		34300	21200	26800	21200	15600
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0456	0.0387	0.0556	0.0423	0.0371
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.21	<0.20	0.28	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.157	0.138	0.246	0.100	0.095
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.95	7.23	17.3	8.45	9.49
Iron	7439-89-6	E472/VA	5.0	mg/kg		119	134	346	74.9	97.5
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	0.101	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1560	1310	1930	1520	1400
Manganese	7439-96-5	E472/VA	0.050	mg/kg		114	129	248	76.7	121
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0300	0.0277	0.0213	0.0655	0.0288

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R2S4_RB-WB-1_2024-08	MP_HAC-R2S4_RB-WB-2_2024-08	MP_HAC-R2S4_RB-WB-11_2024-08	MP_HAC-R2S4_RB-WB-12_2024-08	MP_HAC-R2S4_RB-WB-19_2024-08
					Client sampling date / time	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00	07-Aug-2024 00:00
						VA24C1393-001	VA24C1393-002	VA24C1393-003	VA24C1393-004	VA24C1393-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.113	0.0996	0.0766	0.230	0.107
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.093	0.187	0.287	0.836	0.109
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.31	<0.20	0.34	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		28600	20700	23900	21800	16600
Potassium	7440-09-7	E472/VA	20	mg/kg		9230	10800	10800	12600	11400
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		8.41	5.56	7.96	3.93	4.18
Selenium	7782-49-2	E472/VA	0.10	mg/kg		6.01	5.12	9.02	7.99	6.34
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	0.0104	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		2870	2620	3620	3650	3280
Strontium	7440-24-6	E472/VA	0.10	mg/kg		44.7	28.8	39.3	25.5	19.2
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0107	0.0030	0.0058	0.0034	0.0027
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		4.73	3.81	9.11	1.26	2.24
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0140	0.0054	0.0123	0.0044	0.0041
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.38	0.37	1.06	0.14	0.28
Zinc	7440-66-6	E472/VA	1.0	mg/kg		164	102	157	139	82.8
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R2S4_RB-WB-20_2024-08	MP_HAC-R2S2_RB-WB-1_2024-08	MP_HAC-R2S2_RB-WB-3_2024-08	MP_HAC-R5_RB-WB-1_2024-08	MP_HAC-R5_CO-WB-1_2024-08
					Client sampling date / time	07-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1393-006	VA24C1393-007	VA24C1393-008	VA24C1393-009	VA24C1393-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		76.0	75.1	78.3	75.6	79.3
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		59.2	16.6	33.8	<5.0	33.5
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.142	0.247	0.135	0.071	0.163
Barium	7440-39-3	E472/VA	0.050	mg/kg		5.80	1.90	1.84	0.591	2.29
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.164	0.078	0.070	0.071	0.194
Calcium	7440-70-2	E472/VA	20	mg/kg		32700	25700	10400	5760	30800
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0414	0.0620	0.0452	0.0263	0.172
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.106	0.063	0.084	0.029	0.175
Copper	7440-50-8	E472/VA	0.20	mg/kg		7.45	9.24	9.35	2.16	5.90
Iron	7439-89-6	E472/VA	5.0	mg/kg		149	76.6	81.1	30.2	121
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1350	1200	844	438	1390
Manganese	7439-96-5	E472/VA	0.050	mg/kg		142	29.2	68.5	23.1	19.0
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0220	0.0221	0.0380	0.0207	0.0185

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R2S4_RB-WB-20_2024-08	MP_HAC-R2S2_RB-WB-1_2024-08	MP_HAC-R2S2_RB-WB-3_2024-08	MP_HAC-R5_RB-WB-1_2024-08	MP_HAC-R5_CO-WB-1_2024-08
					Client sampling date / time	07-Aug-2024 00:00	11-Aug-2024 00:00	11-Aug-2024 00:00	14-Aug-2024 00:00	14-Aug-2024 00:00
						VA24C1393-006	VA24C1393-007	VA24C1393-008	VA24C1393-009	VA24C1393-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0913	0.0890	0.175	0.0846	0.0893
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.151	0.068	0.155	<0.040	0.123
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		26800	22600	12400	6420	26400
Potassium	7440-09-7	E472/VA	20	mg/kg		11000	13200	9240	4500	13800
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		6.29	8.67	5.65	3.84	14.3
Selenium	7782-49-2	E472/VA	0.10	mg/kg		8.09	3.33	5.43	2.30	3.81
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0066	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		3470	3670	2760	1060	3380
Strontium	7440-24-6	E472/VA	0.10	mg/kg		48.0	33.6	14.2	7.75	53.8
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0048	0.0074	0.0028	0.0046	0.0216
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		3.74	1.15	2.16	<0.50	1.92
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0063	0.0062	0.0028	<0.0020	0.0036
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.42	0.14	0.20	<0.10	0.21
Zinc	7440-66-6	E472/VA	1.0	mg/kg		172	110	76.0	39.0	142
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-2_2024-08	MP_EDC-REF_RB-WB-1_2024-08	MP_EDC-REF_RB-WB-2_2024-08	MP_EDC-REF_RB-WB-3_2024-08	MP_EDC-REF_RB-WB-4_2024-08
					Client sampling date / time	14-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1393-011	VA24C1393-012	VA24C1393-013	VA24C1393-014	VA24C1393-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		73.1	74.9	75.2	76.6	78.0
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		18.9	55.5	9.4	6.6	12.7
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.156	0.249	0.195	0.225	0.266
Barium	7440-39-3	E472/VA	0.050	mg/kg		2.55	1.70	0.981	3.24	0.617
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.244	0.081	0.034	0.089	0.042
Calcium	7440-70-2	E472/VA	20	mg/kg		33000	13700	11000	23000	8580
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0475	0.0394	0.0470	0.0633	0.0638
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	0.30	<0.20	<0.20	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.173	0.149	0.119	0.177	0.149
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.43	1.91	3.10	2.72	2.79
Iron	7439-89-6	E472/VA	5.0	mg/kg		105	166	41.6	52.5	61.2
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1240	785	1140	1680	1230
Manganese	7439-96-5	E472/VA	0.050	mg/kg		21.6	12.2	6.83	10.1	5.49
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0148	0.0377	0.0336	0.0318	0.0358

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-2_2024-08	MP_EDC-REF_RB-WB-1_2024-08	MP_EDC-REF_RB-WB-2_2024-08	MP_EDC-REF_RB-WB-3_2024-08	MP_EDC-REF_RB-WB-4_2024-08
					Client sampling date / time	14-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00
						VA24C1393-011	VA24C1393-012	VA24C1393-013	VA24C1393-014	VA24C1393-015
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0548	0.150	0.136	0.136	0.163
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.097	0.058	0.046	0.049	0.058
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		26300	12600	13700	22800	15000
Potassium	7440-09-7	E472/VA	20	mg/kg		9730	7340	10400	15600	16500
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		9.76	6.59	9.44	13.6	14.6
Selenium	7782-49-2	E472/VA	0.10	mg/kg		3.65	1.26	1.78	2.91	2.94
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.0229	0.0050	0.181	0.0238
Sodium	7440-23-5	E472/VA	20	mg/kg		2690	1890	2710	4640	4260
Strontium	7440-24-6	E472/VA	0.10	mg/kg		47.4	17.1	14.4	30.4	10.0
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0141	0.0176	0.0176	0.0280	0.0270
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.13	0.13
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		1.08	4.06	0.84	0.53	0.81
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0025	0.0046	<0.0020	0.0026	<0.0020
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.12	0.35	<0.10	<0.10	<0.10
Zinc	7440-66-6	E472/VA	1.0	mg/kg		155	70.8	92.3	125	80.4
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_RB-WB-5_2024-08	MP_EDC-REF_RB-WB-6_2024-08	MP_EDC-REF_RB-WB-7_2024-08	MP_EDC-REF_RB-WB-8_2024-08	MP_FPC-R2S1_RB-WB-1_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-016	VA24C1393-017	VA24C1393-018	VA24C1393-019	VA24C1393-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%	----	76.6	74.1	76.4	74.7	
Moisture	----	E144/VA	0.50	%	76.6	----	----	----	----	
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg	----	450	12.0	39.4	112	
Aluminum	7429-90-5	E440/VA	2.0	mg/kg	8.1	----	----	----	----	
Antimony	7440-36-0	E472/VA	0.010	mg/kg	----	<0.010	0.012	0.038	<0.010	
Antimony	7440-36-0	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Arsenic	7440-38-2	E472/VA	0.030	mg/kg	----	0.619	0.200	0.519	0.167	
Arsenic	7440-38-2	E440/VA	0.020	mg/kg	0.159	----	----	----	----	
Barium	7440-39-3	E472/VA	0.050	mg/kg	----	4.58	2.01	4.24	1.93	
Barium	7440-39-3	E440/VA	0.050	mg/kg	2.24	----	----	----	----	
Beryllium	7440-41-7	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Beryllium	7440-41-7	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Bismuth	7440-69-9	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E472/VA	1.0	mg/kg	----	<1.0	<1.0	<1.0	<1.0	
Boron	7440-42-8	E440/VA	1.0	mg/kg	<1.0	----	----	----	----	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	----	0.057	0.143	0.112	0.139	
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg	0.0313	----	----	----	----	
Calcium	7440-70-2	E472/VA	20	mg/kg	----	37800	36600	45600	20200	
Calcium	7440-70-2	E440/VA	20	mg/kg	36200	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_RB-WB-5_2024-08	MP_EDC-REF_RB-WB-6_2024-08	MP_EDC-REF_RB-WB-7_2024-08	MP_EDC-REF_RB-WB-8_2024-08	MP_FPC-R2S1_RB-WB-1_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-016	VA24C1393-017	VA24C1393-018	VA24C1393-019	VA24C1393-020
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0931	0.0959	0.140	0.0223
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0528	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	0.52	0.21	0.43	0.37
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.058	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.716	0.096	0.224	0.149
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.105	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	3.59	4.20	4.00	3.19
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.52	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	827	105	196	197
Iron	7439-89-6	E440/VA	3.0	mg/kg		74.6	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	0.109	<0.050	0.050	<0.050
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	0.55	<0.50	<0.50	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	2070	1530	1840	1650
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1370	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	48.6	20.0	30.4	23.1
Manganese	7439-96-5	E440/VA	0.050	mg/kg		17.0	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0136	0.0193	0.0166	0.0277
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.0580	0.0748	0.0706	0.109
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0504	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_RB-WB-5_2024-08	MP_EDC-REF_RB-WB-6_2024-08	MP_EDC-REF_RB-WB-7_2024-08	MP_EDC-REF_RB-WB-8_2024-08	MP_FPC-R2S1_RB-WB-1_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-016	VA24C1393-017	VA24C1393-018	VA24C1393-019	VA24C1393-020
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.215	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.067	0.096	0.128	0.120
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.040	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.80	0.22	0.30	0.23
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	30800	29800	36800	22500
Phosphorus	7723-14-0	E440/VA	10	mg/kg		29000	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	15500	13600	14700	14900
Potassium	7440-09-7	E440/VA	20	mg/kg		15400	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	16.7	18.1	14.8	15.2
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		15.7	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	2.11	3.49	2.21	1.49
Selenium	7782-49-2	E440/VA	0.050	mg/kg		1.77	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.0253	0.0151	0.0154	0.0052
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0158	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	4200	3740	4580	3870
Sodium	7440-23-5	E440/VA	20	mg/kg		3340	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	56.7	43.9	59.7	17.8
Strontium	7440-24-6	E440/VA	0.050	mg/kg		42.4	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_RB-WB-5_2024-08	MP_EDC-REF_RB-WB-6_2024-08	MP_EDC-REF_RB-WB-7_2024-08	MP_EDC-REF_RB-WB-8_2024-08	MP_FPC-R2S1_RB-WB-1_2024-08
					Client sampling date / time	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	09-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-016	VA24C1393-017	VA24C1393-018	VA24C1393-019	VA24C1393-020
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0290	0.0151	0.0265	0.0214
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0193	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	21.6	0.80	1.82	6.33
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.49	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0081	<0.0020	0.0054	0.0076
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0062	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	1.30	<0.10	0.47	0.61
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	149	159	158	150
Zinc	7440-66-6	E440/VA	0.50	mg/kg		122	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R2S1_RB-WB-2_2024-08	MP_FPC-R2S1_RB-WB-3_2024-08	MP_FPC-R2S1_RB-WB-4_2024-08	MP_FPC-R2S1_RB-WB-5_2024-08	MP_FPC-R2S1_RB-WB-6_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-021	VA24C1393-022	VA24C1393-023	VA24C1393-024	VA24C1393-025
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		74.5	75.4	75.2	74.5	74.0
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		59.2	48.0	27.9	154	195
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.135	0.547	0.214	0.085	0.141
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.14	1.24	2.00	1.57	1.42
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.105	0.679	0.182	0.087	0.090
Calcium	7440-70-2	E472/VA	20	mg/kg		26600	33700	35300	28400	16300
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0170	0.0285	0.0811	0.0859	0.0284
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.21	<0.20	<0.20	0.58	0.61
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.111	0.178	0.154	0.142	0.219
Copper	7440-50-8	E472/VA	0.20	mg/kg		2.78	3.38	3.78	5.81	3.50
Iron	7439-89-6	E472/VA	5.0	mg/kg		127	133	105	261	308
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	0.058	0.060
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1360	1360	1640	2100	1240
Manganese	7439-96-5	E472/VA	0.050	mg/kg		23.2	25.5	16.1	16.7	22.4
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0273	0.0358	0.0255	0.0206	0.0279

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R2S1_RB-WB-2_2024-08	MP_FPC-R2S1_RB-WB-3_2024-08	MP_FPC-R2S1_RB-WB-4_2024-08	MP_FPC-R2S1_RB-WB-5_2024-08	MP_FPC-R2S1_RB-WB-6_2024-08
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00	12-Aug-2024 00:00
						VA24C1393-021	VA24C1393-022	VA24C1393-023	VA24C1393-024	VA24C1393-025
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.107	0.145	0.103	0.0809	0.107
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.076	0.146	0.089	0.097	0.102
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	0.28	0.36
Phosphorus	7723-14-0	E472/VA	10	mg/kg		25000	29000	31400	27500	18800
Potassium	7440-09-7	E472/VA	20	mg/kg		13400	13000	13400	13400	13000
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		13.3	14.5	18.6	16.1	12.3
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.30	1.95	1.82	1.14	1.27
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.137	0.0291	0.0124	0.0068
Sodium	7440-23-5	E472/VA	20	mg/kg		3540	3660	3970	3720	3650
Strontium	7440-24-6	E472/VA	0.10	mg/kg		20.1	25.9	25.0	23.0	12.8
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0191	0.0234	0.0168	0.0161	0.0131
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		3.85	3.42	2.31	9.72	12.2
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0055	0.0171	0.0038	0.0079	0.0082
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.45	0.45	0.32	0.86	0.90
Zinc	7440-66-6	E472/VA	1.0	mg/kg		141	216	187	170	104
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R2S1_RB-WB-7_2024-08	MP_FPC-R2S1_RB-WB-8_2024-08	----	----	----
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	----	----	----
						VA24C1393-026	VA24C1393-027	----	----	----
						Result	Result	----	----	----
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		75.4	73.0	----	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		173	60.4	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.231	0.220	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		1.80	1.30	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.145	0.101	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		33400	26200	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0220	0.0199	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.61	0.25	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.229	0.190	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.62	2.71	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		339	146	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.083	<0.050	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1810	1240	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		43.6	24.8	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0306	0.0395	----	----	----

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_FPC-R2S1_RB-WB-7_2024-08	MP_FPC-R2S1_RB-WB-8_2024-08	----	----	----
					Client sampling date / time	12-Aug-2024 00:00	12-Aug-2024 00:00	----	----	----
						VA24C1393-026	VA24C1393-027	----	----	----
						Result	Result	----	----	----
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.124	0.146	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.125	0.081	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.41	<0.20	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		28300	24600	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		13400	12300	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		14.1	12.2	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.28	1.76	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0077	0.0104	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		4060	3390	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		23.5	20.2	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0176	0.0140	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		10.6	3.52	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0131	0.0053	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.98	0.38	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		173	166	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C1393**	Page	: 1 of 26
Amendment	: 1		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 6	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Issue Date	: 02-Dec-2024 11:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 27		
No. of samples analysed	: 27		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Barium	7440-39-3	E440	44.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Manganese	7439-96-5	E440	40.1 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Aluminum	7429-90-5	E472	126 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	Description
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Reference Material (RM) Sample								
Metals	QC-MRG6-1729490003	----	Barium	7440-39-3	E472	133 % MES	70.0-130%	Recovery greater than upper control limit
Metals	QC-MRG6-1729490003	----	Calcium	7440-70-2	E472	133 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E511	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-5_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E511	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E511	11-Aug-2024	23-Oct-2024	365 days	74 days	✓	26-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E511	11-Aug-2024	23-Oct-2024	365 days	74 days	✓	26-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E511	12-Aug-2024	24-Oct-2024	365 days	74 days	✓	29-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-6_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-7_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-8_2024-08	E511	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-1_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E511	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E510	09-Aug-2024	10-Oct-2024	365 days	63 days	✓	16-Oct-2024	365 days	69 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E511A	14-Aug-2024	23-Oct-2024	365 days	71 days	✓	26-Oct-2024	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-5_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E511A	12-Aug-2024	23-Oct-2024	365 days	73 days	✓	28-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E511A	11-Aug-2024	23-Oct-2024	365 days	74 days	✓	26-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E511A	11-Aug-2024	23-Oct-2024	365 days	74 days	✓	26-Oct-2024	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E511A	12-Aug-2024	24-Oct-2024	365 days	74 days	✓	29-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	26-Oct-2024	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-6_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
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MP_EDC-REF_RB-WB-7_2024-08	E511A	09-Aug-2024	23-Oct-2024	365 days	76 days	✓	28-Oct-2024	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
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Glass soil jar/Teflon lined cap										
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Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E511A	07-Aug-2024	23-Oct-2024	365 days	78 days	✓	26-Oct-2024	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E510A	09-Aug-2024	10-Oct-2024	365 days	63 days	✓	16-Oct-2024	365 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E472	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
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Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E472	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E472	12-Aug-2024	24-Oct-2024	730 days	74 days	✓	25-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E472	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E472	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
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Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-7_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-8_2024-08	E472	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-1_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E472	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E440	09-Aug-2024	10-Oct-2024	730 days	63 days	✓	15-Oct-2024	730 days	68 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E472.Ag	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-5_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E472.Ag	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E472.Ag	12-Aug-2024	24-Oct-2024	730 days	74 days	✓	25-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E472.Ag	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E472.Ag	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-6_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-7_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-8_2024-08	E472.Ag	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-1_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E472.Ag	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E440.Ag	09-Aug-2024	10-Oct-2024	730 days	63 days	✓	15-Oct-2024	730 days	68 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E472.Ti	14-Aug-2024	23-Oct-2024	730 days	71 days	✓	24-Oct-2024	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-5_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E472.Ti	12-Aug-2024	23-Oct-2024	730 days	73 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E472.Ti	12-Aug-2024	24-Oct-2024	730 days	74 days	✓	25-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E472.Ti	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E472.Ti	11-Aug-2024	23-Oct-2024	730 days	74 days	✓	24-Oct-2024	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-6_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-7_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-8_2024-08	E472.Ti	09-Aug-2024	23-Oct-2024	730 days	76 days	✓	24-Oct-2024	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-1_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E472.Ti	07-Aug-2024	23-Oct-2024	730 days	78 days	✓	24-Oct-2024	730 days	78 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E440.Ti	09-Aug-2024	10-Oct-2024	730 days	63 days	✓	15-Oct-2024	730 days	68 days	✓
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-1_2024-08	E144-H	14-Aug-2024	----	----	----		24-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_CO-WB-2_2024-08	E144-H	14-Aug-2024	----	----	----		24-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R5_RB-WB-1_2024-08	E144-H	14-Aug-2024	----	----	----		24-Oct-2024	----	71 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-1_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-2_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-3_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-4_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-5_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-6_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-8_2024-08	E144-H	12-Aug-2024	----	----	----		24-Oct-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-1_2024-08	E144-H	11-Aug-2024	----	----	----		24-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S2_RB-WB-3_2024-08	E144-H	11-Aug-2024	----	----	----		24-Oct-2024	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-1_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-2_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-3_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-4_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-6_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-7_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-8_2024-08	E144-H	09-Aug-2024	----	----	----		24-Oct-2024	----	76 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_FPC-R2S1_RB-WB-7_2024-08	E144-H	12-Aug-2024	----	----	----		28-Oct-2024	----	77 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-1_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-11_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-12_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-19_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-2_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry (Micro)										
Glass soil jar/Teflon lined cap										
MP_HAC-R2S4_RB-WB-20_2024-08	E144-H	07-Aug-2024	----	----	----		24-Oct-2024	----	78 days	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap										
MP_EDC-REF_RB-WB-5_2024-08	E144	09-Aug-2024	----	----	----		07-Oct-2024	----	60 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✖ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1726973	1	26	3.8	5.0	✖
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1697895	1	1	100.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1726974	1	26	3.8	5.0	✖
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1697894	1	16	6.2	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1726970	1	26	3.8	5.0	✖
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1697897	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1695305	1	16	6.2	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1727941	2	36	5.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1726975	1	26	3.8	5.0	✖
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1697892	1	1	100.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1726971	1	26	3.8	5.0	✖
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1697893	1	1	100.0	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1726973	6	26	23.0	10.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1697895	2	1	200.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1726974	6	26	23.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1697894	2	16	12.5	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1726970	6	26	23.0	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1697897	2	1	200.0	10.0	✓
Moisture Content by Gravimetry	E144	1695305	1	16	6.2	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1727941	3	36	8.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1726975	6	26	23.0	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1697892	2	1	200.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1726971	6	26	23.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1697893	2	1	200.0	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1726973	3	26	11.5	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1697895	1	1	100.0	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1726974	3	26	11.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1697894	1	16	6.2	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1726970	3	26	11.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1697897	1	1	100.0	5.0	✓
Moisture Content by Gravimetry	E144	1695305	1	16	6.2	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1727941	3	36	8.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1726975	3	26	11.5	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1697892	1	1	100.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1726971	3	26	11.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1697893	1	1	100.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at <60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Routine)	E510 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Routine)	E510A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Routine)	EP440 ALS Environmental - Vancouver	Biota	EPA 200.3	This method uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C1393**	Page	: 1 of 22
Amendment	: **1**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 6	Date Samples Received	: 21-Aug-2024 09:45
PO	: 5590017616	Date Analysis Commenced	: 07-Oct-2024
C-O-C number	: ----	Issue Date	: 02-Dec-2024 11:36
Sampler	: ----		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 27		
No. of samples analysed	: 27		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1695305)											
WP2420433-001	Anonymous	Moisture	----	E144	0.50	%	75.9	75.3	0.810%	20%	----
Physical Tests (QC Lot: 1727941)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Moisture	----	E144-H	2.0	%	74.1	75.5	1.86%	20%	----
Physical Tests (QC Lot: 1735383)											
VA24C1197-005	Anonymous	Moisture	----	E144-H	2.0	%	82.1	86.2	4.80%	20%	----
Metals (QC Lot: 1697892)											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.0158	0.0165	0.0007	Diff <2x LOR	----
Metals (QC Lot: 1697893)											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.49	0.57	0.08	Diff <2x LOR	----
Metals (QC Lot: 1697894)											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Mercury	7439-97-6	E510A	0.0019	mg/kg wwt	0.0504	0.0536	6.14%	40%	----
Metals (QC Lot: 1697895)											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Mercury	7439-97-6	E510	0.0082	mg/kg	0.215	0.229	6.14%	40%	----
Metals (QC Lot: 1697897)											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Aluminum	7429-90-5	E440	2.0	mg/kg	8.1	9.7	1.5	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.159	0.148	7.00%	40%	----
		Barium	7440-39-3	E440	0.050	mg/kg	2.24	1.43	44.0%	40%	DUP-H
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0313	0.0303	3.24%	40%	----
		Calcium	7440-70-2	E440	20	mg/kg	36200	23200	43.6%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0528	0.0520	1.56%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.058	0.059	0.0006	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.105	0.106	0.555%	40%	----
		Copper	7440-50-8	E440	0.10	mg/kg	2.52	2.63	4.36%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1697897) - continued											
VA24C1393-016	MP_EDC-REF_RB-WB-5_2024-08	Iron	7439-89-6	E440	3.0	mg/kg	74.6	67.9	9.44%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1370	1140	18.2%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	17.0	11.4	40.1%	40%	DUP-H
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.040	0.041	0.001	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	29000	21700	28.6%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	15400	15500	0.615%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	15.7	15.6	0.638%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	1.77	1.78	0.534%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	3340	3310	0.849%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	42.4	27.1	43.8%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0193	0.0193	0.00987%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0062	0.0046	0.0016	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	122	103	17.2%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1727008)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Aluminum	7429-90-5	E472	5.0	mg/kg	12.0	52.5	126%	40%	DUP-H
		Antimony	7440-36-0	E472	0.010	mg/kg	0.012	0.023	0.011	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.200	0.195	2.61%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	2.01	1.62	21.3%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.143	0.117	19.8%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	36600	25500	35.6%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0959	0.108	11.8%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	0.21	0.34	0.13	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.096	0.105	8.08%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1727008) - continued											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Copper	7440-50-8	E472	0.20	mg/kg	4.20	3.67	13.4%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	105	156	38.7%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	1530	1440	6.28%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	20.0	16.0	22.1%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.096	0.090	0.006	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	0.22	0.32	0.10	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	29800	23700	23.0%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	13600	13600	0.568%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	18.1	19.1	5.39%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	3.49	3.30	5.62%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	3740	3700	1.05%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	43.9	31.1	34.2%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0151	0.0132	13.5%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	<0.10	0.28	0.18	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	159	129	21.1%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1727010)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	0.80	0.99	0.19	Diff <2x LOR	----
Metals (QC Lot: 1727012)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0748	0.0848	12.6%	40%	----
Metals (QC Lot: 1727013)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0193	0.0219	12.6%	40%	----
Metals (QC Lot: 1727014)											
VA24C1393-018	MP_EDC-REF_RB-WB-7_2024-08	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0151	0.0115	0.0036	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1695305)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1727941)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1727949)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1735383)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1697892)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1697893)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1697894)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1697895)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1697897)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1697897) - continued						
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1726970)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1726970) - continued						
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1726971)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1726973)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1726974)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1726975)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1727008)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1727008) - continued						
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1727010)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1727012)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1727013)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1727014)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1729491)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1729491) - continued						
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1729492)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1729493)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1729494)						

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1729494) - continued						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1729495)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1695305)									
Moisture	----	E144	0.5	%	50 %	100.0	90.0	110	----
Physical Tests (QCLot: 1727941)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1727949)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1735383)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1697892)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	83.6	80.0	120	----
Metals (QCLot: 1697893)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	88.3	80.0	120	----
Metals (QCLot: 1697894)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	98.2	80.0	120	----
Metals (QCLot: 1697895)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	98.2	80.0	120	----
Metals (QCLot: 1697897)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	96.3	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	89.5	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	97.8	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	97.9	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	101	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	101	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	93.4	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	93.7	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	100	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	92.0	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	95.5	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	92.5	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	93.3	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	96.3	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	99.8	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1697897) - continued									
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	105	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	96.3	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	93.6	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	93.0	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	91.7	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	98.8	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	99.5	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	93.0	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	94.2	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	99.2	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	96.0	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	91.9	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	98.8	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	93.2	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	97.6	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	95.2	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	91.8	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	88.0	80.0	120	----
Metals (QCLot: 1726970)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	109	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	109	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	113	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	113	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	108	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	98.1	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	119	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	108	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	106	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	105	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	104	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	107	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	107	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	107	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1726970) - continued									
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	108	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	109	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	105	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	114	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	108	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	113	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	105	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	112	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	110	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	104	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	109	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	114	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	110	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	106	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	110	80.0	120	----
Metals (QCLot: 1726971)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	101	80.0	120	----
Metals (QCLot: 1726973)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	103	80.0	120	----
Metals (QCLot: 1726974)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	103	80.0	120	----
Metals (QCLot: 1726975)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	95.1	80.0	120	----
Metals (QCLot: 1727008)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	101	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	108	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	100	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	97.5	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	94.5	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	100	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	98.0	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	106	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	103	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1727008) - continued									
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	102	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	97.7	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	100	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	99.2	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	98.5	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	99.6	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	99.2	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	98.0	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	99.6	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	101	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	98.4	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	99.1	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	97.4	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	105	80.0	120	----
Metals (QCLot: 1727010)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Metals (QCLot: 1727012)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	93.6	80.0	120	----
Metals (QCLot: 1727013)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	93.6	80.0	120	----
Metals (QCLot: 1727014)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.9	80.0	120	----
Metals (QCLot: 1729491)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	97.2	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	93.8	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	100	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	96.2	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	91.7	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1729491) - continued									
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	95.3	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	88.1	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	92.2	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	98.3	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	98.5	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	93.0	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	94.4	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	92.2	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	95.0	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	94.4	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	95.2	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	96.2	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	96.4	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	93.8	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	99.8	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	93.1	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	97.0	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	94.4	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	94.9	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	95.0	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	92.7	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	94.4	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	92.7	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	100	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	98.6	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	94.9	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	97.8	80.0	120	----
Metals (QCLot: 1729492)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	91.5	80.0	120	----
Metals (QCLot: 1729493)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	91.4	80.0	120	----
Metals (QCLot: 1729494)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.4	80.0	120	----
Metals (QCLot: 1729495)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	89.6	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1697892)									
QC-1697892-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	101	70.0	130	----
Metals (QCLot: 1697893)									
QC-1697893-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	99.3	70.0	130	----
Metals (QCLot: 1697894)									
QC-1697894-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	102	70.0	130	----
Metals (QCLot: 1697895)									
QC-1697895-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	102	70.0	130	----
Metals (QCLot: 1697897)									
QC-1697897-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	110	70.0	130	----
QC-1697897-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	99.2	70.0	130	----
QC-1697897-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	100	70.0	130	----
QC-1697897-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	101	70.0	130	----
QC-1697897-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	106	70.0	130	----
QC-1697897-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	109	70.0	130	----
QC-1697897-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	99.0	70.0	130	----
QC-1697897-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	104	70.0	130	----
QC-1697897-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	98.3	65.0	135	----
QC-1697897-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	102	70.0	130	----
QC-1697897-003	RM	Iron	7439-89-6	E440	102 mg/kg	97.5	70.0	130	----
QC-1697897-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	106	70.0	130	----
QC-1697897-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	105	70.0	130	----
QC-1697897-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	105	70.0	130	----
QC-1697897-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	104	70.0	130	----
QC-1697897-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	95.8	40.0	160	----
QC-1697897-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	100	70.0	130	----
QC-1697897-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	104	70.0	130	----
QC-1697897-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	102	70.0	130	----
QC-1697897-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	103	70.0	130	----
QC-1697897-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	103	70.0	130	----
QC-1697897-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	95.2	70.0	130	----
QC-1697897-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	105	70.0	130	----
QC-1697897-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	104	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1726970)									
QC-1726970-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	98.8	70.0	130	----
QC-1726970-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	104	70.0	130	----
QC-1726970-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	103	70.0	130	----
QC-1726970-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	95.3	70.0	130	----
QC-1726970-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	100	70.0	130	----
QC-1726970-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	98.8	70.0	130	----
QC-1726970-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	106	70.0	130	----
QC-1726970-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	99.3	50.0	150	----
QC-1726970-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	103	65.0	135	----
QC-1726970-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	103	70.0	130	----
QC-1726970-003	RM	Iron	7439-89-6	E472	102 mg/kg	97.2	70.0	130	----
QC-1726970-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	102	15.0	185	----
QC-1726970-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	100	70.0	130	----
QC-1726970-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	104	70.0	130	----
QC-1726970-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	103	70.0	130	----
QC-1726970-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	97.2	40.0	160	----
QC-1726970-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	105	70.0	130	----
QC-1726970-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	104	70.0	130	----
QC-1726970-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	105	70.0	130	----
QC-1726970-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	105	70.0	130	----
QC-1726970-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	105	70.0	130	----
QC-1726970-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	98.3	70.0	130	----
QC-1726970-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	98.8	70.0	130	----
QC-1726970-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	106	70.0	130	----
Metals (QCLot: 1726971)									
QC-1726971-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	93.0	70.0	130	----
Metals (QCLot: 1726973)									
QC-1726973-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	98.2	70.0	130	----
Metals (QCLot: 1726974)									
QC-1726974-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	98.2	70.0	130	----
Metals (QCLot: 1726975)									
QC-1726975-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	102	70.0	130	----
Metals (QCLot: 1727008)									
QC-1727008-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	92.0	70.0	130	----
QC-1727008-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	102	70.0	130	----
QC-1727008-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	100	70.0	130	----
QC-1727008-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	101	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1727008) - continued									
QC-1727008-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	102	70.0	130	----
QC-1727008-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	104	70.0	130	----
QC-1727008-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	104	70.0	130	----
QC-1727008-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	95.1	50.0	150	----
QC-1727008-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	107	65.0	135	----
QC-1727008-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	101	70.0	130	----
QC-1727008-003	RM	Iron	7439-89-6	E472	102 mg/kg	100	70.0	130	----
QC-1727008-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	101	15.0	185	----
QC-1727008-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	99.7	70.0	130	----
QC-1727008-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	103	70.0	130	----
QC-1727008-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	99.0	70.0	130	----
QC-1727008-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	103	40.0	160	----
QC-1727008-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	106	70.0	130	----
QC-1727008-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	102	70.0	130	----
QC-1727008-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	101	70.0	130	----
QC-1727008-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	104	70.0	130	----
QC-1727008-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	108	70.0	130	----
QC-1727008-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	102	70.0	130	----
QC-1727008-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	95.6	70.0	130	----
QC-1727008-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	102	70.0	130	----
Metals (QCLot: 1727010)									
QC-1727010-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	87.3	70.0	130	----
Metals (QCLot: 1727012)									
QC-1727012-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	94.4	70.0	130	----
Metals (QCLot: 1727013)									
QC-1727013-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	94.4	70.0	130	----
Metals (QCLot: 1727014)									
QC-1727014-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	103	70.0	130	----
Metals (QCLot: 1729491)									
QC-1729491-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	84.4	70.0	130	----
QC-1729491-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	92.4	70.0	130	----
QC-1729491-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	# 133	70.0	130	MES
QC-1729491-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	91.8	70.0	130	----
QC-1729491-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	90.5	70.0	130	----
QC-1729491-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	# 133	70.0	130	MES
QC-1729491-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	97.1	70.0	130	----
QC-1729491-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	96.6	50.0	150	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1729491) - continued									
QC-1729491-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	96.4	65.0	135	----
QC-1729491-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	92.5	70.0	130	----
QC-1729491-003	RM	Iron	7439-89-6	E472	102 mg/kg	89.7	70.0	130	----
QC-1729491-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	96.4	15.0	185	----
QC-1729491-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	93.5	70.0	130	----
QC-1729491-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	96.2	70.0	130	----
QC-1729491-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	98.7	70.0	130	----
QC-1729491-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	96.6	40.0	160	----
QC-1729491-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	104	70.0	130	----
QC-1729491-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	96.0	70.0	130	----
QC-1729491-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	101	70.0	130	----
QC-1729491-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	97.8	70.0	130	----
QC-1729491-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	96.4	70.0	130	----
QC-1729491-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	93.8	70.0	130	----
QC-1729491-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	87.6	70.0	130	----
QC-1729491-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	100	70.0	130	----
Metals (QCLot: 1729492)									
QC-1729492-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	84.2	70.0	130	----
Metals (QCLot: 1729493)									
QC-1729493-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	90.2	70.0	130	----
Metals (QCLot: 1729494)									
QC-1729494-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	90.2	70.0	130	----
Metals (QCLot: 1729495)									
QC-1729495-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	94.3	70.0	130	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Chain of Custody (COC) / Analy[illegible] Request Form

COC Number: 20 -

Page 1 of 3

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca

Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;

Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 6	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (ALS use only): C 1393

ALS Contact: Can Dang Sampler: KBa

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_HAC-R2S4_RB-WB-1_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_HAC-R2S4_RB-WB-2_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_HAC-R2S4_RB-WB-11_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_HAC-R2S4_RB-WB-12_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_HAC-R2S4_RB-WB-19_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_HAC-R2S4_RB-WB-20_2024-08	7 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-R2S4_RB-WB-1_2024-08~~ MP_HAC-R2S2_RB-WB-1_2024-08	11 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-R2S4_RB-WB-3_2024-08~~ MP_HAC-R2S2_RB-WB-3_2024-08	11 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-1_2024-08~~ MP_HAC-RS_RB-WB-1_2024-08	14 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-1_2024-08~~ MP_HAC-RS_CO-WB-1_2024-08	14 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-2_2024-08~~ MP_HAC-RS_CO-WB-2_2024-08	14 -Aug-24		Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-4_2024-08~~	-Aug-24		Tissue	1	R	R	R	R	R	R			

Environmental Division
Vancouver
Work Order Reference
VA24C1393

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☑ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6,7,8,9	5,5	7	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Katharina Batchelar	Date: 15-Aug-24	Time: 17:00	Received by:	Date:	Time:	Received by: JC	Date: 21-8-24	Time: 945am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

COC page 1 of 3

Chain of Custody (COC) / Analy[illegible] Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely. BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy [illegible]

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #: VA24-MPMC100-004
Job #:
PO / AFE: 24-04 Task 6
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	~~MP_HAC-D_RB-WB-5_2024-08~~ MP_EDC-REF_RB-WB-1_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-6_2024-08~~ MP_EDC-REF_RB-WB-2_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-7_2024-08~~ MP_EDC-REF_RB-WB-3_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_HAC-D_RB-WB-8_2024-08~~ MP_EDC-REF_RB-WB-4_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_EDC-D_RB-WB-1_2024-08~~ MP_EDC_REF_RB-WB-5_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_EDC-D_RB-WB-2_2024-08~~ MP_EDC_REF_RB-WB-6_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_EDC-D_RB-WB-3_2024-08~~ MP_EDC_REF_RB-WB-7_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_EDC-D_RB-WB-4_2024-08~~ MP_EDC_REF_RB-WB-8_2024-08	9 -Aug-24	-	Tissue	1	R	R	R	R	R	R			
	~~MP_EDC-D_RB-WB-5_2024-08~~	-Aug-24	-	~~Tissue~~	~~1~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MP_EDC-D_RB-WB-7_2024-08~~	-Aug-24	-	~~Tissue~~	~~1~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MP_EDC-D_RB-WB-7_2024-08~~	-Aug-24		~~Tissue~~	~~1~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			
	~~MP_EDC-D_RB-WB-8_2024-08~~	-Aug-24	-	~~Tissue~~	~~1~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human consumption/ use?
☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Katharina Batchelar	15-Aug-24	17:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**

Chain of Custody (COC) / Analyt Request Form

COC Number: 20 -

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca
Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;
Email 3: simone.derosemond@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX
Email 1 or Fax: On File
Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

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AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	24-04 Task 6
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang **Sampler:**

Analysis Request

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_FPC-R2_RB-WB-1_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-2_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-3_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-4_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-5_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-6_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-7_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			
	MP_FPC-R2_RB-WB-8_2024-08	12-Aug-24		Tissue	1	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Katharina Batchelar	15-Aug-24	17:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

FISH TISSUE QUALITY

ALS Laboratory Report VA24C9858

(Finalized February 5, 2025)

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C9858**		
Amendment	: **3**		
Client	: **Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	: Accounts Payable	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 30-Oct-2024 12:20
PO	: PO5590023955	Date Analysis Commenced	: 20-Dec-2024
C-O-C number	: ----	Issue Date	: 05-Feb-2025 15:24
Sampler	: SLA, PLE		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 121		
No. of samples analysed	: 121		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Cesar Mora	Lab Assistant	Metals, Burnaby, British Columbia
Dan Gebert	Supervisor - Metals Mercury & Speciation	Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Metals, Burnaby, British Columbia
Hamidreza Hamidzadeh	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maria Larrotta	Lab Assistant	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Salimah Khimani	Lab Assistant	Metals, Burnaby, British Columbia
Shahrazad Firoozbakht	Lab Assistant	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Amendment (21/01/2025): This report has been amended as a result of a request to change sample collection date for the samples ALS identify as VA24C9858-043 to -058. All analysis results are as per the previous report.

Qualifiers

Qualifier	Description
DLHM	Detection Limit Adjusted: Sample has high moisture content.
DLIS	Detection Limit Adjusted due to insufficient sample.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_NSC-WB-1_2024-10	MP_QUL-NHC_NSC-WB-2_2024-10	MP_QUL-NHC_NSC-WB-3_2024-10	MP_QUL-NHC_NSC-WB-4_2024-10	MP_QUL-NHC_NSC-WB-5_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9858-001	VA24C9858-002	VA24C9858-003	VA24C9858-004	VA24C9858-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		81.4	77.8	81.0	67.2	68.5
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		9.4	6.8	10.4	3.5	23.1
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.088	0.170	0.075	0.055	0.086
Barium	7440-39-3	E440/VA	0.050	mg/kg		2.63	3.26	0.264	0.550	1.88
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0644	0.117	0.103	0.0458	0.0899
Calcium	7440-70-2	E440/VA	20	mg/kg		58600	42900	4670	10900	40600
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0530	0.0601	0.112	0.0368	0.0424
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.080	<0.050	<0.050	0.071
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.097	0.043	0.062	0.034	0.110
Copper	7440-50-8	E440/VA	0.10	mg/kg		4.31	4.45	5.57	2.46	3.66
Iron	7439-89-6	E440/VA	3.0	mg/kg		75.6	105	113	47.8	83.9
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.034	0.029	<0.020	<0.020	0.027
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		2210	1930	1080	787	1510
Manganese	7439-96-5	E440/VA	0.050	mg/kg		9.23	14.9	1.54	1.95	8.18
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.234	0.264	0.324	0.190	0.144

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_NSC-WB-1_2024-10	MP_QUL-NHC_NSC-WB-2_2024-10	MP_QUL-NHC_NSC-WB-3_2024-10	MP_QUL-NHC_NSC-WB-4_2024-10	MP_QUL-NHC_NSC-WB-5_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9858-001	VA24C9858-002	VA24C9858-003	VA24C9858-004	VA24C9858-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0437	0.0586	0.0617	0.0621	0.0453
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.047	0.044	0.070	0.033	0.044
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.21	0.39	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		40100	32500	10400	10900	28600
Potassium	7440-09-7	E440/VA	20	mg/kg		13700	14700	16600	9710	10800
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		14.3	9.40	29.6	12.7	12.7
Selenium	7782-49-2	E440/VA	0.050	mg/kg		3.06	6.48	3.73	1.73	3.04
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0112	<0.0050	0.0104	<0.0050	0.0125
Sodium	7440-23-5	E440/VA	20	mg/kg		2310	3090	3820	2650	2920
Strontium	7440-24-6	E440/VA	0.050	mg/kg		101	77.2	5.22	16.5	62.2
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0180	0.0067	0.0122	0.0065	0.0112
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.54	0.64	0.91	0.30	1.50
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0078	0.0060	0.0020	<0.0020	0.0114
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.10	<0.10	<0.10	0.11
Zinc	7440-66-6	E440/VA	0.50	mg/kg		188	115	93.4	85.8	114
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_NSC-WB-6_2024-10	MP_QUL-NHC_NSC-WB-7_2024-10	MP_QUL-NHC_NSC-WB-8_2024-10	MP_QUL-NGC_NSC-WB-1_2024-10	MP_QUL-NGC_NSC-WB-2_2024-10
					Client sampling date / time	23-Oct-2024 00:00	23-Oct-2024 00:00	23-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-006	VA24C9858-007	VA24C9858-008	VA24C9858-009	VA24C9858-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		82.0	80.2	73.4	79.6	86.9
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.2	24.7	25.4	4.5	58.9
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.054	0.071	0.093	0.058	0.125
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.491	2.26	2.84	1.37	2.70
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0499	0.0478	0.156	0.0336	0.0197
Calcium	7440-70-2	E440/VA	20	mg/kg		7020	37600	58200	56800	64800
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0634	0.0784	0.0934	0.113	0.119
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.122	0.056	<0.050	0.294
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.234	0.122	0.114	0.138	0.082
Copper	7440-50-8	E440/VA	0.10	mg/kg		4.17	2.42	2.98	3.23	6.09
Iron	7439-89-6	E440/VA	3.0	mg/kg		55.2	86.5	90.1	61.0	187
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	0.060	0.078	0.038	0.360
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		2520	2180	1840	2710	2650
Manganese	7439-96-5	E440/VA	0.050	mg/kg		3.73	14.5	14.2	7.24	11.6
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.167	0.201	0.141	0.155	0.313

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_NSC-WB-6_2024-10	MP_QUL-NHC_NSC-WB-7_2024-10	MP_QUL-NHC_NSC-WB-8_2024-10	MP_QUL-NGC_NSC-WB-1_2024-10	MP_QUL-NGC_NSC-WB-2_2024-10
					Client sampling date / time	23-Oct-2024 00:00	23-Oct-2024 00:00	23-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-006	VA24C9858-007	VA24C9858-008	VA24C9858-009	VA24C9858-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0302	0.0399	0.0376	0.0316	0.0410
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.036	0.050	0.044	0.036	0.053
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	0.61
Phosphorus	7723-14-0	E440/VA	10	mg/kg		13100	28700	39700	38800	41600
Potassium	7440-09-7	E440/VA	20	mg/kg		15200	14500	11800	13000	12700
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		19.2	17.1	20.0	21.6	22.4
Selenium	7782-49-2	E440/VA	0.050	mg/kg		4.20	3.50	3.47	2.39	2.10
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0054	<0.0050	<0.0050	0.0172	0.0055
Sodium	7440-23-5	E440/VA	20	mg/kg		5310	2940	3300	3200	2450
Strontium	7440-24-6	E440/VA	0.050	mg/kg		7.55	65.6	74.2	85.1	101
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0081	0.0084	0.0062	0.0068	0.0119
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	1.39	1.08	0.40	5.29
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0069	0.0095	0.0093	0.0490
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.14	0.20	<0.10	0.52
Zinc	7440-66-6	E440/VA	0.50	mg/kg		126	160	153	154	174
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-3_2024-10	MP_QUL-NGC_NSC-WB-4_2024-10	MP_QUL-NGC_NSC-WB-5_2024-10	MP_QUL-NGC_NSC-WB-6_2024-10	MP_QUL-NGC_NSC-WB-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9858-011	VA24C9858-012	VA24C9858-013	VA24C9858-014	VA24C9858-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		78.6	77.8	80.5	80.2	78.2
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		6.2	4.0	209	13.3	3.2
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.077	0.057	0.066	0.044	0.060
Barium	7440-39-3	E440/VA	0.050	mg/kg		1.24	1.42	3.15	4.16	6.06
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0703	0.0271	0.0322	0.0246	0.107
Calcium	7440-70-2	E440/VA	20	mg/kg		33500	53200	43400	91800	97400
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.242	0.110	0.414	0.0598	0.0690
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	<0.050	0.474	0.068	0.059
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.091	0.070	0.290	0.144	0.056
Copper	7440-50-8	E440/VA	0.10	mg/kg		4.25	2.76	3.69	3.26	7.77
Iron	7439-89-6	E440/VA	3.0	mg/kg		86.5	62.9	439	78.0	59.0
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.032	0.024	0.176	0.137	0.036
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1910	1980	2680	2940	2720
Manganese	7439-96-5	E440/VA	0.050	mg/kg		10.4	8.24	17.0	12.2	24.2
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.256	0.102	0.196	0.117	0.169

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-3_2024-10	MP_QUL-NGC_NSC-WB-4_2024-10	MP_QUL-NGC_NSC-WB-5_2024-10	MP_QUL-NGC_NSC-WB-6_2024-10	MP_QUL-NGC_NSC-WB-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9858-011	VA24C9858-012	VA24C9858-013	VA24C9858-014	VA24C9858-015
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0549	0.0226	0.0382	0.0231	0.0368
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.052	0.040	0.063	0.040	0.054
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	0.44	0.21	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		26200	37000	31900	55200	58900
Potassium	7440-09-7	E440/VA	20	mg/kg		14900	13400	14300	9850	13800
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		29.6	25.8	33.5	14.2	15.1
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.20	1.94	1.45	2.04	2.85
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0072	<0.0050	0.0108	0.0118	0.0444
Sodium	7440-23-5	E440/VA	20	mg/kg		3350	2590	3070	2090	4080
Strontium	7440-24-6	E440/VA	0.050	mg/kg		58.0	77.4	70.4	201	156
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0070	0.0106	0.0132	0.0118	0.0098
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.54	0.41	12.6	1.14	0.37
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0266	0.0138	0.0963	0.0330	0.0520
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	0.44	0.16	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		146	150	173	237	257
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-8_2024-10	MP_QUL-NHC_PCC-MU-1_2024-10	MP_QUL-NHC_PCC-MU-2_2024-10	MP_QUL-NHC_PCC-MU-3_2024-10	MP_QUL-NHC_PCC-MU-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	26-Oct-2024 00:00	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-016	VA24C9858-017	VA24C9858-018	VA24C9858-019	VA24C9858-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%	----	78.7	79.5	76.9	80.2	
Moisture	----	E144/VA	0.50	%	72.7	----	----	----	----	
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg	----	<5.0	<5.0	<5.0	<5.0	
Aluminum	7429-90-5	E440/VA	2.0	mg/kg	<2.0	----	----	----	----	
Antimony	7440-36-0	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Antimony	7440-36-0	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Arsenic	7440-38-2	E472/VA	0.030	mg/kg	----	0.163	0.172	0.095	0.188	
Arsenic	7440-38-2	E440/VA	0.020	mg/kg	0.056	----	----	----	----	
Barium	7440-39-3	E472/VA	0.050	mg/kg	----	0.456	0.583	0.631	0.790	
Barium	7440-39-3	E440/VA	0.050	mg/kg	1.17	----	----	----	----	
Beryllium	7440-41-7	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Beryllium	7440-41-7	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Bismuth	7440-69-9	E440/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E472/VA	1.0	mg/kg	----	<1.0	<1.0	<1.0	<1.0	
Boron	7440-42-8	E440/VA	1.0	mg/kg	<1.0	----	----	----	----	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg	0.0212	----	----	----	----	
Calcium	7440-70-2	E472/VA	20	mg/kg	----	4840	5170	2860	3310	
Calcium	7440-70-2	E440/VA	20	mg/kg	18600	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-8_2024-10	MP_QUL-NHC_PCC-MU-1_2024-10	MP_QUL-NHC_PCC-MU-2_2024-10	MP_QUL-NHC_PCC-MU-3_2024-10	MP_QUL-NHC_PCC-MU-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	26-Oct-2024 00:00	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-016	VA24C9858-017	VA24C9858-018	VA24C9858-019	VA24C9858-020
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.144	0.144	0.126	0.0596
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.106	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	0.44
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	<0.020	<0.020	0.030	0.020
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.037	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	0.91	0.89	1.06	1.00
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.13	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	8.8	10.1	19.5	52.2
Iron	7439-89-6	E440/VA	3.0	mg/kg		48.2	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	<0.050	<0.050	<0.050	<0.050
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	1650	2140	1330	1770
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		777	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	2.14	2.39	1.68	1.71
Manganese	7439-96-5	E440/VA	0.050	mg/kg		5.08	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.243	0.295	0.227	0.264
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.404	----	----	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	1.14	1.44	0.982	1.33

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-8_2024-10	MP_QUL-NHC_PCC-MU-1_2024-10	MP_QUL-NHC_PCC-MU-2_2024-10	MP_QUL-NHC_PCC-MU-3_2024-10	MP_QUL-NHC_PCC-MU-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	26-Oct-2024 00:00	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-016	VA24C9858-017	VA24C9858-018	VA24C9858-019	VA24C9858-020
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.110	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	<0.040	<0.040	<0.040	<0.040
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.026	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	13500	15900	10600	13200
Phosphorus	7723-14-0	E440/VA	10	mg/kg		15800	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	22100	25900	17500	23200
Potassium	7440-09-7	E440/VA	20	mg/kg		10800	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	23.4	29.0	20.1	12.8
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		15.5	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	2.17	3.52	2.65	2.91
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.14	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	<0.0050	<0.0050	<0.0050	<0.0050
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	1100	1330	1100	1250
Sodium	7440-23-5	E440/VA	20	mg/kg		2900	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	11.4	10.5	5.45	6.50
Strontium	7440-24-6	E440/VA	0.050	mg/kg		32.2	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_NSC-WB-8_2024-10	MP_QUL-NHC_PCC-MU-1_2024-10	MP_QUL-NHC_PCC-MU-2_2024-10	MP_QUL-NHC_PCC-MU-3_2024-10	MP_QUL-NHC_PCC-MU-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	26-Oct-2024 00:00	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-016	VA24C9858-017	VA24C9858-018	VA24C9858-019	VA24C9858-020
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0052	0.0074	0.0040	0.0050
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0031	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0039	0.0037	0.0031	0.0021
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0062	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	23.0	33.3	25.6	36.1
Zinc	7440-66-6	E440/VA	0.50	mg/kg		205	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-MU-5_2024-10	MP_QUL-NHC_PCC-MU-6_2024-10	MP_QUL-NHC_PCC-MU-7_2024-10	MP_QUL-NHC_PCC-MU-8_2024-10	MP_QUL-NHC_PCC-LI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-021	VA24C9858-022	VA24C9858-023	VA24C9858-024	VA24C9858-025
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	----	----	75.7
Moisture	----	E144-H/VA	2.0	%		74.4	79.6	81.4	83.5	----
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	8.0
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		<5.0	<5.0	<5.0	<5.0	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.144
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.165	0.198	0.230	0.155	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	0.144
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.675	0.648	0.703	0.717	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	----	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	----	----	1.03
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		<0.010	0.014	0.014	0.015	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	----	----	220
Calcium	7440-70-2	E472/VA	20	mg/kg		4370	3410	6680	5550	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-MU-5_2024-10	MP_QUL-NHC_PCC-MU-6_2024-10	MP_QUL-NHC_PCC-MU-7_2024-10	MP_QUL-NHC_PCC-MU-8_2024-10	MP_QUL-NHC_PCC-LI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-021	VA24C9858-022	VA24C9858-023	VA24C9858-024	VA24C9858-025
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	----	----	0.0362
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.134	0.133	0.155	0.208	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	----	----	0.22
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	----	----	0.123
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		<0.020	0.025	<0.020	<0.020	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	----	----	10.2
Copper	7440-50-8	E472/VA	0.20	mg/kg		0.72	1.18	0.76	1.07	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	----	----	268
Iron	7439-89-6	E472/VA	5.0	mg/kg		8.3	12.7	9.1	13.5	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	----	----	<0.050
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	----	----	771
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1530	1960	2500	2820	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	----	----	6.22
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1.60	1.38	2.50	2.27	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	----	----	0.121
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	----	----	0.498

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-MU-5_2024-10	MP_QUL-NHC_PCC-MU-6_2024-10	MP_QUL-NHC_PCC-MU-7_2024-10	MP_QUL-NHC_PCC-MU-8_2024-10	MP_QUL-NHC_PCC-LI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-021	VA24C9858-022	VA24C9858-023	VA24C9858-024	VA24C9858-025
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.221	0.200	0.174	0.243	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.863	0.981	0.939	1.47	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.547
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		<0.040	<0.040	<0.040	<0.040	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	0.25
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	12200
Phosphorus	7723-14-0	E472/VA	10	mg/kg		11400	14100	17400	19000	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	11300
Potassium	7440-09-7	E472/VA	20	mg/kg		17400	22900	27100	32100	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	14.0
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		20.0	24.1	27.7	35.5	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	6.53
Selenium	7782-49-2	E472/VA	0.10	mg/kg		3.09	2.78	2.51	3.85	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	0.0172
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	3710
Sodium	7440-23-5	E472/VA	20	mg/kg		1040	996	1620	1100	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	0.62
Strontium	7440-24-6	E472/VA	0.10	mg/kg		8.92	6.78	14.8	11.6	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-MU-5_2024-10	MP_QUL-NHC_PCC-MU-6_2024-10	MP_QUL-NHC_PCC-MU-7_2024-10	MP_QUL-NHC_PCC-MU-8_2024-10	MP_QUL-NHC_PCC-LI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-021	VA24C9858-022	VA24C9858-023	VA24C9858-024	VA24C9858-025
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.0162
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0049	0.0107	0.0093	0.0043	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	<0.50
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0147
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0034	<0.0020	0.0042	0.0033	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	0.16
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	81.6
Zinc	7440-66-6	E472/VA	1.0	mg/kg		19.0	21.8	22.6	33.4	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-2_2024-10	MP_QUL-NHC_PCC-LI-3_2024-10	MP_QUL-NHC_PCC-LI-4_2024-10	MP_QUL-NHC_PCC-LI-5_2024-10	MP_QUL-NHC_PCC-LI-6_2024-10
					Client sampling date / time	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-026	VA24C9858-027	VA24C9858-028	VA24C9858-029	VA24C9858-030
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		67.7	68.1	72.1	74.3	68.1
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		9.2	10.7	24.4	16.9	5.4
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	0.020	<0.020	<0.020	<0.020
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.225	0.144	0.128	0.146	0.352
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.123	0.468	0.309	0.292	0.100
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	0.027	0.011	0.022	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.363	1.17	1.11	1.78	0.524
Calcium	7440-70-2	E475/VA	20	mg/kg		130	538	193	153	93
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0319	0.0394	0.0219	0.0465	0.0246
Chromium	7440-47-3	E475/VA	0.20	mg/kg		0.34	0.50	0.42	0.34	0.21
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.132	0.273	0.157	0.158	0.134
Copper	7440-50-8	E475/VA	0.20	mg/kg		10.0	10.0	13.9	14.5	12.4
Iron	7439-89-6	E475/VA	5.0	mg/kg		943	752	1470	849	676
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	0.064	<0.050	<0.050	<0.050
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		514	685	510	612	388
Manganese	7439-96-5	E475/VA	0.050	mg/kg		4.14	5.02	2.41	3.30	3.29
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.222	0.131	0.152	0.163	0.158

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-2_2024-10	MP_QUL-NHC_PCC-LI-3_2024-10	MP_QUL-NHC_PCC-LI-4_2024-10	MP_QUL-NHC_PCC-LI-5_2024-10	MP_QUL-NHC_PCC-LI-6_2024-10
					Client sampling date / time	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-026	VA24C9858-027	VA24C9858-028	VA24C9858-029	VA24C9858-030
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.688	0.413	0.544	0.635	0.496
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.00	0.739	0.960	1.07	0.666
Nickel	7440-02-0	E475/VA	0.20	mg/kg		<0.20	0.42	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E475/VA	20	mg/kg		10300	10300	9820	11800	7390
Potassium	7440-09-7	E475/VA	20	mg/kg		9460	10500	9550	11600	7960
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		12.2	13.1	6.07	15.0	10.6
Selenium	7782-49-2	E475/VA	0.10	mg/kg		12.7	10.8	9.26	16.2	7.41
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0893	0.0344	0.0504	0.0351	0.0775
Sodium	7440-23-5	E475/VA	20	mg/kg		2290	3050	2550	3320	2300
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.26	1.25	0.60	0.41	0.24
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0285	0.0201	0.0195	0.0203	0.0216
Tin	7440-31-5	E475/VA	0.10	mg/kg		0.57	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	0.57	<0.50	<0.50	<0.50
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0135	0.0105	0.0363	0.0357	0.0058
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		0.42	0.36	1.17	0.80	0.18
Zinc	7440-66-6	E475/VA	1.0	mg/kg		82.3	83.7	73.1	89.0	54.1
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	----	----	66.7
Moisture	----	E144/VA	0.50	%		----	----	64.7	----	----
Moisture	----	E144-H/VA	2.0	%		75.0	79.5	----	64.5	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	<2.0	----	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	6.8
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		7.5	9.2	----	<5.0	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.311
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.143	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.232	0.335	----	0.105	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	1.41
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	0.295	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.197	0.238	----	0.272	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	<0.010

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Metals										
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	----	----	<1.1 DLIS
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	0.0117	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	----	----	9.80
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		1.51	1.56	----	0.019	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	254	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	----	----	267
Calcium	7440-70-2	E472/VA	20	mg/kg		345	275	----	676	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.0366	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	----	----	0.0400
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0290	0.0371	----	0.0380	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	<0.050	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	----	----	0.91
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.28	0.32	----	<0.20	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	0.059	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	----	----	1.60
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.131	0.136	----	0.073	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	3.95	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	----	----	3.55

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Metals										
Copper	7440-50-8	E472/VA	0.20	mg/kg		14.2	13.0	----	4.17	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	----	----	201
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	207	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		779	793	----	65.8	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	----	----	0.053
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	<0.050	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	----	----	471
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	586	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		848	615	----	770	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	----	----	3.95
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	8.01	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		6.30	5.07	----	7.43	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	----	----	0.283
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	----	----	0.0941
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.0126	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	0.0356	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0926	0.117	----	0.0103	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.369	0.569	----	0.0289	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	0.082	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.493
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.586	0.984	----	0.091	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	0.90
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	8410
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	9920	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		13300	11400	----	11400	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	7800
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	6770	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		13900	11500	----	8280	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	8.90	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	9.53
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		15.7	15.5	----	9.63	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	4.32
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	9.99	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		6.60	10.4	----	7.59	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	0.0202	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Metals										
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	<0.0050
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0505	0.132	----	0.0337	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	2660
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	1270	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		3380	4970	----	1690	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	0.452	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	0.68
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.77	0.71	----	1.07	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	<0.020	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0041	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.0301
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0163	0.0162	----	0.0044	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	<0.10	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	<0.55 DLIS
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	<0.25	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	0.0054	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-NHC_PCC-LI-7_2024-10	MP_QUL-NHC_PCC-LI-8_2024-10	MP_QUL-NHC_PCC-OV-1_2024-10	MP_QUL-NHC_PCC-OV-7_2024-10	MP_QUL-NHC_PCC-KI-1_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-031	VA24C9858-032	VA24C9858-033	VA24C9858-034	VA24C9858-035
						Result	Result	Result	Result	Result
Metals										
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0361
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0185	0.0108	----	0.0085	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	0.28
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	<0.10	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.25	0.43	----	<0.10	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	154
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	99.3	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		98.2	88.4	----	105	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-NHC_PCC-KI-2_2024-10	MP_QUL-NHC_PCC-KI-3_2024-10	MP_QUL-NHC_PCC-KI-4_2024-10	MP_QUL-NHC_PCC-KI-5_2024-10	MP_QUL-NHC_PCC-KI-6_2024-10
					Client sampling date / time	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-036	VA24C9858-037	VA24C9858-038	VA24C9858-039	VA24C9858-040
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		74.5	74.6	79.2	78.9	68.7
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		<5.0	8.5	21.9	13.4	<5.0

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-2_2024-10	MP_QUL-NHC_PCC-KI-3_2024-10	MP_QUL-NHC_PCC-KI-4_2024-10	MP_QUL-NHC_PCC-KI-5_2024-10	MP_QUL-NHC_PCC-KI-6_2024-10
					Client sampling date / time	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-036	VA24C9858-037	VA24C9858-038	VA24C9858-039	VA24C9858-040
						Result	Result	Result	Result	Result
Metals										
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.026	<0.027 DLIS	<0.020	0.036	<0.020
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.338	0.254	0.196	0.239	0.484
Barium	7440-39-3	E475/VA	0.050	mg/kg		1.50	3.70	2.40	2.64	1.87
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	<0.013 DLIS	<0.010	<0.012 DLIS	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		0.016	0.045	0.021	0.026	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		1.2	<1.8 DLIS	<1.0	<1.6 DLIS	<1.0
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		11.2	16.7	9.89	16.5	13.2
Calcium	7440-70-2	E475/VA	20	mg/kg		299	362	418	431	554
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0690	0.0824	0.0421	0.0929	0.0402
Chromium	7440-47-3	E475/VA	0.20	mg/kg		5.30	0.90	0.57	0.78	0.41
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		1.25	5.89	2.58	3.09	2.86
Copper	7440-50-8	E475/VA	0.20	mg/kg		4.61	6.44	7.33	6.79	4.21
Iron	7439-89-6	E475/VA	5.0	mg/kg		268	334	401	347	301
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	0.162	<0.050	0.077	<0.050
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	<0.67 DLIS	<0.50	<0.59 DLIS	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		573	572	812	417	419
Manganese	7439-96-5	E475/VA	0.050	mg/kg		3.32	5.26	5.08	3.42	5.29
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0995	0.0799	0.0850	0.0722	0.125
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.391	0.315	0.409	0.343	0.400
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.507	0.588	0.844	0.788	0.550
Nickel	7440-02-0	E475/VA	0.20	mg/kg		1.16	1.86	1.30	1.27	0.68

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-2_2024-10	MP_QUL-NHC_PCC-KI-3_2024-10	MP_QUL-NHC_PCC-KI-4_2024-10	MP_QUL-NHC_PCC-KI-5_2024-10	MP_QUL-NHC_PCC-KI-6_2024-10
					Client sampling date / time	23-Oct-2024 00:00	24-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00	26-Oct-2024 00:00
						VA24C9858-036	VA24C9858-037	VA24C9858-038	VA24C9858-039	VA24C9858-040
						Result	Result	Result	Result	Result
Metals										
Phosphorus	7723-14-0	E475/VA	20	mg/kg		11600	12500	12400	12300	8060
Potassium	7440-09-7	E475/VA	20	mg/kg		11600	13700	11900	13100	7280
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		15.7	19.3	7.75	18.3	9.01
Selenium	7782-49-2	E475/VA	0.10	mg/kg		7.31	6.57	7.05	7.90	5.16
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0068	0.0089	0.0058	<0.0059 DLIS	0.0059
Sodium	7440-23-5	E475/VA	20	mg/kg		4780	4180	5020	6150	3050
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.64	0.93	0.85	1.13	1.40
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		0.049	0.040	0.030	0.049	0.042
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0364	0.0334	0.0334	0.0341	0.0300
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	<0.13 DLIS	<0.10	<0.12 DLIS	<0.10
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	<0.89 DLIS	<0.50	<0.79 DLIS	<0.50
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0392	0.0303	0.0590	0.0520	0.0184
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		0.51	0.49	1.14	0.62	0.37
Zinc	7440-66-6	E475/VA	1.0	mg/kg		179	227	193	152	133
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		0.25	<0.27 DLIS	<0.20	<0.24 DLIS	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-7_2024-10	MP_QUL-NHC_PCC-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1_2024-10	MP_QUL-NGC_PCC-MU-2_2024-10	MP_QUL-NGC_PCC-MU-3_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-041	VA24C9858-042	VA24C9858-043	VA24C9858-044	VA24C9858-045
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	75.2	78.7	78.9	79.9
Moisture	----	E144A/VA	2.0	%		73.6	----	----	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	<5.0	<5.0	<5.0	<5.0
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		<5.0	----	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	----	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.373	0.162	0.204	0.203
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.307	----	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	1.84	0.517	0.167	0.143
Barium	7440-39-3	E475/VA	0.050	mg/kg		1.74	----	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	<0.010
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	<0.010	0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	----	----	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	<1.0	<1.0	<1.0	<1.0
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	----	----	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	14.1	0.024	0.018	<0.010
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		11.6	----	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	350	6000	1270	1170
Calcium	7440-70-2	E475/VA	20	mg/kg		2920	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-7_2024-10	MP_QUL-NHC_PCC-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1_2024-10	MP_QUL-NGC_PCC-MU-2_2024-10	MP_QUL-NGC_PCC-MU-3_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-041	VA24C9858-042	VA24C9858-043	VA24C9858-044	VA24C9858-045
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0565	0.146	0.166	0.208
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0459	----	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	0.70	<0.20	<0.20	<0.20
Chromium	7440-47-3	E475/VA	0.20	mg/kg		0.33	----	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	1.42	<0.020	0.044	0.027
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		2.20	----	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	4.77	0.76	0.92	1.35
Copper	7440-50-8	E475/VA	0.20	mg/kg		4.13	----	----	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	366	14.6	38.3	16.8
Iron	7439-89-6	E475/VA	5.0	mg/kg		351	----	----	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	<0.050	<0.050	<0.050	<0.050
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	----	----	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	602	1800	881	1170
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		532	----	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	4.29	2.32	0.268	0.374
Manganese	7439-96-5	E475/VA	0.050	mg/kg		4.36	----	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0744	0.144	0.138	0.127
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0625	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-7_2024-10	MP_QUL-NHC_PCC-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1_2024-10	MP_QUL-NGC_PCC-MU-2_2024-10	MP_QUL-NGC_PCC-MU-3_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-041	VA24C9858-042	VA24C9858-043	VA24C9858-044	VA24C9858-045
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.300	0.673	0.653	0.634
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.237	----	----	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.459	<0.040	<0.040	<0.040
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.466	----	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.94	<0.20	1.10	<0.20
Nickel	7440-02-0	E475/VA	0.20	mg/kg		1.44	----	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	10500	13200	9640	10500
Phosphorus	7723-14-0	E475/VA	20	mg/kg		11300	----	----	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		----	10400	20000	19700	20800
Potassium	7440-09-7	E475/VA	20	mg/kg		9700	----	----	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	13.0	17.6	22.3	22.0
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		11.2	----	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	5.56	1.80	1.70	1.80
Selenium	7782-49-2	E475/VA	0.10	mg/kg		4.70	----	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.0091	<0.0050	<0.0050	<0.0050
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		<0.0050	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		----	4240	904	1190	1110
Sodium	7440-23-5	E475/VA	20	mg/kg		4160	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	0.97	14.8	0.91	0.89
Strontium	7440-24-6	E475/VA	0.10	mg/kg		7.73	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	0.052	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NHC_PCC-KI-7_2024-10	MP_QUL-NHC_PCC-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1_2024-10	MP_QUL-NGC_PCC-MU-2_2024-10	MP_QUL-NGC_PCC-MU-3_2024-10
					Client sampling date / time	26-Oct-2024 00:00	26-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-041	VA24C9858-042	VA24C9858-043	VA24C9858-044	VA24C9858-045
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		0.020	----	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0217	0.0034	0.0053	0.0064
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0261	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0221	0.0057	<0.0020	<0.0020
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0296	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.45	<0.10	<0.10	<0.10
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		0.20	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	175	22.8	25.2	40.2
Zinc	7440-66-6	E475/VA	1.0	mg/kg		132	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-MU-4_2024-10	MP_QUL-NGC_PCC-MU-5_2024-10	MP_QUL-NGC_PCC-LI-1_2024-10	MP_QUL-NGC_PCC-LI-2_2024-10	MP_QUL-NGC_PCC-LI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-046	VA24C9858-047	VA24C9858-048	VA24C9858-049	VA24C9858-050
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	73.5	75.1	74.4
Moisture	----	E144-H/VA	2.0	%		82.8	77.1	----	----	----
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	9.4	8.2	6.9
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		<5.0	<5.0	----	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	0.023	0.020	<0.020
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	0.141	0.179	0.206
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.423	0.254	----	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	0.490	0.293	0.203
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.739	0.180	----	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	0.089	0.047	0.039
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	<1.0	<1.0	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	0.924	0.535	0.529
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	185	172	219
Calcium	7440-70-2	E472/VA	20	mg/kg		876	1650	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-MU-4_2024-10	MP_QUL-NGC_PCC-MU-5_2024-10	MP_QUL-NGC_PCC-LI-1_2024-10	MP_QUL-NGC_PCC-LI-2_2024-10	MP_QUL-NGC_PCC-LI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-046	VA24C9858-047	VA24C9858-048	VA24C9858-049	VA24C9858-050
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.0364	0.0535	0.0680
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.237	0.203	----	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	0.78	1.22	0.30
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	0.246	0.341	0.226
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.050	<0.020	----	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	14.4	17.7	11.8
Copper	7440-50-8	E472/VA	0.20	mg/kg		4.23	0.90	----	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	438	911	1050
Iron	7439-89-6	E472/VA	5.0	mg/kg		60.6	10.4	----	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	0.051	<0.050	<0.050
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	<0.50	<0.50	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	766	1090	1080
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1740	1160	----	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	5.99	7.03	6.59
Manganese	7439-96-5	E472/VA	0.050	mg/kg		0.660	0.602	----	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.0964	0.0851	0.0754
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.364	0.341	0.295

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-MU-4_2024-10	MP_QUL-NGC_PCC-MU-5_2024-10	MP_QUL-NGC_PCC-LI-1_2024-10	MP_QUL-NGC_PCC-LI-2_2024-10	MP_QUL-NGC_PCC-LI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-046	VA24C9858-047	VA24C9858-048	VA24C9858-049	VA24C9858-050
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.140	0.108	----	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.818	0.471	----	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.835	0.724	0.767
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		<0.040	<0.040	----	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	0.40	0.26	0.22
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	14000	15100	15500
Phosphorus	7723-14-0	E472/VA	10	mg/kg		14800	9570	----	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	11900	13300	13600
Potassium	7440-09-7	E472/VA	20	mg/kg		27700	18500	----	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	11.4	16.9	16.2
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		41.0	23.9	----	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	9.56	9.96	8.81
Selenium	7782-49-2	E472/VA	0.10	mg/kg		2.58	1.24	----	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	0.0976	0.149	0.0414
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	----	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	2400	1930	2400
Sodium	7440-23-5	E472/VA	20	mg/kg		1510	774	----	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	0.50	0.29	0.51
Strontium	7440-24-6	E472/VA	0.10	mg/kg		1.40	2.72	----	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-MU-4_2024-10	MP_QUL-NGC_PCC-MU-5_2024-10	MP_QUL-NGC_PCC-LI-1_2024-10	MP_QUL-NGC_PCC-LI-2_2024-10	MP_QUL-NGC_PCC-LI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-046	VA24C9858-047	VA24C9858-048	VA24C9858-049	VA24C9858-050
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0238	0.0350	0.0277
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0096	0.0054	----	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	0.32	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	<0.50	<0.50	<0.50
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.0266	0.0230	0.0209
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		<0.0020	<0.0020	----	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	0.30	0.21	0.54
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	119	115	110
Zinc	7440-66-6	E472/VA	1.0	mg/kg		75.6	26.8	----	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-LI-4_2024-10	MP_QUL-NGC_PCC-LI-5_2024-10	MP_QUL-NGC_PCC-OV-1_2024-10	MP_QUL-NGC_PCC-OV-2_2024-10	MP_QUL-NGC_PCC-OV-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-051	VA24C9858-052	VA24C9858-053	VA24C9858-054	VA24C9858-055
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	----	----	71.1
Moisture	----	E144-H/VA	2.0	%		65.8	68.2	70.3	65.9	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	----	----	<2.0
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		7.9	5.9	<5.0	<5.0	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	----	----	<0.010
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	0.015	<0.010	<0.010	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	----	----	0.147
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.518	0.452	0.045	0.162	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	----	----	0.392
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.125	0.087	0.331	0.522	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.024	0.030	<0.010	<0.010	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	----	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	----	----	0.0079
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.650	0.358	0.035	0.024	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	----	----	473
Calcium	7440-70-2	E472/VA	20	mg/kg		114	112	484	316	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-LI-4_2024-10	MP_QUL-NGC_PCC-LI-5_2024-10	MP_QUL-NGC_PCC-OV-1_2024-10	MP_QUL-NGC_PCC-OV-2_2024-10	MP_QUL-NGC_PCC-OV-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-051	VA24C9858-052	VA24C9858-053	VA24C9858-054	VA24C9858-055
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	----	----	0.0972
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0383	0.0380	0.0628	0.0576	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	----	----	<0.050
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	0.21	0.22	3.43	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	----	----	0.126
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.166	0.193	0.150	0.185	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	----	----	5.15
Copper	7440-50-8	E472/VA	0.20	mg/kg		12.5	21.4	4.76	4.55	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	----	----	91.1
Iron	7439-89-6	E472/VA	5.0	mg/kg		663	601	106	112	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	----	----	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	----	----	1040
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		514	633	896	871	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	----	----	17.2
Manganese	7439-96-5	E472/VA	0.050	mg/kg		3.53	4.31	7.86	8.76	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	----	----	0.0094
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	----	----	0.0325

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-LI-4_2024-10	MP_QUL-NGC_PCC-LI-5_2024-10	MP_QUL-NGC_PCC-OV-1_2024-10	MP_QUL-NGC_PCC-OV-2_2024-10	MP_QUL-NGC_PCC-OV-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-051	VA24C9858-052	VA24C9858-053	VA24C9858-054	VA24C9858-055
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0845	0.0798	0.0131	0.0106	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.247	0.251	0.0439	0.0312	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	----	----	0.195
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.500	0.486	0.133	0.150	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	----	----	<0.20
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	----	----	11600
Phosphorus	7723-14-0	E472/VA	10	mg/kg		10500	11900	10500	8930	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	----	----	10200
Potassium	7440-09-7	E472/VA	20	mg/kg		7990	9680	10300	8200	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	----	----	13.5
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		13.8	13.5	11.4	12.0	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	----	----	13.6
Selenium	7782-49-2	E472/VA	0.10	mg/kg		6.29	6.43	8.94	13.1	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	----	----	0.0298
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0358	0.196	0.0439	0.0184	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	----	----	1860
Sodium	7440-23-5	E472/VA	20	mg/kg		1750	1520	1890	1630	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	----	----	0.568
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.26	0.22	0.72	0.44	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	----	----	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-LI-4_2024-10	MP_QUL-NGC_PCC-LI-5_2024-10	MP_QUL-NGC_PCC-OV-1_2024-10	MP_QUL-NGC_PCC-OV-2_2024-10	MP_QUL-NGC_PCC-OV-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-051	VA24C9858-052	VA24C9858-053	VA24C9858-054	VA24C9858-055
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	----	----	0.0084
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0180	0.0200	0.0052	0.0044	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	----	----	<0.25
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	----	----	0.0092
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0529	0.0120	0.0166	0.0037	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	----	----	<0.10
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.20	0.20	<0.10	<0.10	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	----	----	173
Zinc	7440-66-6	E472/VA	1.0	mg/kg		71.6	77.7	153	130	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-4_2024-10	MP_QUL-NGC_PCC-OV-5_2024-10	MP_QUL-NGC_PCC-KI-1_2024-10	MP_QUL-NGC_PCC-KI-2_2024-10	MP_QUL-NGC_PCC-KI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-056	VA24C9858-057	VA24C9858-058	VA24C9858-059	VA24C9858-060
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	74.3	----	----
Moisture	----	E144-H/VA	2.0	%		68.5	74.0	----	77.3	76.9
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	5.4	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		<5.0	<5.0	----	<5.0	<5.0
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	0.023	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	0.173	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.319	0.199	----	0.196	0.228
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	1.45	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.303	0.690	----	1.20	1.10
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	0.084	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	0.044	0.030
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	<1.0	<1.0
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	13.8	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.014	0.015	----	6.03	4.44
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	489	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		459	515	----	308	790

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-4_2024-10	MP_QUL-NGC_PCC-OV-5_2024-10	MP_QUL-NGC_PCC-KI-1_2024-10	MP_QUL-NGC_PCC-KI-2_2024-10	MP_QUL-NGC_PCC-KI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-056	VA24C9858-057	VA24C9858-058	VA24C9858-059	VA24C9858-060
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.0684	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0743	0.111	----	0.0917	0.0970
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	0.43	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	<0.20	----	0.36	0.97
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	4.41	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.132	0.102	----	6.84	3.21
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	6.74	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		6.55	5.03	----	5.75	6.08
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	409	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		85.6	58.0	----	399	456
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	0.051	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	<0.050	<0.050
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	903	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		897	915	----	868	828
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	6.83	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		11.9	9.56	----	4.54	5.49
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.0886	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.345	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-4_2024-10	MP_QUL-NGC_PCC-OV-5_2024-10	MP_QUL-NGC_PCC-KI-1_2024-10	MP_QUL-NGC_PCC-KI-2_2024-10	MP_QUL-NGC_PCC-KI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-056	VA24C9858-057	VA24C9858-058	VA24C9858-059	VA24C9858-060
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0090	0.0074	----	0.0478	0.0407
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0286	0.0283	----	0.210	0.176
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.607	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.119	0.138	----	0.495	0.539
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	1.46	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	<0.20	----	1.20	1.62
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	14000	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		11600	11200	----	13600	12400
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	12000	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		9620	12200	----	12700	11700
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	12.4	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		17.7	20.2	----	18.3	15.1
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	6.46	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		9.18	6.89	----	6.04	6.08
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	0.0140	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0195	0.0141	----	0.0068	0.0079
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	3010	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		2120	2400	----	3520	4270
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	1.20	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.58	0.50	----	0.60	1.72
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	0.065	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-4_2024-10	MP_QUL-NGC_PCC-OV-5_2024-10	MP_QUL-NGC_PCC-KI-1_2024-10	MP_QUL-NGC_PCC-KI-2_2024-10	MP_QUL-NGC_PCC-KI-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-056	VA24C9858-057	VA24C9858-058	VA24C9858-059	VA24C9858-060
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	0.025	0.026
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0408	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0051	0.0093	----	0.0633	0.0690
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	<0.10	<0.10
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	<0.50	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	<0.50
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.0633	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0147	0.0025	----	0.0428	0.0406
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	0.36	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	<0.10	----	0.32	0.44
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	191	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		127	199	----	181	183
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	<0.20	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-KI-4_2024-10	MP_QUL-NGC_PCC-KI-5_2024-10	MP_QUL-NCP_LT-MU-1_2024-10	MP_QUL-NCP_LT-MU-2_2024-10	MP_QUL-NCP_LT-MU-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-061	VA24C9858-062	VA24C9858-063	VA24C9858-064	VA24C9858-065
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	82.2	76.8	76.1
Moisture	----	E144-H/VA	2.0	%		74.5	78.4	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	<2.0	5.2	<2.0
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		<5.0	<5.0	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.458	0.355	0.562
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.411	0.404	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	<0.050	0.088	<0.050
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.820	1.16	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		0.014	0.023	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	<1.0	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	<0.0050	<0.0050	<0.0050
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		4.79	3.91	----	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	426	324	224
Calcium	7440-70-2	E472/VA	20	mg/kg		273	351	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-KI-4_2024-10	MP_QUL-NGC_PCC-KI-5_2024-10	MP_QUL-NCP_LT-MU-1_2024-10	MP_QUL-NCP_LT-MU-2_2024-10	MP_QUL-NCP_LT-MU-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-061	VA24C9858-062	VA24C9858-063	VA24C9858-064	VA24C9858-065
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.433	0.186	0.304
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0695	0.100	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	0.103	0.099	<0.050
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.31	0.67	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.15	1.57	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	1.36	1.99	1.53
Copper	7440-50-8	E472/VA	0.20	mg/kg		3.81	6.80	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	16.8	19.0	20.3
Iron	7439-89-6	E472/VA	5.0	mg/kg		507	366	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	<0.50	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	1570	1370	1180
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		491	730	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	0.451	0.418	0.376
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2.41	2.88	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.290	0.0961	0.210
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	1.63	0.415	0.880

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-KI-4_2024-10	MP_QUL-NGC_PCC-KI-5_2024-10	MP_QUL-NCP_LT-MU-1_2024-10	MP_QUL-NCP_LT-MU-2_2024-10	MP_QUL-NCP_LT-MU-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-061	VA24C9858-062	VA24C9858-063	VA24C9858-064	VA24C9858-065
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0433	0.0311	----	----	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.170	0.144	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.414	0.439	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20
Nickel	7440-02-0	E472/VA	0.20	mg/kg		1.02	1.28	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	13000	11400	9970
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9050	12600	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	24200	20000	16500
Potassium	7440-09-7	E472/VA	20	mg/kg		9860	12200	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	74.4	42.5	53.6
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		17.6	18.4	----	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	2.05	1.92	1.89
Selenium	7782-49-2	E472/VA	0.10	mg/kg		4.26	4.39	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	<0.0050	<0.0050	<0.0050
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	0.0053	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	2170	1500	1400
Sodium	7440-23-5	E472/VA	20	mg/kg		4240	4160	----	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	0.281	0.237	0.190
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.69	0.67	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-KI-4_2024-10	MP_QUL-NGC_PCC-KI-5_2024-10	MP_QUL-NCP_LT-MU-1_2024-10	MP_QUL-NCP_LT-MU-2_2024-10	MP_QUL-NCP_LT-MU-3_2024-10
					Client sampling date / time	19-Oct-2024 00:00	22-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-061	VA24C9858-062	VA24C9858-063	VA24C9858-064	VA24C9858-065
						Result	Result	Result	Result	Result
Metals										
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0265	0.0356	0.0499
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0168	0.0459	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	0.29	0.33	<0.25
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	<0.0020	<0.0020	<0.0020
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0742	0.0241	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	<0.10
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.22	0.20	----	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	14.2	17.4	12.3
Zinc	7440-66-6	E472/VA	1.0	mg/kg		95.0	169	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-MU-4_2024-10	MP_QUL-NCP_LT-MU-5_2024-10	MP_QUL-NCP_LT-MU-6_2024-10	MP_QUL-NCP_LT-MU-7_2024-10	MP_QUL-NCP_LT-MU-8_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-066	VA24C9858-067	VA24C9858-068	VA24C9858-069	VA24C9858-070
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.5	73.2	78.3	80.5	75.4
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		20.6	3.9	3.7	2.7	3.5
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.232	0.497	0.320	0.215	0.339
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.143	0.103	0.123	<0.050	0.058
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		391	317	377	359	406
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.224	0.252	0.318	0.456	0.273
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.082	0.094	0.079	0.058	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.030	<0.020	<0.020	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.78	1.43	1.81	1.63	1.53
Iron	7439-89-6	E440/VA	3.0	mg/kg		49.4	21.1	21.9	32.9	17.3
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.025	0.035	<0.020	0.022	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1010	910	1290	2160	1170
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.773	0.327	0.485	0.456	0.358
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.460	0.697	0.736	2.38	0.753

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-MU-4_2024-10	MP_QUL-NCP_LT-MU-5_2024-10	MP_QUL-NCP_LT-MU-6_2024-10	MP_QUL-NCP_LT-MU-7_2024-10	MP_QUL-NCP_LT-MU-8_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-066	VA24C9858-067	VA24C9858-068	VA24C9858-069	VA24C9858-070
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.104	0.187	0.159	0.464	0.186
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		10900	8790	11600	13600	9580
Potassium	7440-09-7	E440/VA	20	mg/kg		21300	16000	20200	22500	18400
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		52.7	45.5	56.4	46.9	44.5
Selenium	7782-49-2	E440/VA	0.050	mg/kg		1.94	1.62	1.82	3.03	1.38
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1450	1270	1500	2040	1060
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.404	0.280	0.364	0.295	0.342
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0393	0.0280	0.0383	0.0326	0.0372
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		1.95	0.32	0.41	0.28	0.33
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0033	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		14.4	11.2	14.8	18.5	10.8
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-1_2024-10	MP_QUL-NCP_LT-LI-2_2024-10	MP_QUL-NCP_LT-LI-3_2024-10	MP_QUL-NCP_LT-LI-4_2024-10	MP_QUL-NCP_LT-LI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-071	VA24C9858-072	VA24C9858-073	VA24C9858-074	VA24C9858-075
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%	----	73.2	55.1	73.5	61.3	
Moisture	----	E144-H/VA	2.0	%	81.1	----	----	----	----	
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg	----	2.1	2.8	3.5	<2.0	
Aluminum	7429-90-5	E472/VA	5.0	mg/kg	<5.0	----	----	----	----	
Antimony	7440-36-0	E440/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Antimony	7440-36-0	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Arsenic	7440-38-2	E440/VA	0.020	mg/kg	----	1.16	1.06	1.78	1.24	
Arsenic	7440-38-2	E472/VA	0.030	mg/kg	1.04	----	----	----	----	
Barium	7440-39-3	E440/VA	0.050	mg/kg	----	<0.050	<0.050	0.092	0.087	
Barium	7440-39-3	E472/VA	0.050	mg/kg	<0.050	----	----	----	----	
Beryllium	7440-41-7	E440/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Beryllium	7440-41-7	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Bismuth	7440-69-9	E440/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E440/VA	1.0	mg/kg	----	<1.0	<1.0	<1.0	<1.0	
Boron	7440-42-8	E472/VA	1.0	mg/kg	<1.0	----	----	----	----	
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg	----	0.155	0.229	0.328	0.191	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	0.641	----	----	----	----	
Calcium	7440-70-2	E440/VA	20	mg/kg	----	176	94	210	102	
Calcium	7440-70-2	E472/VA	20	mg/kg	491	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-1_2024-10	MP_QUL-NCP_LT-LI-2_2024-10	MP_QUL-NCP_LT-LI-3_2024-10	MP_QUL-NCP_LT-LI-4_2024-10	MP_QUL-NCP_LT-LI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-071	VA24C9858-072	VA24C9858-073	VA24C9858-074	VA24C9858-075
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	0.163	0.0337	0.0420	0.0419
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.204	----	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	0.060	0.095	0.184	0.088
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.24	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	0.077	0.064	0.106	0.056
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.088	----	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	88.7	269	140	298
Copper	7440-50-8	E472/VA	0.20	mg/kg		82.1	----	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	103	325	142	122
Iron	7439-89-6	E472/VA	5.0	mg/kg		1010	----	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	<0.020	<0.020	0.024	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	----	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	490	222	496	293
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1010	----	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	4.37	2.20	5.16	2.72
Manganese	7439-96-5	E472/VA	0.050	mg/kg		5.11	----	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	0.110	0.382	0.165	0.294
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	0.410	0.851	0.622	0.760
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.649	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-1_2024-10	MP_QUL-NCP_LT-LI-2_2024-10	MP_QUL-NCP_LT-LI-3_2024-10	MP_QUL-NCP_LT-LI-4_2024-10	MP_QUL-NCP_LT-LI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-071	VA24C9858-072	VA24C9858-073	VA24C9858-074	VA24C9858-075
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		3.43	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	0.505	0.192	0.547	0.192
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.354	----	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	----	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	11700	5290	14300	6910
Phosphorus	7723-14-0	E472/VA	10	mg/kg		17500	----	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	9700	4290	11500	5330
Potassium	7440-09-7	E472/VA	20	mg/kg		15100	----	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	36.5	15.4	37.7	18.1
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		56.4	----	----	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	12.4	4.11	7.94	3.82
Selenium	7782-49-2	E472/VA	0.10	mg/kg		6.77	----	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	0.465	1.03	0.812	1.57
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.529	----	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	4840	2380	4520	3400
Sodium	7440-23-5	E472/VA	20	mg/kg		9760	----	----	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	0.303	0.186	0.482	0.322
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.46	----	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-1_2024-10	MP_QUL-NCP_LT-LI-2_2024-10	MP_QUL-NCP_LT-LI-3_2024-10	MP_QUL-NCP_LT-LI-4_2024-10	MP_QUL-NCP_LT-LI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-071	VA24C9858-072	VA24C9858-073	VA24C9858-074	VA24C9858-075
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	0.249	0.0912	0.143	0.169
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.550	----	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	0.25	<0.25	0.30	<0.25
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	----	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	<0.0020	<0.0020	0.0031	<0.0020
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		<0.0020	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	124	98.9	181	112
Zinc	7440-66-6	E472/VA	1.0	mg/kg		134	----	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-6_2024-10	MP_QUL-NCP_LT-LI-7_2024-10	MP_QUL-NCP_LT-LI-8_2024-10	MP_QUL-NCP_LT-OV-1_2024-10	MP_QUL-NCP_LT-OV-8_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-076	VA24C9858-077	VA24C9858-078	VA24C9858-079	VA24C9858-080
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		73.3	74.1	75.4	66.6	65.0
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.7	4.2	20.5	<2.0	2.2
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		2.11	0.792	0.547	0.227	0.166
Barium	7440-39-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	<0.050	<0.050
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.360	0.409	0.294	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		318	174	242	840	1260
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0620	0.116	0.134	0.0677	0.0648
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.176	0.253	0.079	<0.050	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.144	0.126	0.087	0.020	0.038
Copper	7440-50-8	E440/VA	0.10	mg/kg		337	157	76.5	8.90	13.2
Iron	7439-89-6	E440/VA	3.0	mg/kg		310	1310	360	44.3	51.1
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.022	0.055	0.030	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		678	478	842	1230	1280
Manganese	7439-96-5	E440/VA	0.050	mg/kg		7.02	4.12	3.77	0.378	1.46
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		1.12	5.84	1.18	0.182	0.0496

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-LI-6_2024-10	MP_QUL-NCP_LT-LI-7_2024-10	MP_QUL-NCP_LT-LI-8_2024-10	MP_QUL-NCP_LT-OV-1_2024-10	MP_QUL-NCP_LT-OV-8_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-076	VA24C9858-077	VA24C9858-078	VA24C9858-079	VA24C9858-080
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.300	1.51	0.292	0.0608	0.0173
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.416	0.616	0.326	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		11500	10400	15700	11000	10000
Potassium	7440-09-7	E440/VA	20	mg/kg		10800	10200	15300	6220	5710
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		35.3	22.0	44.5	16.3	13.4
Selenium	7782-49-2	E440/VA	0.050	mg/kg		7.22	13.3	5.21	3.81	4.79
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		1.56	1.10	0.632	0.0128	0.0174
Sodium	7440-23-5	E440/VA	20	mg/kg		5680	5160	3470	3390	3350
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.495	0.305	0.278	2.24	2.55
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.257	0.184	0.635	0.0155	0.0408
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0022	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.19	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		241	148	156	61.3	59.5
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-1_2024-10	MP_QUL-NCP_LT-KI-2_2024-10	MP_QUL-NCP_LT-KI-3_2024-10	MP_QUL-NCP_LT-KI-4_2024-10	MP_QUL-NCP_LT-KI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-081	VA24C9858-082	VA24C9858-083	VA24C9858-084	VA24C9858-085
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		79.5	79.5	81.5	81.5	80.7
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		17.1	10.8	14.2	9.7	9.7
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.698	0.634	0.776	0.505	0.664
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.147	0.169	0.224	0.110	0.090
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		2.60	0.812	2.41	1.04	1.30
Calcium	7440-70-2	E472/VA	20	mg/kg		1700	439	471	578	440
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.100	0.138	0.229	0.113	0.145
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.72	0.68	0.50	0.33	<0.20
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.112	0.172	0.333	0.137	0.186
Copper	7440-50-8	E472/VA	0.20	mg/kg		5.16	5.58	3.78	3.79	3.01
Iron	7439-89-6	E472/VA	5.0	mg/kg		1640	463	656	793	592
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	0.051	0.066	<0.050	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		266	756	466	381	508
Manganese	7439-96-5	E472/VA	0.050	mg/kg		0.880	1.69	1.50	1.60	0.923
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		1.15	0.160	0.332	0.144	0.239

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-1_2024-10	MP_QUL-NCP_LT-KI-2_2024-10	MP_QUL-NCP_LT-KI-3_2024-10	MP_QUL-NCP_LT-KI-4_2024-10	MP_QUL-NCP_LT-KI-5_2024-10
					Client sampling date / time	17-Oct-2024 00:00	17-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00
						VA24C9858-081	VA24C9858-082	VA24C9858-083	VA24C9858-084	VA24C9858-085
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		5.62	0.783	1.79	0.776	1.24
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.179	0.244	0.331	0.172	0.156
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.47	0.34	0.40	0.20	0.29
Phosphorus	7723-14-0	E472/VA	10	mg/kg		6780	12600	11300	10800	10700
Potassium	7440-09-7	E472/VA	20	mg/kg		8500	10700	11300	11500	10700
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		28.3	31.5	52.8	39.2	41.5
Selenium	7782-49-2	E472/VA	0.10	mg/kg		8.43	6.48	7.34	5.08	5.36
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0162	0.0092	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		10000	10100	12000	11000	11400
Strontium	7440-24-6	E472/VA	0.10	mg/kg		2.34	0.76	1.48	1.31	0.93
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0825	0.126	0.127	0.0897	0.0871
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.86	0.70	1.29	0.58	0.55
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0057	<0.0020	0.0042	0.0071	0.0040
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.15	<0.10	0.10	<0.10	<0.10
Zinc	7440-66-6	E472/VA	1.0	mg/kg		70.6	133	81.9	113	92.7
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-6_2024-10	MP_QUL-NCP_LT-KI-7_2024-10	MP_QUL-NCP_LT-KI-8_2024-10	MP_QUL-EAA_LT-MU-1_2024-10	MP_QUL-EAA_LT-MU-2_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-086	VA24C9858-087	VA24C9858-088	VA24C9858-089	VA24C9858-090
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%	----	81.6	80.3	79.3	74.2	
Moisture	----	E144-H/VA	2.0	%	78.7	----	----	----	----	
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg	----	36.1	17.5	5.8	<2.0	
Aluminum	7429-90-5	E472/VA	5.0	mg/kg	14.1	----	----	----	----	
Antimony	7440-36-0	E440/VA	0.010	mg/kg	----	0.016	<0.010	<0.010	<0.010	
Antimony	7440-36-0	E472/VA	0.010	mg/kg	0.086	----	----	----	----	
Arsenic	7440-38-2	E440/VA	0.020	mg/kg	----	0.324	0.448	0.056	0.196	
Arsenic	7440-38-2	E472/VA	0.030	mg/kg	0.497	----	----	----	----	
Barium	7440-39-3	E440/VA	0.050	mg/kg	----	0.314	0.072	0.072	<0.050	
Barium	7440-39-3	E472/VA	0.050	mg/kg	0.128	----	----	----	----	
Beryllium	7440-41-7	E440/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Beryllium	7440-41-7	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Bismuth	7440-69-9	E440/VA	0.010	mg/kg	----	<0.010	<0.010	<0.010	<0.010	
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E440/VA	1.0	mg/kg	----	<1.0	<1.0	<1.0	<1.0	
Boron	7440-42-8	E472/VA	1.0	mg/kg	<1.0	----	----	----	----	
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg	----	2.24	1.26	<0.0050	<0.0050	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	1.13	----	----	----	----	
Calcium	7440-70-2	E440/VA	20	mg/kg	----	717	583	844	270	
Calcium	7440-70-2	E472/VA	20	mg/kg	472	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-6_2024-10	MP_QUL-NCP_LT-KI-7_2024-10	MP_QUL-NCP_LT-KI-8_2024-10	MP_QUL-EAA_LT-MU-1_2024-10	MP_QUL-EAA_LT-MU-2_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-086	VA24C9858-087	VA24C9858-088	VA24C9858-089	VA24C9858-090
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	0.194	0.186	0.476	0.260
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.128	----	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	0.545	0.242	0.055	<0.050
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.28	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	0.303	0.165	<0.020	<0.020
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.273	----	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	3.68	3.78	0.87	1.74
Copper	7440-50-8	E472/VA	0.20	mg/kg		3.02	----	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	1310	440	40.5	20.6
Iron	7439-89-6	E472/VA	5.0	mg/kg		1020	----	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	0.024	0.021	<0.020	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	----	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	476	396	1330	938
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		576	----	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	1.46	1.12	0.528	0.402
Manganese	7439-96-5	E472/VA	0.050	mg/kg		1.35	----	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	1.72	0.372	0.526	0.269
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	9.38	1.89	2.54	1.04
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.316	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-6_2024-10	MP_QUL-NCP_LT-KI-7_2024-10	MP_QUL-NCP_LT-KI-8_2024-10	MP_QUL-EAA_LT-MU-1_2024-10	MP_QUL-EAA_LT-MU-2_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-086	VA24C9858-087	VA24C9858-088	VA24C9858-089	VA24C9858-090
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		1.48	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	0.317	0.252	<0.020	<0.020
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.155	----	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	0.34	0.32	<0.20	<0.20
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.28	----	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	10800	11600	11700	8460
Phosphorus	7723-14-0	E472/VA	10	mg/kg		10000	----	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	11600	11400	20600	14500
Potassium	7440-09-7	E472/VA	20	mg/kg		10700	----	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	30.6	36.2	36.0	26.0
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		38.8	----	----	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	15.6	7.26	1.83	1.62
Selenium	7782-49-2	E472/VA	0.10	mg/kg		5.69	----	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	0.0077	0.0061	<0.0050	<0.0050
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		<0.0050	----	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	12200	9390	1560	1310
Sodium	7440-23-5	E472/VA	20	mg/kg		9920	----	----	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	2.41	0.874	0.806	0.182
Strontium	7440-24-6	E472/VA	0.10	mg/kg		1.02	----	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	0.033	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-6_2024-10	MP_QUL-NCP_LT-KI-7_2024-10	MP_QUL-NCP_LT-KI-8_2024-10	MP_QUL-EAA_LT-MU-1_2024-10	MP_QUL-EAA_LT-MU-2_2024-10
					Client sampling date / time	18-Oct-2024 00:00	18-Oct-2024 00:00	18-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-086	VA24C9858-087	VA24C9858-088	VA24C9858-089	VA24C9858-090
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	0.0998	0.138	0.0232	0.0283
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0983	----	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	2.00	0.78	<0.25	0.27
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.80	----	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	0.0065	0.0037	<0.0020	<0.0020
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0028	----	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	0.28	<0.10	<0.10	<0.10
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	104	91.2	13.1	13.3
Zinc	7440-66-6	E472/VA	1.0	mg/kg		93.4	----	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-MU-3_2024-10	MP_QUL-EAA_LT-MU-4_2024-10	MP_QUL-EAA_LT-MU-5_2024-10	MP_QUL-EAA_LT-MU-6_2024-10	MP_QUL-EAA_LT-MU-7_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-091	VA24C9858-092	VA24C9858-093	VA24C9858-094	VA24C9858-095
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		81.0	77.4	74.4	68.9	75.2
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		18.1	4.6	2.6	<2.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.292	0.163	0.264	0.479	0.189
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.118	<0.050	<0.050	<0.050	<0.050
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		495	261	245	188	327
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.933	0.277	0.249	0.229	0.296
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.102	<0.050	<0.050	0.053	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.020	<0.020	<0.020	<0.020	<0.020
Copper	7440-50-8	E440/VA	0.10	mg/kg		1.46	0.92	0.82	1.03	1.14
Iron	7439-89-6	E440/VA	3.0	mg/kg		72.0	23.2	13.1	9.3	22.8
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	0.026	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1560	1260	1090	997	1040
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.753	0.325	0.308	0.220	0.311
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		2.12	1.60	1.12	0.725	1.96

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-MU-3_2024-10	MP_QUL-EAA_LT-MU-4_2024-10	MP_QUL-EAA_LT-MU-5_2024-10	MP_QUL-EAA_LT-MU-6_2024-10	MP_QUL-EAA_LT-MU-7_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-091	VA24C9858-092	VA24C9858-093	VA24C9858-094	VA24C9858-095
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.404	0.362	0.285	0.226	0.486
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12600	10400	9510	7330	8930
Potassium	7440-09-7	E440/VA	20	mg/kg		23900	18900	17400	13200	15600
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		56.5	36.8	35.1	35.7	33.7
Selenium	7782-49-2	E440/VA	0.050	mg/kg		1.93	2.10	1.68	1.24	1.88
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		2400	1700	1270	897	1340
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.586	0.122	0.128	0.113	0.334
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0424	0.0247	0.0203	0.0441	0.0386
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		17.1	13.0	11.6	8.90	14.6
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-MU-8_2024-10	MP_QUL-EAA_LT-LI-1_2024-10	MP_QUL-EAA_LT-LI-2_2024-10	MP_QUL-EAA_LT-LI-3_2024-10	MP_QUL-EAA_LT-LI-4_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-096	VA24C9858-097	VA24C9858-098	VA24C9858-099	VA24C9858-100
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		81.4	67.2	67.6	78.8	73.9
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		3.6	3.8	3.1	3.6	8.1
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	0.172
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.193	0.291	0.551	0.314	0.760
Barium	7440-39-3	E440/VA	0.050	mg/kg		<0.050	<0.050	0.055	<0.050	0.129
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	0.315	0.325	0.760	0.302
Calcium	7440-70-2	E440/VA	20	mg/kg		343	167	169	272	305
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.458	0.0945	0.0662	0.280	0.101
Chromium	7440-47-3	E440/VA	0.050	mg/kg		<0.050	0.337	0.219	0.466	0.294
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		<0.020	0.106	0.125	0.216	0.157
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.97	102	74.2	11.2	232
Iron	7439-89-6	E440/VA	3.0	mg/kg		46.6	2630	455	691	1420
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1510	420	467	640	446
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.507	3.58	3.57	2.83	3.17
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		2.62	5.15	1.52	6.15	3.01

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-MU-8_2024-10	MP_QUL-EAA_LT-LI-1_2024-10	MP_QUL-EAA_LT-LI-2_2024-10	MP_QUL-EAA_LT-LI-3_2024-10	MP_QUL-EAA_LT-LI-4_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-096	VA24C9858-097	VA24C9858-098	VA24C9858-099	VA24C9858-100
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.488	1.69	0.494	1.30	0.786
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	0.843	0.424	0.280	0.574
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		13000	8760	10300	14000	11400
Potassium	7440-09-7	E440/VA	20	mg/kg		23300	7760	7480	13600	9310
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		44.5	17.2	16.0	41.4	25.2
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.07	8.84	12.0	10.3	11.5
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.480	0.289	0.0293	1.92
Sodium	7440-23-5	E440/VA	20	mg/kg		2230	4270	4150	8090	6130
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.168	0.265	0.266	0.302	0.590
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0353	0.0949	0.145	0.340	0.192
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	<0.25	0.56
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0023	<0.0020	0.0025	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	0.16	<0.10	0.11	0.12
Zinc	7440-66-6	E440/VA	0.50	mg/kg		21.2	148	136	108	149
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-LI-5_2024-10	MP_QUL-EAA_LT-LI-6_2024-10	MP_QUL-EAA_LT-LI-7_2024-10	MP_QUL-EAA_LT-LI-8_2024-10	MP_QUL-EAA_LT-OV-3_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-101	VA24C9858-102	VA24C9858-103	VA24C9858-104	VA24C9858-105
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		72.4	58.0	65.4	70.7	84.4
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.4	<2.0	<2.0	12.0	<2.0
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.638	0.815	0.210	0.717	0.059
Barium	7440-39-3	E440/VA	0.050	mg/kg		<0.050	<0.050	<0.050	0.094	<0.050
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.158	0.192	0.161	0.384	0.0327
Calcium	7440-70-2	E440/VA	20	mg/kg		223	86	277	674	1020
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.132	0.0337	0.0628	0.106	0.595
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.136	0.052	0.117	0.368	0.128
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.101	0.058	0.124	0.176	0.168
Copper	7440-50-8	E440/VA	0.10	mg/kg		275	137	87.0	156	10.2
Iron	7439-89-6	E440/VA	3.0	mg/kg		436	459	508	2290	244
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	0.034	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		509	202	368	670	636
Manganese	7439-96-5	E440/VA	0.050	mg/kg		4.10	1.78	2.96	6.50	3.48
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		1.87	0.836	3.70	4.31	2.76

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-LI-5_2024-10	MP_QUL-EAA_LT-LI-6_2024-10	MP_QUL-EAA_LT-LI-7_2024-10	MP_QUL-EAA_LT-LI-8_2024-10	MP_QUL-EAA_LT-OV-3_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-101	VA24C9858-102	VA24C9858-103	VA24C9858-104	VA24C9858-105
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.516	0.351	1.28	1.26	0.430
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.378	0.202	0.315	0.706	0.070
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		10500	4420	9000	14600	10300
Potassium	7440-09-7	E440/VA	20	mg/kg		8210	4300	5730	9550	13800
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		20.1	13.3	15.9	22.6	40.5
Selenium	7782-49-2	E440/VA	0.050	mg/kg		8.82	2.58	7.96	26.1	5.10
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		1.47	0.755	0.617	1.10	0.0158
Sodium	7440-23-5	E440/VA	20	mg/kg		5110	2340	4840	4010	13800
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.366	0.177	0.410	3.81	1.15
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.167	0.0973	0.125	0.206	0.0629
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	0.41	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	0.0032	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	0.17	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		162	74.8	109	149	129
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-EAA_LT-KI-1_2024-10	MP_QUL-EAA_LT-KI-2_2024-10	MP_QUL-EAA_LT-KI-3_2024-10	MP_QUL-EAA_LT-KI-4_2024-10	MP_QUL-EAA_LT-KI-5_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-106	VA24C9858-107	VA24C9858-108	VA24C9858-109	VA24C9858-110
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	----	----	79.1
Moisture	----	E144/VA	0.50	%		81.3	82.9	85.2	81.2	----
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	22.8
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		19.7	25.1	69.9	23.9	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	0.018	<0.010	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.438
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.190	0.281	0.286	0.356	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	0.148
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.188	0.148	0.283	0.145	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	----	----	<1.1 DLHM
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	----	----	1.56
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		1.23	1.62	3.70	1.71	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	----	----	806
Calcium	7440-70-2	E440/VA	20	mg/kg		593	632	736	734	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-1_2024-10	MP_QUL-EAA_LT-KI-2_2024-10	MP_QUL-EAA_LT-KI-3_2024-10	MP_QUL-EAA_LT-KI-4_2024-10	MP_QUL-EAA_LT-KI-5_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-106	VA24C9858-107	VA24C9858-108	VA24C9858-109	VA24C9858-110
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	----	----	0.196
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.228	0.205	0.436	0.142	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	----	----	0.47
Chromium	7440-47-3	E440/VA	0.050	mg/kg		1.06	0.262	0.823	0.601	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	----	----	0.490
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.380	0.493	0.361	0.409	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	----	----	4.76
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.41	4.63	3.36	3.73	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	----	----	952
Iron	7439-89-6	E440/VA	3.0	mg/kg		1850	1000	1300	1940	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	----	----	<0.050
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.028	0.085	0.057	0.075	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	----	----	866
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		546	562	623	518	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	----	----	2.03
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.05	1.82	2.00	1.36	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	----	----	0.583
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	----	----	2.79
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		10.7	4.45	14.8	7.04	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-1_2024-10	MP_QUL-EAA_LT-KI-2_2024-10	MP_QUL-EAA_LT-KI-3_2024-10	MP_QUL-EAA_LT-KI-4_2024-10	MP_QUL-EAA_LT-KI-5_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-106	VA24C9858-107	VA24C9858-108	VA24C9858-109	VA24C9858-110
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		2.00	0.761	2.18	1.32	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.271
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.331	0.334	0.273	0.331	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	0.82
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.58	0.53	0.86	0.49	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	12000
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12300	12100	11600	10000	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	10800
Potassium	7440-09-7	E440/VA	20	mg/kg		11500	11500	12400	10100	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	31.9
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		25.5	27.7	35.6	24.5	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	11.0
Selenium	7782-49-2	E440/VA	0.050	mg/kg		17.7	11.6	14.4	16.1	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	0.0104
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		0.0086	0.0052	0.0118	0.0107	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	10200
Sodium	7440-23-5	E440/VA	20	mg/kg		9830	12200	14500	10700	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	2.13
Strontium	7440-24-6	E440/VA	0.050	mg/kg		2.43	2.04	2.49	2.28	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	0.020	<0.020	<0.020	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-1_2024-10	MP_QUL-EAA_LT-KI-2_2024-10	MP_QUL-EAA_LT-KI-3_2024-10	MP_QUL-EAA_LT-KI-4_2024-10	MP_QUL-EAA_LT-KI-5_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9858-106	VA24C9858-107	VA24C9858-108	VA24C9858-109	VA24C9858-110
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.127
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.116	0.161	0.150	0.119	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	0.10	<0.10	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	<0.56 DLHM
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.42	0.79	1.38	0.61	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0042
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0090	0.0047	0.0121	0.0059	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.15	<0.10	0.13	0.10	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	149
Zinc	7440-66-6	E440/VA	0.50	mg/kg		114	136	104	111	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	----	----	75.3
Moisture	----	E144-H/VA	2.0	%		----	----	----	79.4	----
Moisture	----	E144/VA	0.50	%		79.6	79.2	84.2	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	<5.0	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	9.4
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		19.8	10.0	14.8	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.142
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.151	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.595	0.190	0.187	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	0.276
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.242	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.112	0.184	0.198	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	0.081

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Metals										
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	----	----	<1.0
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.012	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	----	----	0.910
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		1.63	1.15	2.10	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	901	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	----	----	241
Calcium	7440-70-2	E440/VA	20	mg/kg		457	688	620	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.143	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	----	----	0.0420
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.195	0.171	0.219	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	----	----	0.43
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.303	0.278	0.578	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.028	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	----	----	0.244
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.296	0.387	0.276	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	1.41	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	----	----	16.6

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Metals										
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.46	3.46	4.36	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	----	----	446
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	27.6	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		747	1090	1520	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	----	----	0.055
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	<0.050	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	0.030	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	----	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	----	----	1440
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	1470	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		353	636	677	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	----	----	8.69
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	0.559	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		1.15	0.918	0.916	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	----	----	0.367
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	----	----	0.0905
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.132	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		2.75	8.24	8.87	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	0.639	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.562	1.71	1.40	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	<0.040	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.859
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.257	0.184	0.263	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	0.32
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	0.75	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.50	0.35	0.44	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	15700
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	10900	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		9860	9590	12900	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	12400
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	20600	----
Potassium	7440-09-7	E440/VA	20	mg/kg		10300	10200	14700	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	17.6	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	12.3
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		38.4	26.7	34.2	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	8.96
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	1.84	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		7.44	9.95	16.1	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	<0.0050	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Metals										
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	0.130
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	0.0071	0.0093	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	2850
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	966	----
Sodium	7440-23-5	E440/VA	20	mg/kg		10500	10100	13800	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	0.93	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	0.51
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.841	2.19	1.78	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.0052	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.0217
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.162	0.125	0.110	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	<0.50
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	<0.50	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		0.98	<0.25	0.28	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	<0.0020	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-EAA_LT-KI-6_2024-10	MP_QUL-EAA_LT-KI-7_2024-10	MP_QUL-EAA_LT-KI-8_2024-10	MP_QUL-NGC_PCC-MU-1X_2024-10	MP_QUL-NGC_PCC-LI-1X_2024-10
					Client sampling date / time	21-Oct-2024 00:00	21-Oct-2024 00:00	21-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-111	VA24C9858-112	VA24C9858-113	VA24C9858-114	VA24C9858-115
						Result	Result	Result	Result	Result
Metals										
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0233
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0036	0.0030	0.0069	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	0.28
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	120
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	30.2	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		110	103	120	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	----	----	80.6	----
Moisture	----	E144/VA	0.50	%		----	----	82.3	----	66.8
Moisture	----	E144A/VA	2.0	%		71.2	70.5	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
						VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	<2.0	----	<2.0
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	<5.0	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		<5.0	6.4	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Antimony	7440-36-0	E475/VA	0.020	mg/kg		0.082	<0.020	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	1.09	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.510	----	0.208
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.140	0.191	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	<0.050	----	<0.050
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	<0.050	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.369	1.64	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		0.016	0.076	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	----	<1.0	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	<1.0	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
						VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	----	0.507	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	<0.0050	----	<0.0050
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.033	11.7	----	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	----	427	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	329	----	592
Calcium	7440-70-2	E475/VA	20	mg/kg		473	418	----	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	----	0.213	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.391	----	0.0593
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0629	0.0557	----	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	----	0.25	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	<0.050	----	<0.050
Chromium	7440-47-3	E475/VA	0.20	mg/kg		0.21	0.44	----	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	----	0.076	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.152	3.85	----	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	----	79.4	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	1.27	----	8.84
Copper	7440-50-8	E475/VA	0.20	mg/kg		4.40	8.52	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	15.5	----	43.4
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	----	793	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		120	415	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
						VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	----	<0.050	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	0.063	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	----	<0.50
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	----	<0.50	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	1310	----	1220
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	----	755	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		732	650	----	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	----	4.02	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	0.361	----	0.450
Manganese	7439-96-5	E475/VA	0.050	mg/kg		6.78	5.91	----	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	----	0.635	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	----	3.28	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.242	----	0.0620
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	1.37	----	0.187
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0138	0.0962	----	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.048	0.326	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	0.341	----

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
						VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.179	0.535	----	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	----	<0.20
Nickel	7440-02-0	E475/VA	0.20	mg/kg		<0.20	1.40	----	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	17400	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	12400	----	9900
Phosphorus	7723-14-0	E475/VA	20	mg/kg		10100	11400	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	24200	----	5950
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	14700	----
Potassium	7440-09-7	E475/VA	20	mg/kg		9880	9730	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	72.6	----	16.1
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	57.7	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		11.0	9.93	----	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	6.58	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	2.06	----	3.43
Selenium	7782-49-2	E475/VA	0.10	mg/kg		9.10	6.03	----	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	0.483	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	<0.0050	----	0.0100
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0441	0.0155	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	2100	----	3410
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	8430	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
						VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Sodium	7440-23-5	E475/VA	20	mg/kg		1770	2700	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	0.32	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	0.295	----	1.95
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.62	0.94	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	0.054	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0224	----	0.0158
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.438	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0189	0.0331	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	----	<0.10
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	<0.50	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	<0.25	----	<0.25
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	0.52	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	<0.0020	----	<0.0020
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	<0.0020	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0173	0.0586	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	<0.10	----	<0.10

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-NGC_PCC-OV-1X_2024-10	MP_QUL-NGC_PCC-KI-1X_2024-10	MP_QUL-NCP_LT-MU-1X_2024-10	MP_QUL-NCP_LT-LI-1X_2024-10	MP_QUL-NCP_LT-OV-1X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00	17-Oct-2024 00:00
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-116	VA24C9858-117	VA24C9858-118	VA24C9858-119	VA24C9858-120
						Result	Result	Result	Result	Result
Metals										
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		<0.10	0.37	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	133	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	13.8	----	58.7
Zinc	7440-66-6	E475/VA	1.0	mg/kg		139	210	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	----	<0.20
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	<0.20	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUL-NCP_LT-KI-1X_2024-10	----	----	----	----
					Client sampling date / time	17-Oct-2024 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9858-121	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		84.9	----	----	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		12.6	----	----	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		0.011	----	----	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.525	----	----	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.161	----	----	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-1X_2024-10	----	----	----	----
					Client sampling date / time	17-Oct-2024 00:00	----	----	----	----
					VA24C9858-121	----	----	----	----	----
					Result	----	----	----	----	----
Metals										
Bismuth	7440-69-9	E472/VA	0.010	mg/kg	<0.010	----	----	----	----	
Boron	7440-42-8	E472/VA	1.0	mg/kg	<1.0	----	----	----	----	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	3.35	----	----	----	----	
Calcium	7440-70-2	E472/VA	20	mg/kg	584	----	----	----	----	
Cesium	7440-46-2	E472/VA	0.0050	mg/kg	0.217	----	----	----	----	
Chromium	7440-47-3	E472/VA	0.20	mg/kg	0.69	----	----	----	----	
Cobalt	7440-48-4	E472/VA	0.020	mg/kg	0.166	----	----	----	----	
Copper	7440-50-8	E472/VA	0.20	mg/kg	6.18	----	----	----	----	
Iron	7439-89-6	E472/VA	5.0	mg/kg	1460	----	----	----	----	
Lead	7439-92-1	E472/VA	0.050	mg/kg	<0.050	----	----	----	----	
Lithium	7439-93-2	E472/VA	0.50	mg/kg	<0.50	----	----	----	----	
Magnesium	7439-95-4	E472/VA	2.0	mg/kg	645	----	----	----	----	
Manganese	7439-96-5	E472/VA	0.050	mg/kg	1.18	----	----	----	----	
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt	0.969	----	----	----	----	
Mercury	7439-97-6	E511/VA	0.0050	mg/kg	6.43	----	----	----	----	
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg	0.269	----	----	----	----	
Nickel	7440-02-0	E472/VA	0.20	mg/kg	0.46	----	----	----	----	
Phosphorus	7723-14-0	E472/VA	10	mg/kg	14500	----	----	----	----	
Potassium	7440-09-7	E472/VA	20	mg/kg	14700	----	----	----	----	
Rubidium	7440-17-7	E472/VA	0.050	mg/kg	51.8	----	----	----	----	
Selenium	7782-49-2	E472/VA	0.10	mg/kg	9.55	----	----	----	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUL-NCP_LT-KI-1X_2024-10	----	----	----	----
					Client sampling date / time	17-Oct-2024 00:00	----	----	----	----
						VA24C9858-121	----	----	----	----
						Result	----	----	----	----
Metals										
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0129	----	----	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		15800	----	----	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		1.67	----	----	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	----	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0984	----	----	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	----	----	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.70	----	----	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0051	----	----	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.11	----	----	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		65.5	----	----	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C9858**	Page	: 1 of 91
Amendment	: **3**		
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 30-Oct-2024 12:20
PO	: PO5590023955	Issue Date	: 05-Feb-2025 15:23
C-O-C number	: ----		
Sampler	: PLE, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 121		
No. of samples analysed	: 121		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- Method Blank value outliers occur - please see following pages for full details.
- Duplicate outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Metals	QC-MRG8-1825667 001	----	Manganese	7439-96-5	E475	0.146 mg/kg MB-LOR	0.05 mg/kg	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
MB-LOR	*Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.*

Duplicate (DUP) RPDs								
Metals	VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Aluminum	7429-90-5	E440	160 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Chromium	7440-47-3	E440	0.113 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Iron	7439-89-6	E440	112 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Iron	7439-89-6	E440	74.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Iron	7439-89-6	E440	55.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Strontium	7440-24-6	E440	63.8 % DUP-H	60%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Barium	7440-39-3	E472	74.6 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Cadmium	7440-43-9	E472	106 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Calcium	7440-70-2	E472	64.9 % DUP-H	60%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Iron	7439-89-6	E472	103 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Magnesium	7439-95-4	E472	46.0 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Manganese	7439-96-5	E472	54.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Manganese	7439-96-5	E472	48.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs - Continued								
Metals	Anonymous	Anonymous	Phosphorus	7723-14-0	E472	62.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Strontium	7440-24-6	E472	66.6 % DUP-H	60%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Thallium	7440-28-0	E472	45.2 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Uranium	7440-61-1	E472	60.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Uranium	7440-61-1	E472	0.0050 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Uranium	7440-61-1	E472	0.0045 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).
Metals	Anonymous	Anonymous	Vanadium	7440-62-2	E472	45.9 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG5-1838278 002	----	Boron	7440-42-8	E472	79.2 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG5-1837726 002	----	Cadmium	7440-43-9	E475	79.3 % MES	80.0-120%	Recovery less than lower control limit
Metals	QC-MRG5-1837726 002	----	Silver	7440-22-4	E475.Ag	79.2 % MES	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	*Description*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Reference Material (RM) Sample								
Metals	QC-MRG5-1837726 003	----	Aluminum	7429-90-5	E475	65.6 % MES	70.0-130%	Recovery less than lower control limit

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment

Result Qualifiers

Qualifier	*Description*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E512	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E512	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	08-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E512	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	08-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E512	23-Oct-2024	30-Dec-2024	365 days	69 days	✓	08-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E512	23-Oct-2024	30-Dec-2024	365 days	69 days	✓	08-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E512	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-NGC_PCC-LI-1_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-NGC_PCC-LI-1X_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-NGC_PCC-LI-2_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-NGC_PCC-LI-3_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag										
MP_QUL-NGC_PCC-OV-1X_2024-10	E512	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag										
MP_QUL-NHC_PCC-LI-7_2024-10	E511	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag										
MP_QUL-NHC_PCC-MU-3_2024-10	E511	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	06-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag										
MP_QUL-NHC_PCC-KI-8_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag										
MP_QUL-NHC_PCC-LI-8_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E511	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-2_2024-10	E511	23-Oct-2024	14-Jan-2025	365 days	83 days	✓	15-Jan-2025	365 days	84 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-5_2024-10	E511	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-5_2024-10	E511	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-5_2024-10	E511	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-5_2024-10	E511	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-2_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-3_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-4_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-4_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E511	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E511	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E511	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E511	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E511	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E511	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E511	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E511	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E511	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E511	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E510	26-Oct-2024	02-Jan-2025	365 days	69 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-6_2024-10	E510	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-7_2024-10	E510	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-8_2024-10	E510	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-4_2024-10	E510	22-Oct-2024	02-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-5_2024-10	E510	22-Oct-2024	02-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-5_2024-10	E510	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E510	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E510	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E510	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E510	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-1_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-2_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E510	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E510	19-Oct-2024	13-Jan-2025	365 days	86 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E510	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-4_2024-10	E510	20-Oct-2024	15-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓

Matrix: **Biota**

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E510	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E512A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	08-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E512A	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	08-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E512A	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	08-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E512A	23-Oct-2024	30-Dec-2024	365 days	69 days	✓	08-Jan-2025	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E512A	23-Oct-2024	30-Dec-2024	365 days	69 days	✓	08-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E512A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1X_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-2_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-3_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-OV-1X_2024-10	E512A	19-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	87 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-7_2024-10	E511A	26-Oct-2024	30-Dec-2024	365 days	66 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-3_2024-10	E511A	24-Oct-2024	30-Dec-2024	365 days	68 days	✓	06-Jan-2025	365 days	75 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-KI-8_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-8_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E511A	26-Oct-2024	14-Jan-2025	365 days	80 days	✓	15-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-2_2024-10	E511A	23-Oct-2024	14-Jan-2025	365 days	83 days	✓	15-Jan-2025	365 days	84 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-5_2024-10	E511A	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-5_2024-10	E511A	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-5_2024-10	E511A	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-5_2024-10	E511A	22-Oct-2024	14-Jan-2025	365 days	84 days	✓	15-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-2_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-3_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-4_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-4_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E511A	19-Oct-2024	14-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E511A	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E511A	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E511A	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E511A	18-Oct-2024	14-Jan-2025	365 days	88 days	✓	15-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E511A	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E511A	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E511A	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E511A	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E511A	17-Oct-2024	14-Jan-2025	365 days	89 days	✓	15-Jan-2025	365 days	90 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E510A	26-Oct-2024	02-Jan-2025	365 days	69 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-6_2024-10	E510A	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-7_2024-10	E510A	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-8_2024-10	E510A	23-Oct-2024	02-Jan-2025	365 days	72 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-4_2024-10	E510A	22-Oct-2024	02-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-5_2024-10	E510A	22-Oct-2024	02-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-5_2024-10	E510A	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E510A	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E510A	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E510A	20-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E510A	19-Oct-2024	02-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-1_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-2_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	84 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓

Matrix: **Biota**

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E510A	21-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E510A	19-Oct-2024	13-Jan-2025	365 days	86 days	✓	13-Jan-2025	365 days	87 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E510A	18-Oct-2024	13-Jan-2025	365 days	87 days	✓	13-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-4_2024-10	E510A	20-Oct-2024	15-Jan-2025	365 days	87 days	✓	15-Jan-2025	365 days	88 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E510A	17-Oct-2024	13-Jan-2025	365 days	88 days	✓	13-Jan-2025	365 days	89 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E475	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E475	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E475	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E475	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E475	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E475	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1X_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-2_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-3_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-OV-1X_2024-10	E475	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-7_2024-10	E472	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	31-Dec-2024	730 days	66 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-3_2024-10	E472	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	31-Dec-2024	730 days	68 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-KI-8_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-8_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓

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			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E472	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-2_2024-10	E472	23-Oct-2024	14-Jan-2025	730 days	83 days	✓	14-Jan-2025	730 days	84 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-5_2024-10	E472	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-5_2024-10	E472	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-5_2024-10	E472	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-5_2024-10	E472	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-2_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-3_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-4_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-4_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E472	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E472	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E472	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E472	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E472	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E472	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E472	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E472	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E472	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E472	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E440	26-Oct-2024	02-Jan-2025	730 days	69 days	✓	02-Jan-2025	730 days	69 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-6_2024-10	E440	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-7_2024-10	E440	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-8_2024-10	E440	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-4_2024-10	E440	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-5_2024-10	E440	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-5_2024-10	E440	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E440	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E440	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E440	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E440	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-1_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-2_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E440	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E440	19-Oct-2024	13-Jan-2025	730 days	86 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E440	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-4_2024-10	E440	20-Oct-2024	15-Jan-2025	730 days	87 days	✓	15-Jan-2025	730 days	88 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E440	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E475.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E475.Ag	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E475.Ag	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E475.Ag	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E475.Ag	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E475.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1X_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-2_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-3_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-OV-1X_2024-10	E475.Ag	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-7_2024-10	E472.Ag	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	31-Dec-2024	730 days	66 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-3_2024-10	E472.Ag	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	31-Dec-2024	730 days	68 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-KI-8_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-8_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E472.Ag	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-2_2024-10	E472.Ag	23-Oct-2024	14-Jan-2025	730 days	83 days	✓	14-Jan-2025	730 days	84 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-5_2024-10	E472.Ag	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-5_2024-10	E472.Ag	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-5_2024-10	E472.Ag	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-5_2024-10	E472.Ag	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-2_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-3_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-4_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-4_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E472.Ag	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E472.Ag	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E472.Ag	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E472.Ag	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E472.Ag	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E472.Ag	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E472.Ag	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E472.Ag	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E472.Ag	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E472.Ag	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E440.Ag	26-Oct-2024	02-Jan-2025	730 days	69 days	✓	02-Jan-2025	730 days	69 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-6_2024-10	E440.Ag	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-7_2024-10	E440.Ag	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-8_2024-10	E440.Ag	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-4_2024-10	E440.Ag	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-5_2024-10	E440.Ag	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-5_2024-10	E440.Ag	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E440.Ag	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E440.Ag	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E440.Ag	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E440.Ag	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-1_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-2_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E440.Ag	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E440.Ag	19-Oct-2024	13-Jan-2025	730 days	86 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E440.Ag	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-4_2024-10	E440.Ag	20-Oct-2024	15-Jan-2025	730 days	87 days	✓	15-Jan-2025	730 days	88 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E440.Ag	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E475.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	30-Dec-2024	730 days	66 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E475.Ti	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E475.Ti	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	30-Dec-2024	730 days	68 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E475.Ti	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E475.Ti	23-Oct-2024	30-Dec-2024	730 days	69 days	✓	30-Dec-2024	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E475.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1X_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-2_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-3_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUL-NGC_PCC-OV-1X_2024-10	E475.Ti	19-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	87 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-7_2024-10	E472.Ti	26-Oct-2024	30-Dec-2024	730 days	66 days	✓	31-Dec-2024	730 days	66 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-3_2024-10	E472.Ti	24-Oct-2024	30-Dec-2024	730 days	68 days	✓	31-Dec-2024	730 days	68 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-KI-8_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-8_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E472.Ti	26-Oct-2024	14-Jan-2025	730 days	80 days	✓	14-Jan-2025	730 days	81 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-2_2024-10	E472.Ti	23-Oct-2024	14-Jan-2025	730 days	83 days	✓	14-Jan-2025	730 days	84 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-5_2024-10	E472.Ti	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-5_2024-10	E472.Ti	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-5_2024-10	E472.Ti	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-5_2024-10	E472.Ti	22-Oct-2024	14-Jan-2025	730 days	84 days	✓	14-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-2_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-3_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-KI-4_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-LI-4_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E472.Ti	19-Oct-2024	14-Jan-2025	730 days	87 days	✓	14-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E472.Ti	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E472.Ti	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E472.Ti	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E472.Ti	18-Oct-2024	14-Jan-2025	730 days	88 days	✓	14-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E472.Ti	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E472.Ti	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E472.Ti	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E472.Ti	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E472.Ti	17-Oct-2024	14-Jan-2025	730 days	89 days	✓	14-Jan-2025	730 days	90 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E440.Ti	26-Oct-2024	02-Jan-2025	730 days	69 days	✓	02-Jan-2025	730 days	69 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-6_2024-10	E440.Ti	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-7_2024-10	E440.Ti	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-8_2024-10	E440.Ti	23-Oct-2024	02-Jan-2025	730 days	72 days	✓	02-Jan-2025	730 days	72 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-4_2024-10	E440.Ti	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-5_2024-10	E440.Ti	22-Oct-2024	02-Jan-2025	730 days	73 days	✓	02-Jan-2025	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-5_2024-10	E440.Ti	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E440.Ti	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E440.Ti	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E440.Ti	20-Oct-2024	02-Jan-2025	730 days	75 days	✓	02-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E440.Ti	19-Oct-2024	02-Jan-2025	730 days	76 days	✓	02-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-1_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-2_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	84 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E440.Ti	21-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E440.Ti	19-Oct-2024	13-Jan-2025	730 days	86 days	✓	13-Jan-2025	730 days	87 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E440.Ti	18-Oct-2024	13-Jan-2025	730 days	87 days	✓	13-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NGC_NSC-WB-4_2024-10	E440.Ti	20-Oct-2024	15-Jan-2025	730 days	87 days	✓	15-Jan-2025	730 days	88 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓

Matrix: **Biota**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E440.Ti	17-Oct-2024	13-Jan-2025	730 days	88 days	✓	13-Jan-2025	730 days	89 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-1_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-4_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-5_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-6_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-7_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-1_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-4_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-5_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-6_2024-10	E144A	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-3_2024-10	E144A	24-Oct-2024	----	----	----		30-Dec-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-3_2024-10	E144A	24-Oct-2024	----	----	----		30-Dec-2024	----	68 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-KI-2_2024-10	E144A	23-Oct-2024	----	----	----		30-Dec-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NHC_PCC-LI-2_2024-10	E144A	23-Oct-2024	----	----	----		30-Dec-2024	----	69 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-EAA_LT-KI-5_2024-10	E144A	21-Oct-2024	----	----	----		13-Jan-2025	----	85 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-KI-1X_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-1X_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-2_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-LI-3_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUL-NGC_PCC-OV-1X_2024-10	E144A	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-7_2024-10	E144-H	26-Oct-2024	----	----	----		30-Dec-2024	----	66 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-3_2024-10	E144-H	24-Oct-2024	----	----	----		30-Dec-2024	----	68 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-KI-8_2024-10	E144-H	26-Oct-2024	----	----	----		13-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-LI-8_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-1_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-4_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-5_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-6_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-7_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-MU-8_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NHC_PCC-OV-7_2024-10	E144-H	26-Oct-2024	----	----	----		14-Jan-2025	----	80 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NHC_PCC-MU-2_2024-10	E144-H	23-Oct-2024	----	----	----		14-Jan-2025	----	83 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-KI-5_2024-10	E144-H	22-Oct-2024	----	----	----		13-Jan-2025	----	84 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-LI-5_2024-10	E144-H	22-Oct-2024	----	----	----		13-Jan-2025	----	84 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-MU-5_2024-10	E144-H	22-Oct-2024	----	----	----		13-Jan-2025	----	84 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-OV-5_2024-10	E144-H	22-Oct-2024	----	----	----		13-Jan-2025	----	84 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-KI-2_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-KI-3_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-KI-4_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag										
MP_QUL-NGC_PCC-LI-4_2024-10	E144-H	19-Oct-2024	----	----	----		14-Jan-2025	----	87 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-1X_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-2_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-3_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-MU-4_2024-10	E144-H	19-Oct-2024	----	----	----		14-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-1_2024-10	E144-H	19-Oct-2024	----	----	----		13-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-2_2024-10	E144-H	19-Oct-2024	----	----	----		14-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NGC_PCC-OV-4_2024-10	E144-H	19-Oct-2024	----	----	----		14-Jan-2025	----	87 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-3_2024-10	E144-H	18-Oct-2024	----	----	----		14-Jan-2025	----	88 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-4_2024-10	E144-H	18-Oct-2024	----	----	----		14-Jan-2025	----	88 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-5_2024-10	E144-H	18-Oct-2024	----	----	----		14-Jan-2025	----	88 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-6_2024-10	E144-H	18-Oct-2024	----	----	----		14-Jan-2025	----	88 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1_2024-10	E144-H	17-Oct-2024	----	----	----		13-Jan-2025	----	89 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-1X_2024-10	E144-H	17-Oct-2024	----	----	----		14-Jan-2025	----	89 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-KI-2_2024-10	E144-H	17-Oct-2024	----	----	----		13-Jan-2025	----	89 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1_2024-10	E144-H	17-Oct-2024	----	----	----		14-Jan-2025	----	89 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUL-NCP_LT-LI-1X_2024-10	E144-H	17-Oct-2024	----	----	----		14-Jan-2025	----	89 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NHC_PCC-OV-1_2024-10	E144	26-Oct-2024	----	----	----		20-Dec-2024	----	55 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NHC_NSC-WB-6_2024-10	E144	23-Oct-2024	----	----	----		20-Dec-2024	----	58 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NHC_NSC-WB-7_2024-10	E144	23-Oct-2024	----	----	----		20-Dec-2024	----	58 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NHC_NSC-WB-8_2024-10	E144	23-Oct-2024	----	----	----		20-Dec-2024	----	58 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NHC_NSC-WB-4_2024-10	E144	22-Oct-2024	----	----	----		20-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NHC_NSC-WB-5_2024-10	E144	22-Oct-2024	----	----	----		20-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-EAA_LT-MU-1_2024-10	E144	21-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-EAA_LT-MU-2_2024-10	E144	21-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NGC_NSC-WB-4_2024-10	E144	20-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUL-NGC_NSC-WB-5_2024-10	E144	20-Oct-2024	----	----	----		20-Dec-2024	----	61 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-6_2024-10	E144	20-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-7_2024-10	E144	20-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-8_2024-10	E144	20-Oct-2024	----	----	----		20-Dec-2024	----	61 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-1_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-2_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_NSC-WB-3_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NHC_NSC-WB-1_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NHC_NSC-WB-2_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NHC_NSC-WB-3_2024-10	E144	19-Oct-2024	----	----	----		20-Dec-2024	----	62 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-KI-7_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-KI-8_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-3_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-4_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-5_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-6_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-7_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-8_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-1_2024-10	E144	17-Oct-2024	----	----	----		20-Dec-2024	----	64 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-3_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-4_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-5_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-6_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-7_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-8_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-OV-8_2024-10	E144	18-Oct-2024	----	----	----		20-Dec-2024	----	64 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-LI-2_2024-10	E144	17-Oct-2024	----	----	----		20-Dec-2024	----	65 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-2_2024-10	E144	17-Oct-2024	----	----	----		20-Dec-2024	----	65 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-OV-1_2024-10	E144	17-Oct-2024	----	----	----		20-Dec-2024	----	65 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-1_2024-10	E144	21-Oct-2024	----	----	----		07-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-2_2024-10	E144	21-Oct-2024	----	----	----		07-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-3_2024-10	E144	21-Oct-2024	----	----	----		07-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-4_2024-10	E144	21-Oct-2024	----	----	----		07-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-6_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-7_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-KI-8_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-1_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-2_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-3_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-4_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-5_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-6_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-7_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-LI-8_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-3_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-4_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-5_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-6_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-7_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-MU-8_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-EAA_LT-OV-3_2024-10	E144	21-Oct-2024	----	----	----		08-Jan-2025	----	79 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NGC_PCC-OV-3_2024-10	E144	19-Oct-2024	----	----	----		07-Jan-2025	----	81 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-MU-1X_2024-10	E144	17-Oct-2024	----	----	----		08-Jan-2025	----	83 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUL-NCP_LT-OV-1X_2024-10	E144	17-Oct-2024	----	----	----		08-Jan-2025	----	83 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	3	44	6.8	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1827074	6	78	7.6	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	3	44	6.8	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1827072	6	80	7.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	3	44	6.8	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1827073	6	69	8.7	5.0	✓
Moisture Content by Gravimetry	E144	1817749	4	63	6.3	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	3	44	6.8	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	2	43	4.6	5.0	✗
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1827076	6	69	8.7	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	2	43	4.6	5.0	✗
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1827075	6	69	8.7	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1825670	4	26	15.3	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	6	44	13.6	10.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1827074	12	78	15.3	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1825667	4	26	15.3	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	6	44	13.6	10.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1827072	12	80	15.0	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1825669	4	26	15.3	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	6	44	13.6	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1827073	12	69	17.3	10.0	✓
Moisture Content by Gravimetry	E144	1817749	4	63	6.3	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1825835	2	26	7.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	3	44	6.8	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1825673	4	25	16.0	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	6	43	13.9	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1827076	12	69	17.3	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1825674	4	25	16.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	6	43	13.9	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1827075	12	69	17.3	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1825670	2	26	7.6	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	3	44	6.8	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1827074	6	78	7.6	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1825667	2	26	7.6	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	3	44	6.8	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1827072	6	80	7.5	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1825669	2	26	7.6	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	3	44	6.8	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1827073	6	69	8.7	5.0	✓
Moisture Content by Gravimetry	E144	1817749	4	63	6.3	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1825835	2	26	7.6	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	3	44	6.8	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1825673	2	25	8.0	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	3	43	6.9	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1827076	6	69	8.7	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1825674	2	25	8.0	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	3	43	6.9	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1827075	6	69	8.7	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Routine)	E510 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Routine)	E510A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Routine)	EP440 ALS Environmental - Vancouver	Biota	EPA 200.3	This method uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C9858**	Page	: 1 of 54
Amendment	: **3**		
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 30-Oct-2024 12:20
PO	: PO5590023955	Date Analysis Commenced	: 20-Dec-2024
C-O-C number	: ----	Issue Date	: 05-Feb-2025 15:23
Sampler	: PLE, SLA		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 121		
No. of samples analysed	: 121		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Cesar Mora	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Dan Gebert	Supervisor - Metals Mercury & Speciation	Vancouver Metals, Burnaby, British Columbia
Ghazaleh Khanmirzaei	Analyst	Vancouver Metals, Burnaby, British Columbia
Hamidreza Hamidzadeh	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
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Shahrazad Firoozbakht	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1817749)											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Moisture	----	E144	0.50	%	81.4	79.2	2.72%	20%	----
Physical Tests (QC Lot: 1818747)											
VA24C9858-064	MP_QUL-NCP_LT-MU-2_2024-10	Moisture	----	E144	0.50	%	76.8	77.0	0.250%	20%	----
Physical Tests (QC Lot: 1825727)											
VA24C9929-003	Anonymous	Moisture	----	E144-H	2.0	%	77.9	75.7	2.87%	20%	----
Physical Tests (QC Lot: 1832176)											
VA24C9858-055	MP_QUL-NGC_PCC-OV-3_2024-10	Moisture	----	E144	0.50	%	71.1	70.6	0.788%	20%	----
Physical Tests (QC Lot: 1832655)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Moisture	----	E144	0.50	%	81.0	82.0	1.33%	20%	----
Physical Tests (QC Lot: 1837932)											
VA24C8666-095	Anonymous	Moisture	----	E144-H	2.0	%	79.8	73.8	7.71%	20%	----
Physical Tests (QC Lot: 1838286)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Moisture	----	E144-H	2.0	%	64.5	64.1	0.554%	20%	----
Metals (QC Lot: 1825744)											
VA24C9929-003	Anonymous	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0050	<0.0050	0.00003	Diff <2x LOR	----
Metals (QC Lot: 1825745)											
VA24C9929-003	Anonymous	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	0.87	0.73	0.14	Diff <2x LOR	----
Metals (QC Lot: 1825746)											
VA24C9929-003	Anonymous	Mercury	7439-97-6	E511	0.0050	mg/kg	0.118	0.160	30.4%	40%	----
Metals (QC Lot: 1825747)											
VA24C9929-003	Anonymous	Mercury	7439-97-6	E511A	0.0011	mg/kg wwt	0.0261	0.0354	30.4%	40%	----
Metals (QC Lot: 1825748)											
VA24C9929-003	Anonymous	Aluminum	7429-90-5	E472	5.0	mg/kg	11.2	9.3	1.9	Diff <2x LOR	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.019	0.020	0.0007	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.167	0.132	0.035	Diff <2x LOR	----
		Barium	7440-39-3	E472	0.050	mg/kg	5.14	4.16	21.2%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1825748) - continued											
VA24C9929-003	Anonymous	Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.216	0.066	106%	40%	DUP-H
		Calcium	7440-70-2	E472	20	mg/kg	61300	57300	6.61%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0459	0.0474	3.15%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.168	0.130	26.0%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	4.39	3.21	30.9%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	210	67.4	103%	40%	DUP-H
		Lead	7439-92-1	E472	0.050	mg/kg	0.120	0.066	0.054	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	2080	1880	10.1%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	56.7	34.6	48.4%	40%	DUP-H
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.098	0.058	0.041	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	44100	41500	6.03%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	15200	15400	0.974%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	8.24	8.35	1.32%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	4.22	4.10	2.91%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	4510	3810	17.0%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	95.1	83.5	13.0%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0284	0.0262	7.79%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0100	# 0.0050	0.0050	Diff <2x LOR	DUP-H,J
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.24	0.15	0.09	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	289	195	38.8%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1827072)											
VA24C8767-047	Anonymous	Mercury	7439-97-6	E510A	0.0022	mg/kg wwt	0.0505	0.0576	13.1%	40%	----
Metals (QC Lot: 1827073)											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	9.4	5.6	3.8	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.088	0.086	0.002	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	2.63	2.77	5.03%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1827073) - continued											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0644	0.0508	23.6%	40%	----
		Calcium	7440-70-2	E440	20	mg/kg	58600	59800	2.02%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0530	0.0481	9.73%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	0.070	0.020	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.097	0.074	0.023	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	4.31	4.43	2.81%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	75.6	78.4	3.65%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	0.034	0.030	0.003	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	2210	1960	12.1%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	9.23	8.78	4.98%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.047	0.048	0.0003	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	0.21	0.22	0.007	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	40100	41100	2.31%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	13700	13400	2.44%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	14.3	13.7	4.61%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	3.06	3.04	0.643%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	2310	2280	1.49%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	101	104	2.54%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0180	0.0150	18.5%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0078	0.0084	0.0007	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	188	181	3.79%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1827074)											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Mercury	7439-97-6	E510	0.0104	mg/kg	0.234	0.224	4.53%	40%	----
Metals (QC Lot: 1827075)											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.54	0.73	0.20	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1827076)											
VA24C9858-001	MP_QUL-NHC_NSC-WB-1_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.0112	0.0114	0.0002	Diff <2x LOR	----
Metals (QC Lot: 1834477)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	18.1	<2.0	160%	40%	DUP-H
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.292	0.297	1.58%	40%	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.118	<0.050	0.068	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	495	428	14.4%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.933	0.871	6.88%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.102	0.104	0.002	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.020	<0.020	0.0004	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	1.46	1.37	6.54%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	72.0	20.3	112%	40%	DUP-H
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1560	1280	20.0%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	0.753	0.532	34.5%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	12600	12600	0.677%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	23900	23200	2.92%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	56.5	53.9	4.75%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	1.93	1.93	0.150%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	2400	2280	5.03%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.586	0.302	63.8%	60%	DUP-H
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0424	0.0353	18.3%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1834477) - continued											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Zinc	7440-66-6	E440	0.50	mg/kg	17.1	16.1	5.87%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1834478)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Mercury	7439-97-6	E510A	0.0016	mg/kg wwt	0.404	0.469	14.8%	40%	----
Metals (QC Lot: 1834479)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1834480)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Mercury	7439-97-6	E510	0.0083	mg/kg	2.12	2.46	14.8%	40%	----
Metals (QC Lot: 1834481)											
VA24C9858-091	MP_QUL-EAA_LT-MU-3_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1834488)											
VA24B7916-080	Anonymous	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	0.611	0.596	2.58%	40%	----
Metals (QC Lot: 1834489)											
VA24B7916-080	Anonymous	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.28	0.41	0.13	Diff <2x LOR	----
Metals (QC Lot: 1834490)											
VA24B7916-080	Anonymous	Mercury	7439-97-6	E510	0.0077	mg/kg	0.343	0.305	11.7%	40%	----
Metals (QC Lot: 1834491)											
VA24B7916-080	Anonymous	Mercury	7439-97-6	E510A	0.0014	mg/kg wwt	0.0624	0.0555	11.7%	40%	----
Metals (QC Lot: 1834492)											
VA24B7916-080	Anonymous	Aluminum	7429-90-5	E440	2.0	mg/kg	2.8	4.2	1.4	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	0.011	0.011	0.0004	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	29.5	29.0	1.63%	40%	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.398	0.475	17.6%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	6.2	6.6	6.19%	40%	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.773	0.879	12.9%	40%	----
		Calcium	7440-70-2	E440	20	mg/kg	8010	8610	7.19%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0285	0.0294	3.06%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.056	0.058	0.002	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.480	0.470	2.21%	40%	----
		Copper	7440-50-8	E440	0.10	mg/kg	67.7	73.4	8.08%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1834492) - continued											
VA24B7916-080	Anonymous	Iron	7439-89-6	E440	3.0	mg/kg	18.3	22.4	20.3%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	3590	3630	1.13%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	1.76	1.95	9.82%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.088	0.093	0.006	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	0.20	0.0007	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	9180	9430	2.70%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	17300	17100	1.03%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	4.40	4.33	1.66%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	7.25	7.14	1.45%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	40100	39000	2.85%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	140	143	1.94%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0024	0.0024	0.00001	Diff <2x LOR	----
		Tin	7440-31-5	E440	0.10	mg/kg	0.19	0.23	0.04	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0021	0.0024	0.0002	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	236	238	0.835%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1835104)											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	<2.0	4.1	2.1	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.458	0.426	7.17%	40%	----
		Barium	7440-39-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	426	398	6.93%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.433	0.460	5.97%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.103	# 0.216	0.113	Diff <2x LOR	DUP-H,J
		Cobalt	7440-48-4	E440	0.020	mg/kg	<0.020	0.023	0.003	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	1.36	1.30	4.66%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1835104) - continued											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Iron	7439-89-6	E440	3.0	mg/kg	16.8	36.9	74.8%	40%	DUP-H
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1570	1800	13.4%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	0.451	0.524	15.0%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	0.34	0.14	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	13000	13600	4.40%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	24200	24900	3.10%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	74.4	78.4	5.26%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	2.05	1.83	11.3%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	2170	2230	2.58%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.281	0.271	3.55%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0265	0.0280	5.67%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	14.2	12.9	9.39%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1835105)											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Mercury	7439-97-6	E510A	0.0012	mg/kg wwt	0.290	0.223	26.0%	40%	----
Metals (QC Lot: 1835106)											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1835107)											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Mercury	7439-97-6	E510	0.0069	mg/kg	1.63	1.26	26.0%	40%	----
Metals (QC Lot: 1835108)											
VA24C9858-063	MP_QUL-NCP_LT-MU-1_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.29	0.37	0.08	Diff <2x LOR	----
Metals (QC Lot: 1835114)											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	5.8	<2.0	3.8	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1835114) - continued											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Arsenic	7440-38-2	E440	0.020	mg/kg	0.056	0.053	0.003	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.072	0.062	0.010	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	844	699	18.8%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.476	0.469	1.49%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.055	0.055	0.0001	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	0.87	0.85	2.31%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	40.5	22.9	55.4%	40%	DUP-H
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1330	1230	8.25%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	0.528	0.372	34.5%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	11700	11200	3.62%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	20600	19900	3.50%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	36.0	34.4	4.40%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	1.83	1.82	0.237%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1560	1480	4.66%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	0.806	0.686	16.1%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0232	0.0240	3.23%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	13.1	12.9	1.30%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1835115)											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Mercury	7439-97-6	E510A	0.0118	mg/kg wwt	0.526	0.568	7.71%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1835116)											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1835117)											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Mercury	7439-97-6	E510	0.0570	mg/kg	2.54	2.74	7.71%	40%	----
Metals (QC Lot: 1835118)											
VA24C9858-089	MP_QUL-EAA_LT-MU-1_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	<0.25	0	Diff <2x LOR	----
Metals (QC Lot: 1837934)											
VA24C8666-095	Anonymous	Aluminum	7429-90-5	E472	5.0	mg/kg	8.9	15.1	6.2	Diff <2x LOR	----
		Antimony	7440-36-0	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.259	0.219	16.9%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	24.5	53.6	74.6%	40%	DUP-H
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.437	0.533	19.9%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	96000	188000	64.9%	60%	DUP-H
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0180	0.0184	0.0004	Diff <2x LOR	----
		Chromium	7440-47-3	E472	0.20	mg/kg	0.51	0.34	0.17	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.195	0.199	1.90%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	2.02	1.94	4.25%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	71.8	79.9	10.6%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	0.110	0.181	0.071	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	0.57	0.07	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	2160	3450	46.0%	40%	DUP-H
		Manganese	7439-96-5	E472	0.050	mg/kg	63.5	111	54.8%	40%	DUP-H
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.064	0.075	0.011	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	0.23	0.20	0.03	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	57600	110000	62.2%	40%	DUP-H
		Potassium	7440-09-7	E472	20	mg/kg	6910	7140	3.36%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	3.57	3.55	0.564%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	4.66	4.40	5.69%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	3510	4480	24.3%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	69.6	139	66.6%	60%	DUP-H
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1837934) - continued											
VA24C8666-095	Anonymous	Thallium	7440-28-0	E472	0.0020	mg/kg	0.0308	0.0488	45.2%	40%	DUP-H
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0113	0.0210	60.4%	40%	DUP-H
		Vanadium	7440-62-2	E472	0.10	mg/kg	1.37	2.18	45.9%	40%	DUP-H
		Zinc	7440-66-6	E472	1.0	mg/kg	174	245	33.6%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1837936)											
VA24C8666-095	Anonymous	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0192	0.0149	25.1%	40%	----
Metals (QC Lot: 1837937)											
VA24C8666-095	Anonymous	Mercury	7439-97-6	E511	0.0051	mg/kg	0.0950	0.0738	25.1%	40%	----
Metals (QC Lot: 1838278)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0337	0.0334	0.690%	40%	----
Metals (QC Lot: 1838279)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
Metals (QC Lot: 1838280)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Mercury	7439-97-6	E511	0.0050	mg/kg	0.0289	0.0292	0.901%	40%	----
Metals (QC Lot: 1838281)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0103	0.0104	0.901%	40%	----
Metals (QC Lot: 1838282)											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Aluminum	7429-90-5	E472	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		Antimony	7440-36-0	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.105	0.102	0.004	Diff <2x LOR	----
		Barium	7440-39-3	E472	0.050	mg/kg	0.272	0.268	1.62%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.019	0.028	0.008	Diff <2x LOR	----
		Calcium	7440-70-2	E472	20	mg/kg	676	439	42.4%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0380	0.0353	7.35%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.073	0.069	0.004	Diff <2x LOR	----
		Copper	7440-50-8	E472	0.20	mg/kg	4.17	4.16	0.372%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1838282) - continued											
VA24C9858-034	MP_QUL-NHC_PCC-OV-7_2024-10	Iron	7439-89-6	E472	5.0	mg/kg	65.8	65.1	1.04%	40%	----
		Lead	7439-92-1	E472	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	770	805	4.42%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	7.43	6.98	6.29%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.091	0.083	0.008	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	11400	11200	1.95%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	8280	7420	10.9%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	9.63	8.75	9.57%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	7.59	7.69	1.36%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	1690	1570	7.50%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	1.07	0.78	32.0%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0044	0.0042	0.0002	Diff <2x LOR	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0085	# 0.0040	0.0045	Diff <2x LOR	DUP-H,J
		Vanadium	7440-62-2	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	105	102	3.48%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1839281)											
VA24C8179-021	Anonymous	Mercury	7439-97-6	E510	0.0078	mg/kg	0.0416	0.0370	11.5%	40%	----
Metals (QC Lot: 1839282)											
VA24C8179-021	Anonymous	Mercury	7439-97-6	E510A	0.0022	mg/kg wwt	0.0118	0.0105	11.5%	40%	----
Metals (QC Lot: 1839283)											
VA24C9858-012	MP_QUL-NGC_NSC-WB-4_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	4.0	4.6	0.5	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.057	0.046	0.011	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	1.42	2.10	38.3%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0271	0.0225	0.0046	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1839283) - continued											
VA24C9858-012	MP_QUL-NGC_NSC-WB-4_2024-10	Calcium	7440-70-2	E440	20	mg/kg	53200	74300	33.1%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.110	0.109	0.811%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.070	0.069	0.0006	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	2.76	2.74	0.971%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	62.9	58.8	6.79%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	0.024	0.033	0.009	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1980	2000	1.02%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	8.24	11.8	35.7%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.040	0.042	0.002	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	37000	47000	23.9%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	13400	13400	0.266%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	25.8	25.6	0.718%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	1.94	1.93	0.659%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	2590	2670	3.04%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	77.4	109	34.0%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0106	0.0097	9.16%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0138	0.0180	26.7%	40%	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	150	171	13.3%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1839284)											
VA24C9858-012	MP_QUL-NGC_NSC-WB-4_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1839285)											
VA24C9858-012	MP_QUL-NGC_NSC-WB-4_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.41	0.49	0.09	Diff <2x LOR	----

Qualifiers

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
J	Duplicate results and limits are expressed in terms of absolute difference.

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1817749)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1818747)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1825727)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1825835)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1832176)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1832655)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1837731)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1837932)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1838286)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1825667)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1825669)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1825669) - continued						
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	# 0.146	MB-LOR
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1825670)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1825673)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1825674)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1825744)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1825745)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1825746)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1825747)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1825748)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1827072)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1827073)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1827074)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1827075)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1827076)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1834477)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1834477) - continued						
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1834478)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1834479)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1834480)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1834481)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1834488)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1834489)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1834490)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1834491)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1834492)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1834492) - continued						
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1835104)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1835104) - continued						
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1835105)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1835106)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1835107)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1835108)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1835114)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1835114) - continued						
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1835115)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1835116)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1835117)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1835118)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1837726)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1837727)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1837728)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1837729)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1837730)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1837730) - continued						
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1837934)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1837934) - continued						
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1837936)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1837937)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1837938)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1837939)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1838278)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1838279)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1838280)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1838281)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1838282)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1838282) - continued						
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1839281)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1839282)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1839283)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1839283) - continued						
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1839284)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1839285)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----

Qualifiers

Qualifier	Description
MB-LOR	*Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1817749)									
Moisture	----	E144	0.5	%	50 %	101	90.0	110	----
Physical Tests (QCLot: 1818747)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1825727)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1825835)									
Moisture	----	E144A	2	%	100 %	99.7	90.0	110	----
Physical Tests (QCLot: 1832176)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1832655)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1837731)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1837932)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1838286)									
Moisture	----	E144-H	2	%	100 %	101	90.0	110	----
Metals (QCLot: 1825667)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	96.2	80.0	120	----
Metals (QCLot: 1825669)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	102	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	95.9	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	104	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	99.6	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	102	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	96.5	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	97.4	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	101	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	97.6	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1825669) - continued									
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	95.7	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	100	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	100	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	100	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	97.4	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	97.8	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	96.7	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	99.6	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	100	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	92.1	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	97.8	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	100	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	99.7	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	97.7	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	101	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	96.8	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	105	80.0	120	----
Metals (QCLot: 1825670)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	96.2	80.0	120	----
Metals (QCLot: 1825673)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	92.7	80.0	120	----
Metals (QCLot: 1825674)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	97.2	80.0	120	----
Metals (QCLot: 1825744)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.3	80.0	120	----
Metals (QCLot: 1825745)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	104	80.0	120	----
Metals (QCLot: 1825746)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	100	80.0	120	----
Metals (QCLot: 1825747)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	100	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1825748)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	97.8	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	96.3	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	92.6	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	94.4	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	99.9	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	95.0	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	98.3	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	99.7	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	97.7	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	95.6	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	91.1	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	99.1	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	95.8	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	98.9	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	107	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	95.8	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.9	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	103	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	96.0	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	95.9	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	101	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	96.2	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	94.7	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	94.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	110	80.0	120	----
Metals (QCLot: 1827072)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.8	80.0	120	----
Metals (QCLot: 1827073)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1827073) - continued									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	104	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	103	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	99.9	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	100	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	101	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	99.0	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	98.7	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	99.2	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	100	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	98.4	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	101	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	97.4	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	105	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	103	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	99.3	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	102	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	101	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	95.6	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	102	80.0	120	----
Metals (QCLot: 1827074)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	91.8	80.0	120	----
Metals (QCLot: 1827075)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1827075) - continued									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	102	80.0	120	----
Metals (QCLot: 1827076)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	97.2	80.0	120	----
Metals (QCLot: 1834477)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	89.9	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	94.6	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	96.9	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	93.2	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	85.6	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	92.0	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	89.7	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	90.4	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	88.8	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	89.6	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	93.2	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	92.0	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	92.7	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	94.4	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	93.4	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	87.3	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	96.0	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	91.8	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	92.9	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	92.1	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	94.2	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	92.5	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	94.7	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	96.5	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	93.0	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	92.2	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	92.8	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	90.2	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	90.4	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	92.8	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	93.6	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	92.3	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1834477) - continued									
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	90.8	80.0	120	----
Metals (QCLot: 1834478)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	88.0	80.0	120	----
Metals (QCLot: 1834479)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	85.8	80.0	120	----
Metals (QCLot: 1834480)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	88.0	80.0	120	----
Metals (QCLot: 1834481)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	91.0	80.0	120	----
Metals (QCLot: 1834488)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	94.9	80.0	120	----
Metals (QCLot: 1834489)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	102	80.0	120	----
Metals (QCLot: 1834490)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	87.0	80.0	120	----
Metals (QCLot: 1834491)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	87.0	80.0	120	----
Metals (QCLot: 1834492)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	101	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	106	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	98.9	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	100	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	107	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	97.0	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	100	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	99.6	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	99.9	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	100	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	101	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	101	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	100	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1834492) - continued									
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	99.6	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	105	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	101	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	106	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	99.1	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	99.8	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	100	80.0	120	----
Metals (QCLot: 1835104)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	107	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	104	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	108	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	105	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	108	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	103	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	103	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	104	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	103	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	108	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	105	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	108	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	105	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	108	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	104	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1835104) - continued									
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	110	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	107	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	107	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	105	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	107	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	107	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	103	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	101	80.0	120	----
Metals (QCLot: 1835105)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	84.6	80.0	120	----
Metals (QCLot: 1835106)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	97.2	80.0	120	----
Metals (QCLot: 1835107)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	84.6	80.0	120	----
Metals (QCLot: 1835108)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	104	80.0	120	----
Metals (QCLot: 1835114)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	108	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	102	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	99.6	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	104	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	103	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	106	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	105	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1835114) - continued									
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	105	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	101	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	99.2	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	110	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	102	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	104	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	100	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	107	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	108	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	108	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	105	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	102	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	104	80.0	120	----
Metals (QCLot: 1835115)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.6	80.0	120	----
Metals (QCLot: 1835116)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	98.3	80.0	120	----
Metals (QCLot: 1835117)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	91.6	80.0	120	----
Metals (QCLot: 1835118)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	101	80.0	120	----
Metals (QCLot: 1837726)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	# 79.2	80.0	120	MES
Metals (QCLot: 1837727)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	95.8	80.0	120	----
Metals (QCLot: 1837728)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	87.8	80.0	120	----
Metals (QCLot: 1837729)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	87.8	80.0	120	----
Metals (QCLot: 1837730)									

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1837730) - continued									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	82.1	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	99.5	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	102	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	82.8	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	82.8	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	83.6	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	100	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	# 79.3	80.0	120	MES
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	83.8	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	87.4	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	84.2	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	81.6	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	81.6	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	85.0	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	82.8	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	84.3	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	87.3	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	83.9	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	81.0	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	100	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	87.6	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	86.3	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	93.8	80.0	120	----
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	85.7	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	85.7	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	99.5	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	81.8	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	96.8	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	85.5	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	85.4	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	83.1	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	106	80.0	120	----
Metals (QCLot: 1837934)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	97.1	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	98.0	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1837934) - continued									
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	102	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	98.0	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	92.4	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	98.0	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	90.2	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	96.1	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	94.1	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	103	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	97.9	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	96.3	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	93.7	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	94.1	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	96.5	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	98.5	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	98.1	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	104	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	94.5	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.0	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	96.9	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	95.0	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	103	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	95.0	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	95.1	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	98.8	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	94.2	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	100	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	92.0	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	108	80.0	120	----
Metals (QCLot: 1837936)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	86.3	80.0	120	----
Metals (QCLot: 1837937)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	86.3	80.0	120	----
Metals (QCLot: 1837938)									

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1837938) - continued									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.9	80.0	120	----
Metals (QCLot: 1837939)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	92.2	80.0	120	----
Metals (QCLot: 1838278)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	89.5	80.0	120	----
Metals (QCLot: 1838279)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	86.0	80.0	120	----
Metals (QCLot: 1838280)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	87.5	80.0	120	----
Metals (QCLot: 1838281)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	87.5	80.0	120	----
Metals (QCLot: 1838282)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	103	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	87.8	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	92.6	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	104	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	91.0	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	97.1	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	# 79.2	80.0	120	MES
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	100	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	96.4	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	100	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	98.4	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	99.6	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	97.1	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	95.5	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	93.7	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	98.7	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	92.5	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	103	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	85.2	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1838282) - continued									
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	105	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	84.3	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	94.3	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	89.9	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	95.3	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	95.0	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	96.6	80.0	120	----
Metals (QCLot: 1839281)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	89.2	80.0	120	----
Metals (QCLot: 1839282)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	89.2	80.0	120	----
Metals (QCLot: 1839283)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	107	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	110	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	99.8	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	97.8	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	103	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	102	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	102	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	102	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	105	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	105	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	101	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	104	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1839283) - continued									
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	100	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	101	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	103	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	102	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	99.9	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	96.2	80.0	120	----
Metals (QCLot: 1839284)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	95.1	80.0	120	----
Metals (QCLot: 1839285)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	98.6	80.0	120	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1825667)									
QC-1825667-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	99.4	70.0	130	----
Metals (QCLot: 1825669)									
QC-1825669-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	78.0	70.0	130	----
QC-1825669-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	95.5	70.0	130	----
QC-1825669-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	91.9	70.0	130	----
QC-1825669-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	120	70.0	130	----
QC-1825669-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	99.2	70.0	130	----
QC-1825669-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	98.2	70.0	130	----
QC-1825669-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	98.3	70.0	130	----
QC-1825669-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	149	50.0	150	----
QC-1825669-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	104	65.0	135	----
QC-1825669-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	92.5	70.0	130	----
QC-1825669-003	RM	Iron	7439-89-6	E475	102 mg/kg	91.8	70.0	130	----
QC-1825669-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	101	15.0	185	----
QC-1825669-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	87.9	70.0	130	----
QC-1825669-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	99.2	70.0	130	----
QC-1825669-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	102	70.0	130	----
QC-1825669-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	147	40.0	160	----
QC-1825669-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	100	70.0	130	----
QC-1825669-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	99.2	70.0	130	----
QC-1825669-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	98.2	70.0	130	----
QC-1825669-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	97.2	70.0	130	----
QC-1825669-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	94.1	70.0	130	----
QC-1825669-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	94.5	70.0	130	----
QC-1825669-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	82.5	70.0	130	----
QC-1825669-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	100	70.0	130	----
Metals (QCLot: 1825670)									
QC-1825670-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	99.4	70.0	130	----
Metals (QCLot: 1825673)									
QC-1825673-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	98.5	70.0	130	----
Metals (QCLot: 1825674)									
QC-1825674-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	82.7	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 1825744)									
QC-1825744-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	101	70.0	130	----
Metals (QCLot: 1825745)									
QC-1825745-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	98.4	70.0	130	----
Metals (QCLot: 1825746)									
QC-1825746-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	99.7	70.0	130	----
Metals (QCLot: 1825747)									
QC-1825747-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	99.7	70.0	130	----
Metals (QCLot: 1825748)									
QC-1825748-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	92.7	70.0	130	----
QC-1825748-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	93.3	70.0	130	----
QC-1825748-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	83.1	70.0	130	----
QC-1825748-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	96.9	70.0	130	----
QC-1825748-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	93.2	70.0	130	----
QC-1825748-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	101	50.0	150	----
QC-1825748-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	107	65.0	135	----
QC-1825748-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	98.0	70.0	130	----
QC-1825748-003	RM	Iron	7439-89-6	E472	102 mg/kg	96.9	70.0	130	----
QC-1825748-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	97.7	15.0	185	----
QC-1825748-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	99.2	70.0	130	----
QC-1825748-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	97.8	70.0	130	----
QC-1825748-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	99.2	40.0	160	----
QC-1825748-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	98.2	70.0	130	----
QC-1825748-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	97.5	70.0	130	----
QC-1825748-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	104	70.0	130	----
QC-1825748-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	98.1	70.0	130	----
QC-1825748-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	104	70.0	130	----
QC-1825748-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	98.8	70.0	130	----
QC-1825748-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	96.6	70.0	130	----
QC-1825748-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	100	70.0	130	----
Metals (QCLot: 1827072)									
QC-1827072-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	93.7	70.0	130	----
Metals (QCLot: 1827073)									
QC-1827073-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	95.8	70.0	130	----
QC-1827073-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	91.1	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1827073) - continued									
QC-1827073-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	89.7	70.0	130	----
QC-1827073-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	110	70.0	130	----
QC-1827073-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	91.6	70.0	130	----
QC-1827073-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	91.0	70.0	130	----
QC-1827073-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	91.1	70.0	130	----
QC-1827073-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	94.8	70.0	130	----
QC-1827073-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	95.9	65.0	135	----
QC-1827073-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	93.2	70.0	130	----
QC-1827073-003	RM	Iron	7439-89-6	E440	102 mg/kg	89.6	70.0	130	----
QC-1827073-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	96.3	70.0	130	----
QC-1827073-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	92.0	70.0	130	----
QC-1827073-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	91.7	70.0	130	----
QC-1827073-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	89.9	70.0	130	----
QC-1827073-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	99.3	40.0	160	----
QC-1827073-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	92.6	70.0	130	----
QC-1827073-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	94.3	70.0	130	----
QC-1827073-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	93.0	70.0	130	----
QC-1827073-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	95.3	70.0	130	----
QC-1827073-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	99.5	70.0	130	----
QC-1827073-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	88.6	70.0	130	----
QC-1827073-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	90.0	70.0	130	----
QC-1827073-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	92.7	70.0	130	----
Metals (QCLot: 1827074)									
QC-1827074-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	93.7	70.0	130	----
Metals (QCLot: 1827075)									
QC-1827075-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	94.2	70.0	130	----
Metals (QCLot: 1827076)									
QC-1827076-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	94.1	70.0	130	----
Metals (QCLot: 1834477)									
QC-1834477-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	102	70.0	130	----
QC-1834477-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	97.6	70.0	130	----
QC-1834477-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	105	70.0	130	----
QC-1834477-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	103	70.0	130	----
QC-1834477-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	97.9	70.0	130	----
QC-1834477-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	102	70.0	130	----
QC-1834477-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	95.0	70.0	130	----
QC-1834477-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	94.2	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1834477) - continued									
QC-1834477-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	98.7	65.0	135	----
QC-1834477-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	99.9	70.0	130	----
QC-1834477-003	RM	Iron	7439-89-6	E440	102 mg/kg	99.4	70.0	130	----
QC-1834477-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	102	70.0	130	----
QC-1834477-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	100	70.0	130	----
QC-1834477-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	97.6	70.0	130	----
QC-1834477-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	91.3	70.0	130	----
QC-1834477-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	105	40.0	160	----
QC-1834477-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	95.8	70.0	130	----
QC-1834477-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	102	70.0	130	----
QC-1834477-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	99.8	70.0	130	----
QC-1834477-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	103	70.0	130	----
QC-1834477-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	102	70.0	130	----
QC-1834477-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	94.0	70.0	130	----
QC-1834477-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	99.2	70.0	130	----
QC-1834477-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	101	70.0	130	----
Metals (QCLot: 1834478)									
QC-1834478-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	94.0	70.0	130	----
Metals (QCLot: 1834479)									
QC-1834479-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	97.8	70.0	130	----
Metals (QCLot: 1834480)									
QC-1834480-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1834481)									
QC-1834481-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	100	70.0	130	----
Metals (QCLot: 1834488)									
QC-1834488-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	98.4	70.0	130	----
Metals (QCLot: 1834489)									
QC-1834489-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	84.2	70.0	130	----
Metals (QCLot: 1834490)									
QC-1834490-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	83.4	70.0	130	----
Metals (QCLot: 1834491)									
QC-1834491-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	83.4	70.0	130	----
Metals (QCLot: 1834492)									
QC-1834492-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	90.2	70.0	130	----
QC-1834492-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	97.6	70.0	130	----
QC-1834492-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	108	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1834492) - continued									
QC-1834492-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	97.2	70.0	130	----
QC-1834492-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	95.2	70.0	130	----
QC-1834492-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	108	70.0	130	----
QC-1834492-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	95.5	70.0	130	----
QC-1834492-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	94.5	70.0	130	----
QC-1834492-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	101	65.0	135	----
QC-1834492-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	100	70.0	130	----
QC-1834492-003	RM	Iron	7439-89-6	E440	102 mg/kg	98.5	70.0	130	----
QC-1834492-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	97.1	70.0	130	----
QC-1834492-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	96.6	70.0	130	----
QC-1834492-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	98.2	70.0	130	----
QC-1834492-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	94.6	70.0	130	----
QC-1834492-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	99.5	40.0	160	----
QC-1834492-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	96.2	70.0	130	----
QC-1834492-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	99.2	70.0	130	----
QC-1834492-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	102	70.0	130	----
QC-1834492-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	102	70.0	130	----
QC-1834492-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	101	70.0	130	----
QC-1834492-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	95.7	70.0	130	----
QC-1834492-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	93.8	70.0	130	----
QC-1834492-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	103	70.0	130	----
Metals (QCLot: 1835104)									
QC-1835104-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	83.8	70.0	130	----
QC-1835104-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	93.1	70.0	130	----
QC-1835104-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	99.3	70.0	130	----
QC-1835104-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	99.8	70.0	130	----
QC-1835104-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	98.6	70.0	130	----
QC-1835104-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	108	70.0	130	----
QC-1835104-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	96.4	70.0	130	----
QC-1835104-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	85.0	70.0	130	----
QC-1835104-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	97.2	65.0	135	----
QC-1835104-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	94.8	70.0	130	----
QC-1835104-003	RM	Iron	7439-89-6	E440	102 mg/kg	91.8	70.0	130	----
QC-1835104-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	102	70.0	130	----
QC-1835104-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	93.2	70.0	130	----
QC-1835104-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	96.5	70.0	130	----
QC-1835104-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	101	70.0	130	----

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1835104) - continued									
QC-1835104-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	86.2	40.0	160	----
QC-1835104-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	97.8	70.0	130	----
QC-1835104-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	100	70.0	130	----
QC-1835104-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	98.1	70.0	130	----
QC-1835104-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	98.1	70.0	130	----
QC-1835104-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	96.2	70.0	130	----
QC-1835104-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	97.4	70.0	130	----
QC-1835104-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	87.5	70.0	130	----
QC-1835104-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	98.4	70.0	130	----
Metals (QCLot: 1835105)									
QC-1835105-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	85.5	70.0	130	----
Metals (QCLot: 1835106)									
QC-1835106-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	98.0	70.0	130	----
Metals (QCLot: 1835107)									
QC-1835107-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	85.5	70.0	130	----
Metals (QCLot: 1835108)									
QC-1835108-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	87.4	70.0	130	----
Metals (QCLot: 1835114)									
QC-1835114-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	100	70.0	130	----
QC-1835114-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	90.6	70.0	130	----
QC-1835114-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	93.7	70.0	130	----
QC-1835114-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	98.8	70.0	130	----
QC-1835114-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	94.7	70.0	130	----
QC-1835114-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	99.0	70.0	130	----
QC-1835114-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	94.8	70.0	130	----
QC-1835114-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	92.7	70.0	130	----
QC-1835114-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	95.9	65.0	135	----
QC-1835114-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	92.7	70.0	130	----
QC-1835114-003	RM	Iron	7439-89-6	E440	102 mg/kg	95.8	70.0	130	----
QC-1835114-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	104	70.0	130	----
QC-1835114-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	93.5	70.0	130	----
QC-1835114-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	93.7	70.0	130	----
QC-1835114-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	101	70.0	130	----
QC-1835114-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	107	40.0	160	----
QC-1835114-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	92.9	70.0	130	----
QC-1835114-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	94.4	70.0	130	----
QC-1835114-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	91.7	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1835114) - continued									
QC-1835114-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	94.1	70.0	130	----
QC-1835114-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	96.2	70.0	130	----
QC-1835114-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	93.8	70.0	130	----
QC-1835114-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	92.6	70.0	130	----
QC-1835114-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	94.5	70.0	130	----
Metals (QCLot: 1835115)									
QC-1835115-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	85.8	70.0	130	----
Metals (QCLot: 1835116)									
QC-1835116-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	96.3	70.0	130	----
Metals (QCLot: 1835117)									
QC-1835117-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	85.8	70.0	130	----
Metals (QCLot: 1835118)									
QC-1835118-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	99.6	70.0	130	----
Metals (QCLot: 1837726)									
QC-1837726-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	92.5	70.0	130	----
Metals (QCLot: 1837727)									
QC-1837727-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	77.9	70.0	130	----
Metals (QCLot: 1837728)									
QC-1837728-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	89.3	70.0	130	----
Metals (QCLot: 1837729)									
QC-1837729-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	89.3	70.0	130	----
Metals (QCLot: 1837730)									
QC-1837730-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	# 65.6	70.0	130	MES
QC-1837730-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	94.5	70.0	130	----
QC-1837730-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	87.0	70.0	130	----
QC-1837730-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	101	70.0	130	----
QC-1837730-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	91.8	70.0	130	----
QC-1837730-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	89.7	70.0	130	----
QC-1837730-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	90.8	70.0	130	----
QC-1837730-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	76.2	50.0	150	----
QC-1837730-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	89.6	65.0	135	----
QC-1837730-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	91.5	70.0	130	----
QC-1837730-003	RM	Iron	7439-89-6	E475	102 mg/kg	88.8	70.0	130	----
QC-1837730-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	92.3	15.0	185	----
QC-1837730-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	92.0	70.0	130	----
QC-1837730-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	88.9	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 1837730) - continued									
QC-1837730-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	92.3	70.0	130	----
QC-1837730-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	87.9	40.0	160	----
QC-1837730-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	96.0	70.0	130	----
QC-1837730-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	98.5	70.0	130	----
QC-1837730-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	93.8	70.0	130	----
QC-1837730-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	94.5	70.0	130	----
QC-1837730-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	96.1	70.0	130	----
QC-1837730-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	89.8	70.0	130	----
QC-1837730-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	78.7	70.0	130	----
QC-1837730-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	96.8	70.0	130	----
Metals (QCLot: 1837934)									
QC-1837934-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	92.2	70.0	130	----
QC-1837934-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	93.4	70.0	130	----
QC-1837934-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	89.2	70.0	130	----
QC-1837934-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	87.4	70.0	130	----
QC-1837934-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	92.8	70.0	130	----
QC-1837934-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	85.6	70.0	130	----
QC-1837934-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	85.6	70.0	130	----
QC-1837934-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	82.0	50.0	150	----
QC-1837934-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	92.3	65.0	135	----
QC-1837934-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	91.8	70.0	130	----
QC-1837934-003	RM	Iron	7439-89-6	E472	102 mg/kg	92.3	70.0	130	----
QC-1837934-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	88.3	15.0	185	----
QC-1837934-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	95.6	70.0	130	----
QC-1837934-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	92.4	70.0	130	----
QC-1837934-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	86.0	70.0	130	----
QC-1837934-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	86.8	40.0	160	----
QC-1837934-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	92.0	70.0	130	----
QC-1837934-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	96.3	70.0	130	----
QC-1837934-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	92.8	70.0	130	----
QC-1837934-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	96.6	70.0	130	----
QC-1837934-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	99.3	70.0	130	----
QC-1837934-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	90.3	70.0	130	----
QC-1837934-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	92.2	70.0	130	----
QC-1837934-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	92.0	70.0	130	----
Metals (QCLot: 1837936)									
QC-1837936-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	85.8	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1837937)									
QC-1837937-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	85.8	70.0	130	----
Metals (QCLot: 1837938)									
QC-1837938-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	90.2	70.0	130	----
Metals (QCLot: 1837939)									
QC-1837939-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	87.0	70.0	130	----
Metals (QCLot: 1838278)									
QC-1838278-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	98.0	70.0	130	----
Metals (QCLot: 1838279)									
QC-1838279-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	90.0	70.0	130	----
Metals (QCLot: 1838280)									
QC-1838280-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	94.1	70.0	130	----
Metals (QCLot: 1838281)									
QC-1838281-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	94.1	70.0	130	----
Metals (QCLot: 1838282)									
QC-1838282-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	97.6	70.0	130	----
QC-1838282-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	99.7	70.0	130	----
QC-1838282-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	103	70.0	130	----
QC-1838282-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	92.8	70.0	130	----
QC-1838282-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	103	70.0	130	----
QC-1838282-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	101	70.0	130	----
QC-1838282-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	94.8	70.0	130	----
QC-1838282-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	102	50.0	150	----
QC-1838282-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	115	65.0	135	----
QC-1838282-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	98.8	70.0	130	----
QC-1838282-003	RM	Iron	7439-89-6	E472	102 mg/kg	98.5	70.0	130	----
QC-1838282-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	97.8	15.0	185	----
QC-1838282-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	106	70.0	130	----
QC-1838282-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	102	70.0	130	----
QC-1838282-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	96.9	70.0	130	----
QC-1838282-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	99.2	40.0	160	----
QC-1838282-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	103	70.0	130	----
QC-1838282-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	104	70.0	130	----
QC-1838282-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	106	70.0	130	----
QC-1838282-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	101	70.0	130	----
QC-1838282-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	108	70.0	130	----
QC-1838282-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	100	70.0	130	----
QC-1838282-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	97.4	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1838282) - continued									
QC-1838282-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	101	70.0	130	----
Metals (QCLot: 1839281)									
QC-1839281-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	89.7	70.0	130	----
Metals (QCLot: 1839282)									
QC-1839282-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	89.7	70.0	130	----
Metals (QCLot: 1839283)									
QC-1839283-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	77.0	70.0	130	----
QC-1839283-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	96.8	70.0	130	----
QC-1839283-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	95.9	70.0	130	----
QC-1839283-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	95.2	70.0	130	----
QC-1839283-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	99.4	70.0	130	----
QC-1839283-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	99.2	70.0	130	----
QC-1839283-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	94.4	70.0	130	----
QC-1839283-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	84.1	70.0	130	----
QC-1839283-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	94.6	65.0	135	----
QC-1839283-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	97.0	70.0	130	----
QC-1839283-003	RM	Iron	7439-89-6	E440	102 mg/kg	89.0	70.0	130	----
QC-1839283-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	94.4	70.0	130	----
QC-1839283-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	90.5	70.0	130	----
QC-1839283-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	92.2	70.0	130	----
QC-1839283-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	101	70.0	130	----
QC-1839283-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	89.3	40.0	160	----
QC-1839283-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	94.1	70.0	130	----
QC-1839283-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	99.6	70.0	130	----
QC-1839283-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	96.2	70.0	130	----
QC-1839283-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	97.2	70.0	130	----
QC-1839283-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	103	70.0	130	----
QC-1839283-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	93.3	70.0	130	----
QC-1839283-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	85.5	70.0	130	----
QC-1839283-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	97.4	70.0	130	----
Metals (QCLot: 1839284)									
QC-1839284-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	94.0	70.0	130	----
Metals (QCLot: 1839285)									
QC-1839285-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	83.1	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Page 1 of 14

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: Can Dang **Sampler:** SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Reque

Indicate Filtered (F), Preserved (P) or Filtered and Pre

Environmental Division
Vancouver
Work Order Reference
VA24C9858

Telephone : +1 604 253 4188

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440 Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440 Ti)								
1	MP_QUL-NHC_NSC-WB-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
2	MP_QUL-NHC_NSC-WB-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
3	MP_QUL-NHC_NSC-WB-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
4	MP_QUL-NHC_NSC-WB-4_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R								1
5	MP_QUL-NHC_NSC-WB-5_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R								1
6	MP_QUL-NHC_NSC-WB-6_2024-10	23-Oct-24	-	Tissue	R	R	R	R	R	R								1
7	MP_QUL-NHC_NSC-WB-7_2024-10	23-Oct-24	-	Tissue	R	R	R	R	R	R								1
8	MP_QUL-NHC_NSC-WB-8_2024-10	23-Oct-24	-	Tissue	R	R	R	R	R	R								1
9	MP_QUL-NGC_NSC-WB-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
10	MP_QUL-NGC_NSC-WB-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
11	MP_QUL-NGC_NSC-WB-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R								1
12	MP_QUL-NGC_NSC-WB-4_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R								1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☑ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			3.1	1.4	[3 coolers]

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by: MC	Date: Oct 30	Time: 12:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):
ALS Contact: Can Dang
Sampler: SLA, PLE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
13	MP_QUL-NGC_NSC-WB-5_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
14	MP_QUL-NGC_NSC-WB-6_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
15	MP_QUL-NGC_NSC-WB-7_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
16	MP_QUL-NGC_NSC-WB-8_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
17	MP_QUL-NHC_PCC-MU-1_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
18	MP_QUL-NHC_PCC-MU-2_2024-10	23-Oct-24	-	Tissue	R	R	R	R	R	R	1
19	MP_QUL-NHC_PCC-MU-3_2024-10	24-Oct-24	-	Tissue	R	R	R	R	R	R	1
20	MP_QUL-NHC_PCC-MU-4_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
21	MP_QUL-NHC_PCC-MU-5_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
22	MP_QUL-NHC_PCC-MU-6_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
23	MP_QUL-NHC_PCC-MU-7_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
24	MP_QUL-NHC_PCC-MU-8_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			3.4	4	3 (Cooler)

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by: MC	Date: Oct 30	Time: 1220

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:			
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440 Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
25	MP_QUL-NHC_PCC-LI-1_2024-10 26	[redacted]-Oct-24	-	Tissue	R	R	R	R	R	R	1
26	MP_QUL-NHC_PCC-LI-2_2024-10	23-Oct-24	-	Tissue	R	R	R	R	R	R	1
27	MP_QUL-NHC_PCC-LI-3_2024-10	24-Oct-24	-	Tissue	R	R	R	R	R	R	1
28	MP_QUL-NHC_PCC-LI-4_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
29	MP_QUL-NHC_PCC-LI-5_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
30	MP_QUL-NHC_PCC-LI-6_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
31	MP_QUL-NHC_PCC-LI-7_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
32	MP_QUL-NHC_PCC-LI-8_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NHC_PCC-OV-1_2024-10~~ MP_QUL-NHC_PCC-OV-1_2024-10	~~[redacted]-Oct-24~~ → 26-OCT-24		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-NHC_PCC-OV-2_2024-10~~	~~[redacted]~~	-	~~[redacted]~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-NHC_PCC-OV-3_2024-10~~	~~[redacted]~~	-	~~[redacted]~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-NHC_PCC-OV-4_2024-10~~	[redacted]-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					
INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Page 4 of 14

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: sletimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):
ALS Contact: Can Dang
Sampler: SLA, PLE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440-Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440-Ti)	Number of Containers
	~~MP_QUL-NHC_PCC-OV-5_2024-10~~	-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NHC_PCC-OV-6_2024-10~~	-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUL-NHC_PCC-OV-7_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NHC_PCC-OV-8_2024-10~~	-Oct-24	-	Tissue	R	R	R	R	R	R	1
33	MP_QUL-NHC_PCC-KI-1_2024-10	26 ~~25~~ -Oct-24	-	Tissue	R	R	R	R	R	R	1
1C	MP_QUL-NHC_PCC-KI-2_2024-10	23 -Oct-24	-	Tissue	R	R	R	R	R	R	1
3C	MP_QUL-NHC_PCC-KI-3_2024-10	24 -Oct-24	-	Tissue	R	R	R	R	R	R	1
9F	MP_QUL-NHC_PCC-KI-4_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1
32	MP_QUL-NHC_PCC-KI-5_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1
35	MP_QUL-NHC_PCC-KI-6_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1
3H9	MP_QUL-NHC_PCC-KI-7_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1
U0	MP_QUL-NHC_PCC-KI-8_2024-10	26 -Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- -2024 27	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

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(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUL-NGC_PCC-MU-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U2	MP_QUL-NGC_PCC-MU-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U3	MP_QUL-NGC_PCC-MU-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U4	MP_QUL-NGC_PCC-MU-4_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-MU-5_2024-10~~ MP_QUL-NGC_PCC-MU-5_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-MU-6_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-MU-7_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-MU-8_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
U5	MP_QUL-NGC_PCC-LI-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U6	MP_QUL-NGC_PCC-LI-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U7	MP_QUL-NGC_PCC-LI-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
U8	MP_QUL-NGC_PCC-LI-4_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUL-NGC_PCC-LI-5_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-LI-6_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-LI-7_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-LI-8_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
49	MP_QUL-NGC_PCC-OV-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
50	MP_QUL-NGC_PCC-OV-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
51	MP_QUL-NGC_PCC-OV-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
52	MP_QUL-NGC_PCC-OV-4_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
53	MP_QUL-NGC_PCC-OV-5_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-OV-6_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-OV-7_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-OV-8_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**

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Affix ALS barcode label here
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COC Number: 15 -

Report To	Contact and company name below will appear on the final report
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Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
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City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
54	MP_QUL-NGC_PCC-KI-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
55	MP_QUL-NGC_PCC-KI-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
56	MP_QUL-NGC_PCC-KI-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
57	MP_QUL-NGC_PCC-KI-4_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
58	MP_QUL-NGC_PCC-KI-5_2024-10	22-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-KI-6_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-KI-7_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NGC_PCC-KI-8_2024-10~~	~~Oct-24~~	-	Tissue	R	R	R	R	R	R	1
59	MP_QUL-NCP_LT-MU-1_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
60	MP_QUL-NCP_LT-MU-2_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
61	MP_QUL-NCP_LT-MU-3_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
62	MP_QUL-NCP_LT-MU-4_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

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4 day [P4]	☐	1 Business day [E1]	☐
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2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

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Analysis Request

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63	MP_QUL-NCP_LT-MU-5_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
64	MP_QUL-NCP_LT-MU-6_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
65	MP_QUL-NCP_LT-MU-7_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
66	MP_QUL-NCP_LT-MU-8_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
67	MP_QUL-NCP_LT-LI-1_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R								1
68	MP_QUL-NCP_LT-LI-2_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R								1
69	MP_QUL-NCP_LT-LI-3_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
70	MP_QUL-NCP_LT-LI-4_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
71	MP_QUL-NCP_LT-LI-5_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
72	MP_QUL-NCP_LT-LI-6_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
73	MP_QUL-NCP_LT-LI-7_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1
74	MP_QUL-NCP_LT-LI-8_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R								1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

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SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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Contact:	Gabriel Holmes
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	Company address below will appear on the final report
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City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

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75	MP_QUL-NCP_LT-OV-1_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-2_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-3_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-4_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-5_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-6_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
	~~MP_QUL-NCP_LT-OV-7_2024-10~~	~~-Oct-24~~	—	~~Tissue~~	R	R	R	R	R	R	1
76	MP_QUL-NCP_LT-OV-8_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
77	MP_QUL-NCP_LT-KI-1_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
78	MP_QUL-NCP_LT-KI-2_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
79	MP_QUL-NCP_LT-KI-3_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
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Drinking Water (DW) Samples[1] (client use)

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Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

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Contact:	

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Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
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Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang **Sampler:** SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
81	MP_QUL-NCP_LT-KI-5_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
82	MP_QUL-NCP_LT-KI-6_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
83	MP_QUL-NCP_LT-KI-7_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
84	MP_QUL-NCP_LT-KI-8_2024-10	18-Oct-24	-	Tissue	R	R	R	R	R	R	1
85	MP_QUL-EAA_LT-MU-1_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
86	MP_QUL-EAA_LT-MU-2_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
87	MP_QUL-EAA_LT-MU-3_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
88	MP_QUL-EAA_LT-MU-4_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
89	MP_QUL-EAA_LT-MU-5_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
90	MP_QUL-EAA_LT-MU-6_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
91	MP_QUL-EAA_LT-MU-7_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
92	MP_QUL-EAA_LT-MU-8_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

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Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
93	MP_QUL-EAA_LT-LI-1_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
94	MP_QUL-EAA_LT-LI-2_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
95	MP_QUL-EAA_LT-LI-3_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
96	MP_QUL-EAA_LT-LI-4_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
97	MP_QUL-EAA_LT-LI-5_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
98	MP_QUL-EAA_LT-LI-6_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
99	MP_QUL-EAA_LT-LI-7_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
100	MP_QUL-EAA_LT-LI-8_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUL-EAA_LT-OV-1_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-EAA_LT-OV-2_2024-10~~	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
101	MP_QUL-EAA_LT-OV-3_2024-10	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-EAA_LT-OV-4_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)		ALS Contact:	Can Dang	Sampler:	SLA, PLE

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440 Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440 Ti)	Number of Containers
	~~MP_QUL-EAA_LT-OV-5_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-EAA_LT-OV-6_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-EAA_LT-OV-7_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-EAA_LT-OV-8_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
102	MP_QUL-EAA_LT-KI-1_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
103	MP_QUL-EAA_LT-KI-2_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
104	MP_QUL-EAA_LT-KI-3_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
105	MP_QUL-EAA_LT-KI-4_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
106	MP_QUL-EAA_LT-KI-5_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
107	MP_QUL-EAA_LT-KI-6_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
108	MP_QUL-EAA_LT-KI-7_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1
109	MP_QUL-EAA_LT-KI-8_2024-10	21-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- 27 -2024	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

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OCTOBER 2015 FRONT

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

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Email 2:

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Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

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Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang | Sampler: SLA, PLE

Analysis Request

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	~~MP_QUL-NHC_PCC-MU- X_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUL-NHC_PCC-LI- X_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
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	~~MP_QUL-NHC_PCC-KI- X_2024-10~~	~~Oct-24~~	-	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
110	MP_QUL-NGC_PCC-MU- X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
111	MP_QUL-NGC_PCC-LI- X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
112	MP_QUL-NGC_PCC-OV- X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
113	MP_QUL-NGC_PCC-KI- X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
114	MP_QUL-NGP_LT-MU- X_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
115	MP_QUL-NGP_LT-LI- X_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
116	MP_QUL-NGP_LT-OV- X_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1
117	MP_QUL-NGP_LT-KI- X_2024-10	17-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

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Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
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COC Number: 15 -

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Contact:	Gabriel Holmes
Phone:	236-317-4939
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City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
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PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact: Can Dang	Sampler: SLA, PLE

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4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

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Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUL-_LT-MU-_X_2024-10	-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUL-_LT-LI-_X_2024-10	-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUL-_LT-OV-_X_2024-10	-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUL-_LT-KI-_X_2024-10	-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: S. Latimer	Date: Oct- -2024 27	Time: 17:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

FISH TISSUE QUALITY

ALS Laboratory Report VA24C9929

(Finalized January 7, 2025)

CERTIFICATE OF ANALYSIS

Work Order	: **VA24C9929**		
Client	: **Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	: Accounts Payable	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: 1-289-775-1547	Telephone	: +1 604 253 4188
Project	: 24-04 Task 10	Date Samples Received	: 30-Oct-2024 12:20
PO	: 5590017616	Date Analysis Commenced	: 05-Dec-2024
C-O-C number	: ----	Issue Date	: 07-Jan-2025 16:29
Sampler	: KBa		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 14		
No. of samples analysed	: 14		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cesar Mora	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-1_2024-10	MP_HAC-R5_CO-WB-2_2024-10	MP_HAC-R5_CO-WB-3_2024-10	MP_HAC-R5_CO-WB-4_2024-10	MP_HAC-R5_CO-WB-5_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9929-001	VA24C9929-002	VA24C9929-003	VA24C9929-004	VA24C9929-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	----	77.9	75.7	----
Moisture	----	E144/VA	0.50	%		77.2	79.5	----	----	77.4
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	11.2	16.5	----
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		24.6	7.5	----	----	165
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	0.019	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	0.167	0.388	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.181	0.408	----	----	0.270
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	5.14	4.77	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		2.21	3.10	----	----	3.30
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	<0.010	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	----	----	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	----	<1.0	<1.0	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	----	----	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	----	0.216	0.068	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.100	0.0681	----	----	0.324
Calcium	7440-70-2	E472/VA	20	mg/kg		----	----	61300	47600	----
Calcium	7440-70-2	E440/VA	20	mg/kg		19700	39400	----	----	17400

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-1_2024-10	MP_HAC-R5_CO-WB-2_2024-10	MP_HAC-R5_CO-WB-3_2024-10	MP_HAC-R5_CO-WB-4_2024-10	MP_HAC-R5_CO-WB-5_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9929-001	VA24C9929-002	VA24C9929-003	VA24C9929-004	VA24C9929-005
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	----	0.0459	0.0443	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0433	0.0830	----	----	0.0660
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	----	<0.20	<0.20	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.124	0.164	----	----	0.423
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	----	0.168	0.171	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.083	0.231	----	----	0.415
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	----	4.39	4.13	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		3.92	6.98	----	----	6.24
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	----	210	93.6	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		89.2	66.2	----	----	327
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	----	0.120	0.104	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.064	0.054	----	----	0.058
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	----	<0.50	<0.50	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	----	----	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	----	2080	1820	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1480	1970	----	----	1410
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	----	56.7	27.3	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		13.9	29.5	----	----	17.6
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	----	0.0261	0.0245	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0829	0.0806	----	----	0.0938
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	----	0.118	0.101	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-1_2024-10	MP_HAC-R5_CO-WB-2_2024-10	MP_HAC-R5_CO-WB-3_2024-10	MP_HAC-R5_CO-WB-4_2024-10	MP_HAC-R5_CO-WB-5_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9929-001	VA24C9929-002	VA24C9929-003	VA24C9929-004	VA24C9929-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0189	0.0165	----	----	0.0212
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	0.098	0.082	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.100	0.110	----	----	0.138
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	<0.20	<0.20	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	----	----	0.31
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	44100	35300	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		21500	35000	----	----	21100
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	15200	13200	----
Potassium	7440-09-7	E440/VA	20	mg/kg		15100	16900	----	----	16400
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	8.24	9.50	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		12.7	13.0	----	----	11.7
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	4.22	3.58	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.45	7.75	----	----	5.81
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	0.0050	0.0055	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	----	----	<0.0050
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	4510	4270	----
Sodium	7440-23-5	E440/VA	20	mg/kg		2890	4420	----	----	3900
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	95.1	85.8	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		34.5	68.8	----	----	27.6
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	<0.020	<0.020	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	----	----	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-1_2024-10	MP_HAC-R5_CO-WB-2_2024-10	MP_HAC-R5_CO-WB-3_2024-10	MP_HAC-R5_CO-WB-4_2024-10	MP_HAC-R5_CO-WB-5_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00	22-Oct-2024 00:00
						VA24C9929-001	VA24C9929-002	VA24C9929-003	VA24C9929-004	VA24C9929-005
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	0.0284	0.0182	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0185	0.0267	----	----	0.0209
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	<0.10	<0.10	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	----	----	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	0.87	1.44	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		1.54	0.70	----	----	9.37
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	0.0100	0.0040	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0031	0.0030	----	----	0.0077
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	0.24	0.17	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.16	<0.10	----	----	0.68
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	289	250	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		136	200	----	----	158
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	<0.20	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	----	----	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-1_2024-10	MP_EDC-REF_CO-WB-2_2024-10	MP_EDC-REF_CO-WB-3_2024-10	MP_EDC-REF_CO-WB-4_2024-10
					Client sampling date / time	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9929-006	VA24C9929-007	VA24C9929-008	VA24C9929-009	VA24C9929-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	76.7	75.7	----	----
Moisture	----	E144/VA	0.50	%		78.3	----	----	75.1	78.8
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	5.8	82.0	----	----
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		128	----	----	7.0	48.5
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.251	0.380	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.392	----	----	0.254	0.352
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	4.31	4.92	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		5.24	----	----	3.87	5.15
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	----	----	<0.010	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	<1.0	<1.0	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	----	----	<1.0	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	0.096	0.146	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.167	----	----	0.0682	0.0729
Calcium	7440-70-2	E472/VA	20	mg/kg		----	40300	37700	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		43000	----	----	42400	47800

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-1_2024-10	MP_EDC-REF_CO-WB-2_2024-10	MP_EDC-REF_CO-WB-3_2024-10	MP_EDC-REF_CO-WB-4_2024-10
					Client sampling date / time	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9929-006	VA24C9929-007	VA24C9929-008	VA24C9929-009	VA24C9929-010
						Result	Result	Result	Result	Result
Metals										
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0620	0.0742	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0624	----	----	0.0538	0.0778
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	<0.20	0.40	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.414	----	----	0.132	0.179
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.168	0.163	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.196	----	----	0.109	0.127
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	3.26	2.68	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		7.32	----	----	2.73	2.68
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	94.5	188	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		282	----	----	94.1	187
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	0.067	0.090	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		0.077	----	----	0.034	0.042
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	<0.50	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	<0.50	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	1880	2280	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		1850	----	----	1760	1930
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	9.16	21.8	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		19.7	----	----	17.5	25.6
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0427	0.0476	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0783	----	----	0.109	0.0878
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.183	0.196	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-1_2024-10	MP_EDC-REF_CO-WB-2_2024-10	MP_EDC-REF_CO-WB-3_2024-10	MP_EDC-REF_CO-WB-4_2024-10
					Client sampling date / time	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9929-006	VA24C9929-007	VA24C9929-008	VA24C9929-009	VA24C9929-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0170	----	----	0.0272	0.0186
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	0.088	0.115	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.187	----	----	0.108	0.120
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	<0.20	0.22	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		0.27	----	----	<0.20	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	30300	29300	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		35700	----	----	32600	37700
Potassium	7440-09-7	E472/VA	20	mg/kg		----	11600	13000	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		15200	----	----	13600	14600
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	11.4	14.2	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		9.98	----	----	13.7	12.8
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	1.87	1.94	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		4.12	----	----	2.70	3.04
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	0.0118	0.0375	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	----	----	0.0106	0.0103
Sodium	7440-23-5	E472/VA	20	mg/kg		----	4450	4750	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		3230	----	----	4310	4440
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	69.6	87.3	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		78.0	----	----	69.3	82.8
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	----	----	<0.020	<0.020

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_HAC-R5_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-1_2024-10	MP_EDC-REF_CO-WB-2_2024-10	MP_EDC-REF_CO-WB-3_2024-10	MP_EDC-REF_CO-WB-4_2024-10
					Client sampling date / time	22-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	21-Oct-2024 00:00
						VA24C9929-006	VA24C9929-007	VA24C9929-008	VA24C9929-009	VA24C9929-010
						Result	Result	Result	Result	Result
Metals										
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0155	0.0259	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0175	----	----	0.0180	0.0195
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	----	----	<0.10	<0.10
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	<0.50	6.43	----	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		7.53	----	----	0.92	3.31
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0020	0.0204	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		0.0088	----	----	0.0057	0.0070
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.10	0.44	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		0.56	----	----	<0.10	0.27
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	280	223	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		176	----	----	316	245
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	----	----	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_CO-WB-5_2024-10	MP_EDC-REF_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-7_2024-10	MP_EDC-REF_CO-WB-8_2024-10	----
					Client sampling date / time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----
						VA24C9929-011	VA24C9929-012	VA24C9929-013	VA24C9929-014	----
						Result	Result	Result	Result	----
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	76.6	78.1	----	----
Moisture	----	E144-H/VA	2.0	%		74.7	----	----	75.2	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	7.2	22.2	----	----
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		11.7	----	----	25.9	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	----	----	<0.010	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	0.304	0.229	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.185	----	----	0.170	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	5.94	4.10	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		2.45	----	----	2.61	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	----	----	<0.010	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	<0.010	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	----	----	<0.010	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	<1.0	<1.0	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	----	----	<1.0	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	0.105	0.0831	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.107	----	----	0.124	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	66000	35600	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		47200	----	----	25000	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_CO-WB-5_2024-10	MP_EDC-REF_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-7_2024-10	MP_EDC-REF_CO-WB-8_2024-10	----
					Client sampling date / time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----
						VA24C9929-011	VA24C9929-012	VA24C9929-013	VA24C9929-014	----
						Result	Result	Result	Result	----
Metals										
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	0.0423	0.0583	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0436	----	----	0.0400	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	0.112	0.211	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		<0.20	----	----	<0.20	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	0.130	0.057	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.062	----	----	0.131	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	3.14	2.89	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		2.36	----	----	2.41	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	132	109	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		93.8	----	----	137	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	0.089	0.045	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		0.063	----	----	0.077	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	<0.50	<0.50	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	----	----	<0.50	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	2250	1660	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		1890	----	----	1220	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	20.8	12.9	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		9.52	----	----	13.2	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	0.0242	0.0308	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	0.103	0.140	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0144	----	----	0.0247	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_EDC-REF_CO-WB-5_2024-10	MP_EDC-REF_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-7_2024-10	MP_EDC-REF_CO-WB-8_2024-10	----
					Client sampling date / time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----
Analyte	CAS Number	Method/Lab	LOR	Unit		VA24C9929-011	VA24C9929-012	VA24C9929-013	VA24C9929-014	----
						Result	Result	Result	Result	----
Metals										
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.0569	----	----	0.0998	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	0.166	0.112	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.080	----	----	0.176	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	<0.20	<0.20	----	----
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	----	----	<0.20	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	50600	30400	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		33400	----	----	20900	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	14400	15800	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		12300	----	----	12500	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	11.4	12.6	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		10.6	----	----	9.71	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	2.80	2.88	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		1.70	----	----	1.77	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	0.0148	0.0078	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0110	----	----	0.0096	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	4710	4630	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		4410	----	----	4200	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	107	67.7	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		65.7	----	----	42.2	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	<0.020	<0.020	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	----	----	<0.020	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_EDC-REF_CO-WB-5_2024-10	MP_EDC-REF_CO-WB-6_2024-10	MP_EDC-REF_CO-WB-7_2024-10	MP_EDC-REF_CO-WB-8_2024-10	----
					Client sampling date / time	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	25-Oct-2024 00:00	----
						VA24C9929-011	VA24C9929-012	VA24C9929-013	VA24C9929-014	----
						Result	Result	Result	Result	----
Metals										
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	0.0248	0.0183	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0177	----	----	0.0178	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	<0.10	<0.10	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	----	----	<0.10	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	0.72	1.50	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.79	----	----	1.19	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	0.0034	<0.0020	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		<0.0020	----	----	0.0043	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	<0.10	0.11	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	----	----	0.15	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	371	219	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		229	----	----	140	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	<0.20	<0.20	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	----	----	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C9929**	Page	: 1 of 17
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 10	Date Samples Received	: 30-Oct-2024 12:20
PO	: 5590017616	Issue Date	: 07-Jan-2025 16:26
C-O-C number	: ----		
Sampler	: KBa		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 14		
No. of samples analysed	: 14		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Cadmium	7440-43-9	E472	106 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Iron	7439-89-6	E472	103 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Manganese	7439-96-5	E472	48.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Uranium	7440-61-1	E472	0.0050 % DUP-H, J	Diff <2x LOR	Low Level DUP DQO exceeded (difference > 2 LOR).

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E511	25-Oct-2024	30-Dec-2024	365 days	67 days	✓	06-Jan-2025	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E511	25-Oct-2024	30-Dec-2024	365 days	67 days	✓	06-Jan-2025	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E511	22-Oct-2024	30-Dec-2024	365 days	70 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E511	22-Oct-2024	30-Dec-2024	365 days	70 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E511	19-Oct-2024	30-Dec-2024	365 days	73 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E511	19-Oct-2024	30-Dec-2024	365 days	73 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E510	25-Oct-2024	03-Jan-2025	365 days	70 days	✓	06-Jan-2025	365 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E510	25-Oct-2024	03-Jan-2025	365 days	70 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E510	22-Oct-2024	03-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E510	22-Oct-2024	03-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E510	21-Oct-2024	03-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E510	20-Oct-2024	03-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E510	20-Oct-2024	03-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E510	19-Oct-2024	03-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E511A	25-Oct-2024	30-Dec-2024	365 days	67 days	✓	06-Jan-2025	365 days	74 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E511A	25-Oct-2024	30-Dec-2024	365 days	67 days	✓	06-Jan-2025	365 days	74 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E511A	22-Oct-2024	30-Dec-2024	365 days	70 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E511A	22-Oct-2024	30-Dec-2024	365 days	70 days	✓	06-Jan-2025	365 days	77 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E511A	19-Oct-2024	30-Dec-2024	365 days	73 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E511A	19-Oct-2024	30-Dec-2024	365 days	73 days	✓	06-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E510A	25-Oct-2024	03-Jan-2025	365 days	70 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E510A	25-Oct-2024	03-Jan-2025	365 days	70 days	✓	06-Jan-2025	365 days	73 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E510A	22-Oct-2024	03-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E510A	22-Oct-2024	03-Jan-2025	365 days	73 days	✓	06-Jan-2025	365 days	76 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E510A	21-Oct-2024	03-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E510A	20-Oct-2024	03-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E510A	20-Oct-2024	03-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E510A	19-Oct-2024	03-Jan-2025	365 days	76 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E472	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E472	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E472	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E472	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E472	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E472	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E440	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E440	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E440	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E440	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E440	21-Oct-2024	03-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E440	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E440	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E440	19-Oct-2024	03-Jan-2025	730 days	76 days	✓	03-Jan-2025	730 days	77 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E472.Ag	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E472.Ag	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E472.Ag	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E472.Ag	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E472.Ag	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E472.Ag	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E440.Ag	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E440.Ag	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E440.Ag	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E440.Ag	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E440.Ag	21-Oct-2024	03-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E440.Ag	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E440.Ag	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E440.Ag	19-Oct-2024	03-Jan-2025	730 days	76 days	✓	03-Jan-2025	730 days	77 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E472.Ti	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E472.Ti	25-Oct-2024	30-Dec-2024	730 days	67 days	✓	31-Dec-2024	730 days	67 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E472.Ti	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E472.Ti	22-Oct-2024	30-Dec-2024	730 days	70 days	✓	31-Dec-2024	730 days	70 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E472.Ti	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method **Container / Client Sample ID(s)**	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E472.Ti	19-Oct-2024	30-Dec-2024	730 days	73 days	✓	31-Dec-2024	730 days	73 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E440.Ti	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E440.Ti	25-Oct-2024	03-Jan-2025	730 days	70 days	✓	03-Jan-2025	730 days	71 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E440.Ti	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E440.Ti	22-Oct-2024	03-Jan-2025	730 days	73 days	✓	03-Jan-2025	730 days	74 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E440.Ti	21-Oct-2024	03-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E440.Ti	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E440.Ti	20-Oct-2024	03-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E440.Ti	19-Oct-2024	03-Jan-2025	730 days	76 days	✓	03-Jan-2025	730 days	77 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_EDC-REF_CO-WB-5_2024-10	E144-H	25-Oct-2024	----	----	----		30-Dec-2024	----	67 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_EDC-REF_CO-WB-8_2024-10	E144-H	25-Oct-2024	----	----	----		30-Dec-2024	----	67 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_HAC-R5_CO-WB-3_2024-10	E144-H	22-Oct-2024	----	----	----		30-Dec-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_HAC-R5_CO-WB-4_2024-10	E144-H	22-Oct-2024	----	----	----		30-Dec-2024	----	70 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_EDC-REF_CO-WB-1_2024-10	E144-H	19-Oct-2024	----	----	----		30-Dec-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_EDC-REF_CO-WB-2_2024-10	E144-H	19-Oct-2024	----	----	----		30-Dec-2024	----	73 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_EDC-REF_CO-WB-6_2024-10	E144	25-Oct-2024	----	----	----		05-Dec-2024	----	42 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_EDC-REF_CO-WB-7_2024-10	E144	25-Oct-2024	----	----	----		05-Dec-2024	----	42 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_HAC-R5_CO-WB-5_2024-10	E144	22-Oct-2024	----	----	----		05-Dec-2024	----	45 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times*		*Eval*	*Analysis Date*	*Holding Times*		*Eval*
				Rec	*Actual*			*Rec*	*Actual*	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_HAC-R5_CO-WB-6_2024-10	E144	22-Oct-2024	----	----	----		05-Dec-2024	----	45 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_EDC-REF_CO-WB-4_2024-10	E144	21-Oct-2024	----	----	----		05-Dec-2024	----	46 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_HAC-R5_CO-WB-1_2024-10	E144	20-Oct-2024	----	----	----		05-Dec-2024	----	47 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_HAC-R5_CO-WB-2_2024-10	E144	20-Oct-2024	----	----	----		05-Dec-2024	----	47 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_EDC-REF_CO-WB-3_2024-10	E144	19-Oct-2024	----	----	----		05-Dec-2024	----	48 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1828392	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1828391	1	8	12.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	1	8	12.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1828390	1	8	12.5	5.0	✓
Moisture Content by Gravimetry	E144	1797417	1	14	7.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	1	8	12.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	1	8	12.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1828394	1	8	12.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	1	8	12.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1828393	1	8	12.5	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	2	8	25.0	10.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1828392	2	8	25.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	2	8	25.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1828391	2	8	25.0	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	2	8	25.0	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1828390	2	8	25.0	10.0	✓
Moisture Content by Gravimetry	E144	1797417	1	14	7.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	1	8	12.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	2	8	25.0	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1828394	2	8	25.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	2	8	25.0	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1828393	2	8	25.0	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1825746	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1828392	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1825747	1	8	12.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1828391	1	8	12.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1825748	1	8	12.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1828390	1	8	12.5	5.0	✓
Moisture Content by Gravimetry	E144	1797417	1	14	7.1	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1825727	1	8	12.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1825744	1	8	12.5	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1828394	1	8	12.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1825745	1	8	12.5	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1828393	1	8	12.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at <60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Routine)	E510 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Routine)	E510A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Routine)	EP440 ALS Environmental - Vancouver	Biota	EPA 200.3	This method uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.

QUALITY CONTROL REPORT

Work Order	: **VA24C9929**	Page	: 1 of 13
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 24-04 Task 10	Date Samples Received	: 30-Oct-2024 12:20
PO	: 5590017616	Date Analysis Commenced	: 05-Dec-2024
C-O-C number	: ----	Issue Date	: 07-Jan-2025 16:26
Sampler	: KBa		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 14		
No. of samples analysed	: 14		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cesar Mora	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1797417)											
VA24D1472-005	Anonymous	Moisture	----	E144	0.50	%	64.8	64.6	0.182%	20%	----
Physical Tests (QC Lot: 1825727)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Moisture	----	E144-H	2.0	%	77.9	75.7	2.87%	20%	----
Metals (QC Lot: 1825744)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Silver	7440-22-4	E472.Ag	0.0050	mg/kg	0.0050	<0.0050	0.00003	Diff <2x LOR	----
Metals (QC Lot: 1825745)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Titanium	7440-32-6	E472.Ti	0.50	mg/kg	0.87	0.73	0.14	Diff <2x LOR	----
Metals (QC Lot: 1825746)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Mercury	7439-97-6	E511	0.0050	mg/kg	0.118	0.160	30.4%	40%	----
Metals (QC Lot: 1825747)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Mercury	7439-97-6	E511A	0.0011	mg/kg wwt	0.0261	0.0354	30.4%	40%	----
Metals (QC Lot: 1825748)											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Aluminum	7429-90-5	E472	5.0	mg/kg	11.2	9.3	1.9	Diff <2x LOR	----
		Antimony	7440-36-0	E472	0.010	mg/kg	0.019	0.020	0.0007	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.167	0.132	0.035	Diff <2x LOR	----
		Barium	7440-39-3	E472	0.050	mg/kg	5.14	4.16	21.2%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.216	0.066	106%	40%	DUP-H
		Calcium	7440-70-2	E472	20	mg/kg	61300	57300	6.61%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0459	0.0474	3.15%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Cobalt	7440-48-4	E472	0.020	mg/kg	0.168	0.130	26.0%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	4.39	3.21	30.9%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	210	67.4	103%	40%	DUP-H
		Lead	7439-92-1	E472	0.050	mg/kg	0.120	0.066	0.054	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1825748) - continued											
VA24C9929-003	MP_HAC-R5_CO-WB-3_2024-10	Magnesium	7439-95-4	E472	2.0	mg/kg	2080	1880	10.1%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	56.7	34.6	48.4%	40%	DUP-H
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.098	0.058	0.041	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	44100	41500	6.03%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	15200	15400	0.974%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	8.24	8.35	1.32%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	4.22	4.10	2.91%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	4510	3810	17.0%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	95.1	83.5	13.0%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0284	0.0262	7.79%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0100	# 0.0050	0.0050	Diff <2x LOR	DUP-H,J
		Vanadium	7440-62-2	E472	0.10	mg/kg	0.24	0.15	0.09	Diff <2x LOR	----
		Zinc	7440-66-6	E472	1.0	mg/kg	289	195	38.8%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1828390)											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	7.5	8.3	0.8	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.408	0.405	0.581%	40%	----
		Barium	7440-39-3	E440	0.050	mg/kg	3.10	2.67	14.9%	40%	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	0.0681	0.0631	7.60%	40%	----
		Calcium	7440-70-2	E440	20	mg/kg	39400	33800	15.4%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0830	0.0804	3.19%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.164	0.144	0.019	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.231	0.220	5.02%	40%	----
		Copper	7440-50-8	E440	0.10	mg/kg	6.98	6.82	2.30%	40%	----
		Iron	7439-89-6	E440	3.0	mg/kg	66.2	65.8	0.611%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	0.054	0.039	0.015	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1828390) - continued											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	1970	1690	15.1%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	29.5	25.5	14.7%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	0.110	0.100	10.2%	40%	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	35000	29700	16.3%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	16900	16800	0.617%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	13.0	12.6	3.71%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	7.75	8.09	4.34%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	4420	4410	0.166%	40%	----
		Strontium	7440-24-6	E440	0.050	mg/kg	68.8	59.7	14.0%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0267	0.0241	10.0%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	0.0030	0.0026	0.0005	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	200	190	5.04%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1828391)											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Mercury	7439-97-6	E510A	0.0020	mg/kg wwt	0.0165	0.0169	2.21%	40%	----
Metals (QC Lot: 1828392)											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Mercury	7439-97-6	E510	0.0099	mg/kg	0.0806	0.0824	2.21%	40%	----
Metals (QC Lot: 1828393)											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	0.70	0.77	0.07	Diff <2x LOR	----
Metals (QC Lot: 1828394)											
VA24C9929-002	MP_HAC-R5_CO-WB-2_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*
J	*Duplicate results and limits are expressed in terms of absolute difference.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1797417)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1825727)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1825744)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1825745)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1825746)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1825747)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1825748)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1825748) - continued						
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1828390)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1828390) - continued						
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1828391)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1828392)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1828393)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1828394)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1797417)									
Moisture	----	E144	0.5	%	50 %	100	90.0	110	----
Physical Tests (QCLot: 1825727)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1825744)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.3	80.0	120	----
Metals (QCLot: 1825745)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	104	80.0	120	----
Metals (QCLot: 1825746)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	100	80.0	120	----
Metals (QCLot: 1825747)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	100	80.0	120	----
Metals (QCLot: 1825748)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	97.8	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	96.3	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	92.6	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	94.4	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	99.9	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	95.0	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	98.3	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	99.7	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	97.7	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	95.6	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	91.1	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	99.1	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	95.8	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	102	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	98.9	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	107	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1825748) - continued									
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	95.8	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	103	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	97.9	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	103	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	96.0	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	95.9	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	101	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	96.2	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	104	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	94.7	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	94.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	110	80.0	120	----
Metals (QCLot: 1828390)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	104	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	105	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	103	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	95.0	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	93.7	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	93.6	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	101	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	104	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	98.4	80.0	120	----
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	98.9	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	101	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	98.3	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	93.0	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	99.9	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	101	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	106	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	98.0	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	103	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1828390) - continued									
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	104	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	99.8	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	100	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	108	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	106	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	93.9	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	96.2	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	98.3	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	99.2	80.0	120	----
Metals (QCLot: 1828391)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	91.6	80.0	120	----
Metals (QCLot: 1828392)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	91.6	80.0	120	----
Metals (QCLot: 1828393)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	98.7	80.0	120	----
Metals (QCLot: 1828394)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	94.6	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1825744)									
QC-1825744-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	101	70.0	130	----
Metals (QCLot: 1825745)									
QC-1825745-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	98.4	70.0	130	----
Metals (QCLot: 1825746)									
QC-1825746-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	99.7	70.0	130	----
Metals (QCLot: 1825747)									
QC-1825747-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	99.7	70.0	130	----
Metals (QCLot: 1825748)									
QC-1825748-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	92.7	70.0	130	----
QC-1825748-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	93.3	70.0	130	----
QC-1825748-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	83.1	70.0	130	----
QC-1825748-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	96.9	70.0	130	----
QC-1825748-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	93.2	70.0	130	----
QC-1825748-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	101	50.0	150	----
QC-1825748-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	107	65.0	135	----
QC-1825748-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	98.0	70.0	130	----
QC-1825748-003	RM	Iron	7439-89-6	E472	102 mg/kg	96.9	70.0	130	----
QC-1825748-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	97.7	15.0	185	----
QC-1825748-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	99.2	70.0	130	----
QC-1825748-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	97.8	70.0	130	----
QC-1825748-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	101	70.0	130	----
QC-1825748-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	99.2	40.0	160	----
QC-1825748-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	98.2	70.0	130	----
QC-1825748-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	97.5	70.0	130	----
QC-1825748-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	104	70.0	130	----
QC-1825748-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	98.1	70.0	130	----
QC-1825748-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	104	70.0	130	----
QC-1825748-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	98.8	70.0	130	----
QC-1825748-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	96.6	70.0	130	----
QC-1825748-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	100	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1828390)									
QC-1828390-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	96.9	70.0	130	----
QC-1828390-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	97.4	70.0	130	----
QC-1828390-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	97.8	70.0	130	----
QC-1828390-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	102	70.0	130	----
QC-1828390-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	104	70.0	130	----
QC-1828390-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	101	70.0	130	----
QC-1828390-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	99.2	70.0	130	----
QC-1828390-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	97.0	70.0	130	----
QC-1828390-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	98.4	65.0	135	----
QC-1828390-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	98.6	70.0	130	----
QC-1828390-003	RM	Iron	7439-89-6	E440	102 mg/kg	94.0	70.0	130	----
QC-1828390-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	99.3	70.0	130	----
QC-1828390-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	98.6	70.0	130	----
QC-1828390-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	97.9	70.0	130	----
QC-1828390-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	106	70.0	130	----
QC-1828390-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	96.5	40.0	160	----
QC-1828390-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	98.0	70.0	130	----
QC-1828390-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	102	70.0	130	----
QC-1828390-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	104	70.0	130	----
QC-1828390-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	99.4	70.0	130	----
QC-1828390-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	99.7	70.0	130	----
QC-1828390-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	102	70.0	130	----
QC-1828390-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	91.4	70.0	130	----
QC-1828390-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	101	70.0	130	----
Metals (QCLot: 1828391)									
QC-1828391-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	90.4	70.0	130	----
Metals (QCLot: 1828392)									
QC-1828392-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	90.4	70.0	130	----
Metals (QCLot: 1828393)									
QC-1828393-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	103	70.0	130	----
Metals (QCLot: 1828394)									
QC-1828394-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	103	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

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Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Vancouver

Work Order Reference VA24C9929

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	Mount Polley Mining Corp.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Gabriel Holmes	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimi
Phone:	236-317-4939	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minim
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minim
Street:	PO BOX 12	Email 1 or Fax: gabriel.holmes@mountpolley.com; alalonde@dwbconsulting.ca	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minim
City/Province:	Likely, BC	Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge
Postal Code:	V0L 1N0	Email 3: sally.ju@minnow.ca	Additional fees may apply to rush requests on weeke
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX	For all tests with rush TATs requested, please
Company:		Email 1 or Fax: On File	Analysis R
Contact:	On File	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	VA24-MPMC100-004	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:	24-04 Task 10	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	9929	ALS Contact: Can Dang	Sampler: KBa

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
					Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below									
	MP_HAC-R5_CO-WB-1_2024-10	20-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_HAC-R5_CO-WB-2_2024-10	20-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_HAC-R5_CO-WB-3_2024-10	22-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_HAC-R5_CO-WB-4_2024-10	22-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_HAC-R5_CO-WB-5_2024-10	22-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_HAC-R5_CO-WB-6_2024-10	22-Oct-24	-	Tissue	1	R	R	R	R	R	R			
			-	Tissue	1	R	R	R	R	R	R			
			-	Tissue	1	R	R	R	R	R	R			
			-	Tissue	1	R	R	R	R	R	R			
			-	Tissue	1	R	R	R	R	R	R			
			-	Tissue	1	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g., use of microdigestion and HR-ICPMS). Report in dry weight except mercury (both wet and dry)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				4	4	3	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: D. Freitas ~~Katherine Batchelar~~	Date: ~~15 Aug 24~~ 27-OCT-24	Time: ~~17:00~~ 17:30	Received by:	Date:	Time:	Received by: MK	Date: OCT 30	Time: 12:26 pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 -

Page 2 of 2

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corp.
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO BOX 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	On File

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: gabriel.holmes@mountpolley.com; atalonde@cwbconsulting.ca

Email 2: slatimer@minnow.ca;kbatchelar@minnow.ca;

Email 3: sally.ju@minnow.ca

Invoice Recipients

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☑ FAX

Email 1 or Fax: On File

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	24-04 Task 10
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only):

ALS Contact: Can Dang **Sampler:** Kba

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Moisture Content by Gravimetry E144	Mercury in Biota by CVAAS (DRY units, Routine) E510	Mercury in Biota by CVAAS (WET units, Routine) E510A	Metals in Biota by CRC ICPMS (DRY units, Routine) E440	Silver in Biota by CRC ICPMS (DRY units, Routine) E440.Ag	Titanium in Biota by CRC ICPMS (DRY units, Routine) E440.Ti	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MP_EDC-REF_CO-WB-1_2024-10	19-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-2_2024-10	19-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-3_2024-10	19-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-4_2024-10	21-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-5_2024-10	25-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-6_2024-10	25-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-7_2024-10	25-Oct-24	-	Tissue	1	R	R	R	R	R	R			
	MP_EDC-REF_CO-WB-8_2024-10	25-Oct-24	-	Tissue	1	R	R	R	R	R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

If sample is insufficient for regular digestion and analysis, contact kbatchelar@minnow.ca to discuss analysis options (e.g , use of microdigestion and HR-ICPMS). Report in dry weight except mercury (both wet and dry)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
~~Katherine Batchelar~~ D. Freitas	15-Aug-24	17:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

FISH TISSUE QUALITY

ALS Laboratory Report VA24C9932

(Finalized January 14, 2025)

CERTIFICATE OF ANALYSIS

Work Order	:	**VA24C9932**		
Client	:	**Mount Polley Mining Corporation**	Laboratory	: ALS Environmental - Vancouver
Contact	:	Accounts Payable	Account Manager	: Can Dang
Address	:	306-885 Don Mills Road Toronto Ontario Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	:	1-289-775-1547	Telephone	: +1 604 253 4188
Project	:	----	Date Samples Received	: 30-Oct-2024 12:20
PO	:	5590017616	Date Analysis Commenced	: 18-Dec-2024
C-O-C number	:	----	Issue Date	: 14-Jan-2025 09:07
Sampler	:	KBa		
Site	:	----		
Quote number	:	VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	:	36		
No. of samples analysed	:	36		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cesar Mora	Lab Assistant	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Shahrazad Firoozbakht	Lab Assistant	Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Metals, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key: CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.
LOR: Limit of Reporting (detection limit).

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight

<: less than.
>: greater than.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	Description
DLIS	Detection Limit Adjusted due to insufficient sample.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-1_2024-10	MP_QUR_RB-MU-2_2024-10	MP_QUR_RB-MU-3_2024-10	MP_QUR_RB-MU-4_2024-10	MP_QUR_RB-MU-5_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-001	VA24C9932-002	VA24C9932-003	VA24C9932-004	VA24C9932-005
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		77.1	78.6	78.9	80.1	77.4
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		2.7	12.3	3.1	<2.0	3.6
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.070	0.281	0.130	0.396	0.135
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.082	0.940	0.095	0.186	0.095
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium	7440-70-2	E440/VA	20	mg/kg		581	14200	304	1130	1920
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0472	0.0832	0.0774	0.0854	0.0508
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.123	0.068	0.098	0.170	<0.050
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.041	0.072	0.065	0.021	0.027
Copper	7440-50-8	E440/VA	0.10	mg/kg		2.32	0.95	1.85	1.29	0.87
Iron	7439-89-6	E440/VA	3.0	mg/kg		36.0	46.2	42.4	26.2	14.0
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	<0.020	0.025	<0.020	<0.020
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	<0.50	<0.50	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		953	2060	1380	1470	1430
Manganese	7439-96-5	E440/VA	0.050	mg/kg		0.423	4.41	0.718	0.457	0.862
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0487	0.0385	0.0616	0.102	0.0284

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Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-1_2024-10	MP_QUR_RB-MU-2_2024-10	MP_QUR_RB-MU-3_2024-10	MP_QUR_RB-MU-4_2024-10	MP_QUR_RB-MU-5_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-001	VA24C9932-002	VA24C9932-003	VA24C9932-004	VA24C9932-005
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.213	0.180	0.292	0.515	0.126
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	0.27	0.20	<0.20
Phosphorus	7723-14-0	E440/VA	10	mg/kg		10800	21500	12300	13400	12900
Potassium	7440-09-7	E440/VA	20	mg/kg		18300	23400	20200	23300	21000
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		12.1	19.5	19.4	17.2	15.6
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.40	2.58	2.39	2.23	2.28
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Sodium	7440-23-5	E440/VA	20	mg/kg		1360	1730	1760	1540	995
Strontium	7440-24-6	E440/VA	0.050	mg/kg		0.721	24.2	0.399	1.40	2.65
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	<0.020	<0.020
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0168	0.0171	0.0317	0.0188	0.0190
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	0.64	0.36	<0.25	<0.25
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	0.0024	<0.0020	<0.0020	<0.0020
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	<0.10	<0.10
Zinc	7440-66-6	E440/VA	0.50	mg/kg		19.4	28.1	19.8	14.8	15.2
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	----	----	69.6
Moisture	----	E144-H/VA	2.0	%		----	----	----	73.4	----
Moisture	----	E144/VA	0.50	%		77.1	80.2	65.6	----	----
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	----	----	11.7	----
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	----	----	<5.0
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		<2.0	<2.0	10.2	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	----	----	0.303
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	----	----	0.160	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.142	0.163	0.116	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	----	----	0.290
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	----	----	0.099	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		<0.050	<0.050	0.052	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	----	----	<0.010
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	<0.010	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	----	----	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	----	----	<0.010

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
					VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010	
					Result	Result	Result	Result	Result	
Metals										
Bismuth	7440-69-9	E440/VA	0.010	mg/kg	<0.010	<0.010	<0.010	----	----	
Boron	7440-42-8	E472/VA	1.0	mg/kg	----	----	----	<1.0	----	
Boron	7440-42-8	E475/VA	1.0	mg/kg	----	----	----	----	<1.0	
Boron	7440-42-8	E440/VA	1.0	mg/kg	<1.0	<1.0	<1.0	----	----	
Cadmium	7440-43-9	E472/VA	0.010	mg/kg	----	----	----	0.492	----	
Cadmium	7440-43-9	E475/VA	0.010	mg/kg	----	----	----	----	0.435	
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg	<0.0050	<0.0050	<0.0050	----	----	
Calcium	7440-70-2	E472/VA	20	mg/kg	----	----	----	169	----	
Calcium	7440-70-2	E475/VA	20	mg/kg	----	----	----	----	204	
Calcium	7440-70-2	E440/VA	20	mg/kg	1300	348	392	----	----	
Cesium	7440-46-2	E472/VA	0.0050	mg/kg	----	----	----	0.0236	----	
Cesium	7440-46-2	E475/VA	0.0050	mg/kg	----	----	----	----	0.0268	
Cesium	7440-46-2	E440/VA	0.0050	mg/kg	0.0652	0.0580	0.0772	----	----	
Chromium	7440-47-3	E472/VA	0.20	mg/kg	----	----	----	<0.20	----	
Chromium	7440-47-3	E475/VA	0.20	mg/kg	----	----	----	----	<0.20	
Chromium	7440-47-3	E440/VA	0.050	mg/kg	0.240	0.904	0.110	----	----	
Cobalt	7440-48-4	E472/VA	0.020	mg/kg	----	----	----	0.140	----	
Cobalt	7440-48-4	E475/VA	0.020	mg/kg	----	----	----	----	0.209	
Cobalt	7440-48-4	E440/VA	0.020	mg/kg	0.033	0.024	<0.020	----	----	
Copper	7440-50-8	E472/VA	0.20	mg/kg	----	----	----	519	----	
Copper	7440-50-8	E475/VA	0.20	mg/kg	----	----	----	----	122	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
					VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010	
					Result	Result	Result	Result	Result	
Metals										
Copper	7440-50-8	E440/VA	0.10	mg/kg	0.77	0.87	0.70	----	----	
Iron	7439-89-6	E475/VA	5.0	mg/kg	----	----	----	----	661	
Iron	7439-89-6	E472/VA	5.0	mg/kg	----	----	----	1290	----	
Iron	7439-89-6	E440/VA	3.0	mg/kg	12.2	23.3	27.3	----	----	
Lead	7439-92-1	E475/VA	0.050	mg/kg	----	----	----	----	<0.050	
Lead	7439-92-1	E472/VA	0.050	mg/kg	----	----	----	<0.050	----	
Lead	7439-92-1	E440/VA	0.020	mg/kg	<0.020	<0.020	<0.020	----	----	
Lithium	7439-93-2	E475/VA	0.50	mg/kg	----	----	----	----	<0.50	
Lithium	7439-93-2	E472/VA	0.50	mg/kg	----	----	----	<0.50	----	
Lithium	7439-93-2	E440/VA	0.50	mg/kg	<0.50	<0.50	<0.50	----	----	
Magnesium	7439-95-4	E475/VA	2.0	mg/kg	----	----	----	----	558	
Magnesium	7439-95-4	E472/VA	2.0	mg/kg	----	----	----	577	----	
Magnesium	7439-95-4	E440/VA	2.0	mg/kg	1480	1360	1020	----	----	
Manganese	7439-96-5	E475/VA	0.050	mg/kg	----	----	----	----	7.45	
Manganese	7439-96-5	E472/VA	0.050	mg/kg	----	----	----	4.40	----	
Manganese	7439-96-5	E440/VA	0.050	mg/kg	0.491	0.262	0.503	----	----	
Mercury	7439-97-6	E512/VA	0.010	mg/kg	----	----	----	----	0.134	
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt	----	----	----	----	0.0407	
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt	----	----	----	0.0286	----	
Mercury	7439-97-6	E510/VA	0.0050	mg/kg	0.153	0.315	0.275	----	----	
Mercury	7439-97-6	E511/VA	0.0050	mg/kg	----	----	----	0.108	----	

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010
						Result	Result	Result	Result	Result
Metals										
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0350	0.0624	0.0945	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	----	----	1.23	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	----	----	0.893
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	----	----	11900
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	----	----	13300	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		12900	12900	8160	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	----	----	9310
Potassium	7440-09-7	E472/VA	20	mg/kg		----	----	----	11100	----
Potassium	7440-09-7	E440/VA	20	mg/kg		21800	23300	14300	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	----	----	10.9	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	----	----	8.76
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		17.1	15.0	19.8	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	----	----	55.0
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	----	----	136	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		2.00	2.17	1.50	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	----	----	3.86	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	----	----	3.60

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010
						Result	Result	Result	Result	Result
Metals										
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		<0.0050	<0.0050	<0.0050	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	----	----	3850
Sodium	7440-23-5	E472/VA	20	mg/kg		----	----	----	3410	----
Sodium	7440-23-5	E440/VA	20	mg/kg		986	1280	854	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	----	----	0.32	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	----	----	0.92
Strontium	7440-24-6	E440/VA	0.050	mg/kg		1.50	0.442	0.379	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	----	----	<0.020	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	----	----	<0.020
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		<0.020	<0.020	<0.020	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	----	----	0.0554	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	----	----	0.0664
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		0.0158	0.0212	0.0116	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Tin	7440-31-5	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	----	----	<0.50
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	----	----	<0.50	----
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		<0.25	<0.25	<0.25	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	----	----	0.0096	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	----	----	0.0024

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-MU-6_2024-10	MP_QUR_RB-MU-7_2024-10	MP_QUR_RB-MU-8_2024-10	MP_QUR_RB-LI-1_2024-10	MP_QUR_RB-LI-2_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-006	VA24C9932-007	VA24C9932-008	VA24C9932-009	VA24C9932-010
						Result	Result	Result	Result	Result
Metals										
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		<0.0020	<0.0020	<0.0020	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	----	----	<0.10
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	----	----	<0.10	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	----	----	91.0
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	----	----	111	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		13.8	12.6	9.65	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	----	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	----	----	<0.20	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		<0.20	<0.20	<0.20	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-4_2024-10	MP_QUR_RB-LI-5_2024-10	MP_QUR_RB-LI-6_2024-10	MP_QUR_RB-LI-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-011	VA24C9932-012	VA24C9932-013	VA24C9932-014	VA24C9932-015
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144-H/VA	2.0	%		----	71.7	68.2	67.8	----
Moisture	----	E144A/VA	2.0	%		74.9	----	----	----	72.5
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		----	12.8	<5.0	5.9	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-4_2024-10	MP_QUR_RB-LI-5_2024-10	MP_QUR_RB-LI-6_2024-10	MP_QUR_RB-LI-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-011	VA24C9932-012	VA24C9932-013	VA24C9932-014	VA24C9932-015
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		9.4	----	----	----	15.2
Antimony	7440-36-0	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	----	----	----	<0.020
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		----	0.352	0.339	0.395	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.186	----	----	----	0.088
Barium	7440-39-3	E472/VA	0.050	mg/kg		----	0.087	<0.050	<0.050	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.118	----	----	----	0.059
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	----	----	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		----	<0.010	<0.010	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	----	----	----	<0.010
Boron	7440-42-8	E472/VA	1.0	mg/kg		----	<1.0	<1.0	<1.0	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	----	----	----	<1.0
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		----	0.701	0.457	0.561	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.805	----	----	----	1.03
Calcium	7440-70-2	E472/VA	20	mg/kg		----	157	154	157	----
Calcium	7440-70-2	E475/VA	20	mg/kg		223	----	----	----	229
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		----	0.0197	0.0354	0.0365	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0400	----	----	----	0.0283
Chromium	7440-47-3	E472/VA	0.20	mg/kg		----	0.22	<0.20	<0.20	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		<0.20	----	----	----	<0.20

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-4_2024-10	MP_QUR_RB-LI-5_2024-10	MP_QUR_RB-LI-6_2024-10	MP_QUR_RB-LI-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-011	VA24C9932-012	VA24C9932-013	VA24C9932-014	VA24C9932-015
						Result	Result	Result	Result	Result
Metals										
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		----	0.117	0.155	0.170	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.195	----	----	----	0.102
Copper	7440-50-8	E472/VA	0.20	mg/kg		----	30.4	518	124	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		167	----	----	----	41.5
Iron	7439-89-6	E472/VA	5.0	mg/kg		----	2410	783	976	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		1930	----	----	----	1260
Lead	7439-92-1	E472/VA	0.050	mg/kg		----	<0.050	<0.050	<0.050	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	----	----	----	<0.050
Lithium	7439-93-2	E472/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	----	----	----	<0.50
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		----	600	599	698	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		722	----	----	----	813
Manganese	7439-96-5	E472/VA	0.050	mg/kg		----	5.06	5.35	5.04	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		5.12	----	----	----	10.7
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		----	0.0800	0.0233	0.0346	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0387	----	----	----	0.0637
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		----	0.283	0.0731	0.108	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.154	----	----	----	0.231
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		----	1.17	0.923	0.975	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.877	----	----	----	0.982
Nickel	7440-02-0	E472/VA	0.20	mg/kg		----	0.22	<0.20	<0.20	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-4_2024-10	MP_QUR_RB-LI-5_2024-10	MP_QUR_RB-LI-6_2024-10	MP_QUR_RB-LI-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-011	VA24C9932-012	VA24C9932-013	VA24C9932-014	VA24C9932-015
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E475/VA	0.20	mg/kg		<0.20	----	----	----	<0.20
Phosphorus	7723-14-0	E472/VA	10	mg/kg		----	11700	14000	14700	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		16200	----	----	----	15800
Potassium	7440-09-7	E472/VA	20	mg/kg		----	10200	9900	11000	----
Potassium	7440-09-7	E475/VA	20	mg/kg		14000	----	----	----	13900
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		----	8.48	8.70	12.8	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		16.1	----	----	----	18.3
Selenium	7782-49-2	E472/VA	0.10	mg/kg		----	19.8	137	54.3	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		40.1	----	----	----	12.6
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		----	1.60	4.29	3.45	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		1.97	----	----	----	0.836
Sodium	7440-23-5	E472/VA	20	mg/kg		----	3810	2610	2590	----
Sodium	7440-23-5	E475/VA	20	mg/kg		4390	----	----	----	2740
Strontium	7440-24-6	E472/VA	0.10	mg/kg		----	0.33	0.29	0.28	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.44	----	----	----	0.31
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		----	<0.020	<0.020	<0.020	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	----	----	----	<0.020
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		----	0.0967	0.128	0.183	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.129	----	----	----	0.150
Tin	7440-31-5	E472/VA	0.10	mg/kg		----	<0.10	<0.10	<0.10	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	----	----	----	<0.10

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3_2024-10	MP_QUR_RB-LI-4_2024-10	MP_QUR_RB-LI-5_2024-10	MP_QUR_RB-LI-6_2024-10	MP_QUR_RB-LI-7_2024-10
					Client sampling date / time	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-011	VA24C9932-012	VA24C9932-013	VA24C9932-014	VA24C9932-015
						Result	Result	Result	Result	Result
Metals										
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		----	<0.50	<0.50	<0.50	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	----	----	----	<0.50
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		----	0.0323	0.0023	0.0054	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0062	----	----	----	0.0305
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		----	0.29	<0.10	<0.10	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		<0.10	----	----	----	1.72
Zinc	7440-66-6	E472/VA	1.0	mg/kg		----	121	101	107	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		120	----	----	----	135
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		----	<0.20	<0.20	<0.20	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	----	----	----	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-8_2024-10	MP_QUR_RB-KI-1_2024-10	MP_QUR_RB-KI-2_2024-10	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-016	VA24C9932-017	VA24C9932-018	VA24C9932-019	VA24C9932-020
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	74.6	----	----
Moisture	----	E144-H/VA	2.0	%		73.4	75.6	----	77.1	79.4
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	15.2	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-8_2024-10	MP_QUR_RB-KI-1_2024-10	MP_QUR_RB-KI-2_2024-10	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-016	VA24C9932-017	VA24C9932-018	VA24C9932-019	VA24C9932-020
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		10.9	8.7	----	9.8	13.0
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	<0.020	----	----
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	0.021
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	0.837	----	----
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		1.11	0.547	----	0.888	2.04
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	0.764	----	----
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.064	0.792	----	0.368	3.39
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	<0.010	----	----
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	<1.0	<1.0
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	1.24	----	----
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.648	0.894	----	0.891	1.63
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	1360	----	----
Calcium	7440-70-2	E472/VA	20	mg/kg		189	965	----	912	1640
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.0328	----	----
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0420	0.0261	----	0.0379	0.0516
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	0.27	----	----
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.24	0.21	----	0.42	1.36

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-8_2024-10	MP_QUR_RB-KI-1_2024-10	MP_QUR_RB-KI-2_2024-10	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-016	VA24C9932-017	VA24C9932-018	VA24C9932-019	VA24C9932-020
						Result	Result	Result	Result	Result
Metals										
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	1.09	----	----
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		0.072	0.821	----	0.976	1.62
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	7.76	----	----
Copper	7440-50-8	E472/VA	0.20	mg/kg		259	6.47	----	3.91	8.08
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	897	----	----
Iron	7439-89-6	E472/VA	5.0	mg/kg		1490	837	----	1110	2140
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	<0.050	----	----
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	<0.050	0.085
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	<0.50
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	695	----	----
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		753	540	----	625	1440
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	8.73	----	----
Manganese	7439-96-5	E472/VA	0.050	mg/kg		6.56	2.93	----	2.33	3.39
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.0795	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.313	----	----
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0561	0.0673	----	0.107	0.150
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.211	0.276	----	0.466	0.728
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.581	----	----
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		1.35	0.537	----	0.318	0.842
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	0.77	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-8_2024-10	MP_QUR_RB-KI-1_2024-10	MP_QUR_RB-KI-2_2024-10	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-016	VA24C9932-017	VA24C9932-018	VA24C9932-019	VA24C9932-020
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E472/VA	0.20	mg/kg		<0.20	0.67	----	0.59	1.63
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	9050	----	----
Phosphorus	7723-14-0	E472/VA	10	mg/kg		15200	8520	----	10100	16700
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	9110	----	----
Potassium	7440-09-7	E472/VA	20	mg/kg		14000	9370	----	10900	17400
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	8.79	----	----
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		26.3	8.30	----	11.9	15.7
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	18.6	----	----
Selenium	7782-49-2	E472/VA	0.10	mg/kg		42.2	12.6	----	14.8	23.5
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	0.0128	----	----
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		2.55	0.0097	----	0.0076	0.0184
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	8400	----	----
Sodium	7440-23-5	E472/VA	20	mg/kg		3320	6490	----	7250	14300
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	4.33	----	----
Strontium	7440-24-6	E472/VA	0.10	mg/kg		0.25	2.08	----	2.21	6.48
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	0.021	----	----
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	0.028	0.050
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0771	----	----
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0992	0.0661	----	0.0767	0.0839
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	0.12	----	<0.10	<0.10

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-8_2024-10	MP_QUR_RB-KI-1_2024-10	MP_QUR_RB-KI-2_2024-10	MP_QUR_RB-KI-3_2024-10	MP_QUR_RB-KI-4_2024-10
					Client sampling date / time	20-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-016	VA24C9932-017	VA24C9932-018	VA24C9932-019	VA24C9932-020
						Result	Result	Result	Result	Result
Metals										
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	0.83	----	----
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		<0.50	0.53	----	0.53	0.67
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.0109	----	----
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0130	0.0172	----	0.0204	0.0727
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	0.12	----	----
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		0.20	0.12	----	0.15	0.94
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	140	----	----
Zinc	7440-66-6	E472/VA	1.0	mg/kg		160	124	----	110	162
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	<0.20	----	----
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-KI-5_2024-10	MP_QUR_RB-KI-6_2024-10	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-8_2024-10	MP_QUR_RB-OV-1_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-021	VA24C9932-022	VA24C9932-023	VA24C9932-024	VA24C9932-025
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144A/VA	2.0	%		----	----	80.8	----	77.9
Moisture	----	E144-H/VA	2.0	%		76.6	77.7	----	84.7	----
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		----	----	35.2	----	2050

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-KI-5_2024-10	MP_QUR_RB-KI-6_2024-10	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-8_2024-10	MP_QUR_RB-OV-1_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-021	VA24C9932-022	VA24C9932-023	VA24C9932-024	VA24C9932-025
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E472/VA	5.0	mg/kg		10.2	8.3	----	32.6	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		----	----	<0.020	----	<0.020
Antimony	7440-36-0	E472/VA	0.010	mg/kg		<0.010	<0.010	----	0.014	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		----	----	1.12	----	0.360
Arsenic	7440-38-2	E472/VA	0.030	mg/kg		0.482	0.482	----	1.42	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		----	----	0.773	----	3.76
Barium	7440-39-3	E472/VA	0.050	mg/kg		0.202	0.410	----	1.04	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		----	----	<0.010	----	0.027
Beryllium	7440-41-7	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		----	----	<0.010	----	<0.010
Bismuth	7440-69-9	E472/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		----	----	<1.0	----	<1.0
Boron	7440-42-8	E472/VA	1.0	mg/kg		<1.0	<1.0	----	<1.0	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		----	----	1.45	----	0.040
Cadmium	7440-43-9	E472/VA	0.010	mg/kg		0.478	0.691	----	1.76	----
Calcium	7440-70-2	E475/VA	20	mg/kg		----	----	978	----	668
Calcium	7440-70-2	E472/VA	20	mg/kg		1090	889	----	1910	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		----	----	0.0300	----	0.0639
Cesium	7440-46-2	E472/VA	0.0050	mg/kg		0.0343	0.0455	----	0.0580	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		----	----	0.72	----	9.96
Chromium	7440-47-3	E472/VA	0.20	mg/kg		0.24	0.39	----	0.88	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-KI-5_2024-10	MP_QUR_RB-KI-6_2024-10	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-8_2024-10	MP_QUR_RB-OV-1_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-021	VA24C9932-022	VA24C9932-023	VA24C9932-024	VA24C9932-025
						Result	Result	Result	Result	Result
Metals										
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		----	----	1.12	----	1.62
Cobalt	7440-48-4	E472/VA	0.020	mg/kg		1.24	0.999	----	1.08	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		----	----	5.08	----	16.8
Copper	7440-50-8	E472/VA	0.20	mg/kg		5.90	4.70	----	8.12	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		----	----	1830	----	4700
Iron	7439-89-6	E472/VA	5.0	mg/kg		894	840	----	1340	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		----	----	0.065	----	0.192
Lead	7439-92-1	E472/VA	0.050	mg/kg		<0.050	<0.050	----	0.075	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		----	----	<0.50	----	3.45
Lithium	7439-93-2	E472/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		----	----	802	----	2860
Magnesium	7439-95-4	E472/VA	2.0	mg/kg		501	648	----	927	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		----	----	3.03	----	64.8
Manganese	7439-96-5	E472/VA	0.050	mg/kg		2.49	4.11	----	12.6	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		----	----	0.117	----	0.0187
Mercury	7439-97-6	E512/VA	0.010	mg/kg		----	----	0.610	----	0.084
Mercury	7439-97-6	E511A/VA	0.0010	mg/kg wwt		0.0369	0.0618	----	0.0528	----
Mercury	7439-97-6	E511/VA	0.0050	mg/kg		0.158	0.278	----	0.344	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		----	----	0.450	----	0.105
Molybdenum	7439-98-7	E472/VA	0.040	mg/kg		0.278	0.334	----	0.342	----
Nickel	7440-02-0	E475/VA	0.20	mg/kg		----	----	1.88	----	4.20

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-KI-5_2024-10	MP_QUR_RB-KI-6_2024-10	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-8_2024-10	MP_QUR_RB-OV-1_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-021	VA24C9932-022	VA24C9932-023	VA24C9932-024	VA24C9932-025
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E472/VA	0.20	mg/kg		0.60	0.74	----	0.62	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		----	----	11400	----	13400
Phosphorus	7723-14-0	E472/VA	10	mg/kg		9110	11100	----	12200	----
Potassium	7440-09-7	E475/VA	20	mg/kg		----	----	12200	----	17900
Potassium	7440-09-7	E472/VA	20	mg/kg		9650	11500	----	13300	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		----	----	9.35	----	17.3
Rubidium	7440-17-7	E472/VA	0.050	mg/kg		8.56	10.7	----	21.5	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		----	----	20.1	----	34.5
Selenium	7782-49-2	E472/VA	0.10	mg/kg		16.6	17.1	----	12.8	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		----	----	0.0120	----	0.0205
Silver	7440-22-4	E472.Ag/VA	0.0050	mg/kg		0.0154	0.0115	----	0.0231	----
Sodium	7440-23-5	E475/VA	20	mg/kg		----	----	9900	----	5660
Sodium	7440-23-5	E472/VA	20	mg/kg		7310	7120	----	12900	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		----	----	4.92	----	2.34
Strontium	7440-24-6	E472/VA	0.10	mg/kg		2.20	2.10	----	2.72	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		----	----	0.055	----	<0.020
Tellurium	13494-80-9	E472/VA	0.020	mg/kg		<0.020	<0.020	----	<0.020	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		----	----	0.0931	----	0.0166
Thallium	7440-28-0	E472/VA	0.0020	mg/kg		0.0562	0.0531	----	0.0590	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		----	----	<0.10	----	<0.10
Tin	7440-31-5	E472/VA	0.10	mg/kg		<0.10	<0.10	----	<0.10	----

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-KI-5_2024-10	MP_QUR_RB-KI-6_2024-10	MP_QUR_RB-KI-7_2024-10	MP_QUR_RB-KI-8_2024-10	MP_QUR_RB-OV-1_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-021	VA24C9932-022	VA24C9932-023	VA24C9932-024	VA24C9932-025
						Result	Result	Result	Result	Result
Metals										
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		----	----	1.36	----	3.46
Titanium	7440-32-6	E472.Ti/VA	0.50	mg/kg		0.54	0.53	----	1.65	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		----	----	0.0915	----	0.0178
Uranium	7440-61-1	E472/VA	0.0020	mg/kg		0.0073	0.0133	----	0.0193	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		----	----	4.01	----	13.9
Vanadium	7440-62-2	E472/VA	0.10	mg/kg		<0.10	<0.10	----	0.47	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		----	----	134	----	221
Zinc	7440-66-6	E472/VA	1.0	mg/kg		107	126	----	202	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		----	----	<0.20	----	<0.20
Zirconium	7440-67-7	E472/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-5_2024-10	MP_QUR_RB-OV-6_2024-10	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-8_2024-10	MP_QUR_RB-MU-3X_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-026	VA24C9932-027	VA24C9932-028	VA24C9932-029	VA24C9932-030
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	66.1	73.7	75.7
Moisture	----	E144A/VA	2.0	%		79.8	77.7	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	<2.0	<2.0	<2.0

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-5_2024-10	MP_QUR_RB-OV-6_2024-10	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-8_2024-10	MP_QUR_RB-MU-3X_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-026	VA24C9932-027	VA24C9932-028	VA24C9932-029	VA24C9932-030
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		<5.0	10.0	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.027	0.254	0.123
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.149	0.177	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	0.567	1.12	0.070
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.100	0.165	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	<0.010	<0.010
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	<0.010	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	<1.0	<1.0
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.1 DLIS	<1.0	----	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	0.0084	0.0066	<0.0050
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.018	0.028	----	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	1720	1940	512
Calcium	7440-70-2	E475/VA	20	mg/kg		511	304	----	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.0109	0.0300	0.0787
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0517	0.0631	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	0.082	0.116	0.071
Chromium	7440-47-3	E475/VA	0.20	mg/kg		<0.20	0.85	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-5_2024-10	MP_QUR_RB-OV-6_2024-10	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-8_2024-10	MP_QUR_RB-MU-3X_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-026	VA24C9932-027	VA24C9932-028	VA24C9932-029	VA24C9932-030
						Result	Result	Result	Result	Result
Metals										
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	0.189	0.378	0.048
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.542	0.399	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	13.8	37.1	1.51
Copper	7440-50-8	E475/VA	0.20	mg/kg		26.9	15.3	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	89.5	215	29.7
Iron	7439-89-6	E475/VA	5.0	mg/kg		336	272	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	<0.050	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	<0.50	<0.50
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	<0.50	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	1620	1800	1260
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		959	1020	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	9.45	14.0	0.376
Manganese	7439-96-5	E475/VA	0.050	mg/kg		26.1	10.8	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.0078	0.0112	0.0573
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	0.0230	0.0425	0.235
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0110	0.0139	----	----	----
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.055	0.063	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	0.025	0.032	<0.020
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		0.047	0.063	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	0.22

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-5_2024-10	MP_QUR_RB-OV-6_2024-10	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-8_2024-10	MP_QUR_RB-MU-3X_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-026	VA24C9932-027	VA24C9932-028	VA24C9932-029	VA24C9932-030
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E475/VA	0.20	mg/kg		<0.20	0.36	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	10600	10400	10900
Phosphorus	7723-14-0	E475/VA	20	mg/kg		15800	16200	----	----	----
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	4790	6290	17800
Potassium	7440-09-7	E475/VA	20	mg/kg		21100	20800	----	----	----
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	4.15	12.2	17.1
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		20.7	21.7	----	----	----
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	16.6	10.7	2.06
Selenium	7782-49-2	E475/VA	0.10	mg/kg		50.3	27.2	----	----	----
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	0.0161	0.0279	<0.0050
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		0.0401	0.0438	----	----	----
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	3080	6110	1290
Sodium	7440-23-5	E475/VA	20	mg/kg		4630	3720	----	----	----
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	4.72	2.22	0.663
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.96	0.66	----	----	----
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	<0.020	<0.020
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	<0.020	----	----	----
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0103	0.0093	0.0298
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.0164	0.0147	----	----	----
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	<0.10	<0.10
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	<0.10	----	----	----

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-5_2024-10	MP_QUR_RB-OV-6_2024-10	MP_QUR_RB-OV-7_2024-10	MP_QUR_RB-OV-8_2024-10	MP_QUR_RB-MU-3X_2024-10
					Client sampling date / time	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	19-Oct-2024 00:00
						VA24C9932-026	VA24C9932-027	VA24C9932-028	VA24C9932-029	VA24C9932-030
						Result	Result	Result	Result	Result
Metals										
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	<0.25	<0.25	<0.25
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.54 DLIS	0.82	----	----	----
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	0.0056	0.0025	<0.0020
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		<0.0020	0.0049	----	----	----
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	0.11	<0.10	<0.10
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		<0.10	<0.10	----	----	----
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	96.2	280	16.4
Zinc	7440-66-6	E475/VA	1.0	mg/kg		295	344	----	----	----
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	<0.20	<0.20
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	<0.20	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3X_2024-10	MP_QUR_RB-KI-3X_2024-10	MP_QUR_RB-MU-7X_2024-10	MP_QUR_RB-LI-7X_2024-10	MP_QUR_RB-KI-7X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-031	VA24C9932-032	VA24C9932-033	VA24C9932-034	VA24C9932-035
						Result	Result	Result	Result	Result
Physical Tests										
Moisture	----	E144/VA	0.50	%		----	----	77.9	----	----
Moisture	----	E144A/VA	2.0	%		67.3	75.3	----	71.2	77.3
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		----	----	<2.0	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3X_2024-10	MP_QUR_RB-KI-3X_2024-10	MP_QUR_RB-MU-7X_2024-10	MP_QUR_RB-LI-7X_2024-10	MP_QUR_RB-KI-7X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-031	VA24C9932-032	VA24C9932-033	VA24C9932-034	VA24C9932-035
						Result	Result	Result	Result	Result
Metals										
Aluminum	7429-90-5	E475/VA	5.0	mg/kg		13.7	12.2	----	16.9	53.5
Antimony	7440-36-0	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Antimony	7440-36-0	E475/VA	0.020	mg/kg		<0.020	<0.020	----	<0.020	0.026
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		----	----	0.166	----	----
Arsenic	7440-38-2	E475/VA	0.050	mg/kg		0.198	0.566	----	0.105	1.68
Barium	7440-39-3	E440/VA	0.050	mg/kg		----	----	0.065	----	----
Barium	7440-39-3	E475/VA	0.050	mg/kg		0.240	0.446	----	0.172	1.78
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Beryllium	7440-41-7	E475/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		----	----	<0.010	----	----
Bismuth	7440-69-9	E475/VA	0.010	mg/kg		<0.010	<0.010	----	<0.010	<0.010
Boron	7440-42-8	E440/VA	1.0	mg/kg		----	----	<1.0	----	----
Boron	7440-42-8	E475/VA	1.0	mg/kg		<1.0	<1.0	----	<1.0	<1.0
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		----	----	<0.0050	----	----
Cadmium	7440-43-9	E475/VA	0.010	mg/kg		0.636	0.696	----	0.918	5.16
Calcium	7440-70-2	E440/VA	20	mg/kg		----	----	663	----	----
Calcium	7440-70-2	E475/VA	20	mg/kg		283	562	----	230	1940
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		----	----	0.0545	----	----
Cesium	7440-46-2	E475/VA	0.0050	mg/kg		0.0266	0.0345	----	0.0266	0.0363
Chromium	7440-47-3	E440/VA	0.050	mg/kg		----	----	0.072	----	----
Chromium	7440-47-3	E475/VA	0.20	mg/kg		0.24	0.64	----	<0.20	0.71

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3X_2024-10	MP_QUR_RB-KI-3X_2024-10	MP_QUR_RB-MU-7X_2024-10	MP_QUR_RB-LI-7X_2024-10	MP_QUR_RB-KI-7X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-031	VA24C9932-032	VA24C9932-033	VA24C9932-034	VA24C9932-035
						Result	Result	Result	Result	Result
Metals										
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Cobalt	7440-48-4	E475/VA	0.020	mg/kg		0.165	0.851	----	0.121	1.06
Copper	7440-50-8	E440/VA	0.10	mg/kg		----	----	0.69	----	----
Copper	7440-50-8	E475/VA	0.20	mg/kg		335	4.14	----	61.1	9.04
Iron	7439-89-6	E440/VA	3.0	mg/kg		----	----	17.5	----	----
Iron	7439-89-6	E475/VA	5.0	mg/kg		1610	1170	----	1340	1280
Lead	7439-92-1	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Lead	7439-92-1	E475/VA	0.050	mg/kg		<0.050	0.058	----	<0.050	0.081
Lithium	7439-93-2	E440/VA	0.50	mg/kg		----	----	<0.50	----	----
Lithium	7439-93-2	E475/VA	0.50	mg/kg		<0.50	<0.50	----	<0.50	<0.50
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		----	----	1230	----	----
Magnesium	7439-95-4	E475/VA	2.0	mg/kg		546	470	----	834	868
Manganese	7439-96-5	E440/VA	0.050	mg/kg		----	----	0.431	----	----
Manganese	7439-96-5	E475/VA	0.050	mg/kg		5.53	1.64	----	11.4	5.71
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		----	----	0.0716	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		----	----	0.324	----	----
Mercury	7439-97-6	E512A/VA	0.0020	mg/kg wwt		0.0604	0.0889	----	0.0663	0.128
Mercury	7439-97-6	E512/VA	0.010	mg/kg		0.185	0.360	----	0.230	0.562
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Molybdenum	7439-98-7	E475/VA	0.040	mg/kg		1.02	0.205	----	1.07	1.01
Nickel	7440-02-0	E440/VA	0.20	mg/kg		----	----	<0.20	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3X_2024-10	MP_QUR_RB-KI-3X_2024-10	MP_QUR_RB-MU-7X_2024-10	MP_QUR_RB-LI-7X_2024-10	MP_QUR_RB-KI-7X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-031	VA24C9932-032	VA24C9932-033	VA24C9932-034	VA24C9932-035
						Result	Result	Result	Result	Result
Metals										
Nickel	7440-02-0	E475/VA	0.20	mg/kg		2.19	0.54	----	<0.20	1.87
Phosphorus	7723-14-0	E440/VA	10	mg/kg		----	----	11200	----	----
Phosphorus	7723-14-0	E475/VA	20	mg/kg		12700	9390	----	16300	9540
Potassium	7440-09-7	E440/VA	20	mg/kg		----	----	20900	----	----
Potassium	7440-09-7	E475/VA	20	mg/kg		8920	9510	----	13500	10400
Rubidium	7440-17-7	E440/VA	0.050	mg/kg		----	----	13.5	----	----
Rubidium	7440-17-7	E475/VA	0.050	mg/kg		10.6	10.6	----	18.2	9.32
Selenium	7782-49-2	E440/VA	0.050	mg/kg		----	----	2.08	----	----
Selenium	7782-49-2	E475/VA	0.10	mg/kg		95.1	11.4	----	16.0	24.0
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg		----	----	<0.0050	----	----
Silver	7440-22-4	E475.Ag/VA	0.0050	mg/kg		4.34	0.0148	----	1.26	0.0391
Sodium	7440-23-5	E440/VA	20	mg/kg		----	----	1190	----	----
Sodium	7440-23-5	E475/VA	20	mg/kg		3630	6850	----	2960	9730
Strontium	7440-24-6	E440/VA	0.050	mg/kg		----	----	0.969	----	----
Strontium	7440-24-6	E475/VA	0.10	mg/kg		0.69	1.57	----	0.34	7.77
Tellurium	13494-80-9	E440/VA	0.020	mg/kg		----	----	<0.020	----	----
Tellurium	13494-80-9	E475/VA	0.020	mg/kg		<0.020	<0.020	----	<0.020	0.038
Thallium	7440-28-0	E440/VA	0.0020	mg/kg		----	----	0.0155	----	----
Thallium	7440-28-0	E475/VA	0.0020	mg/kg		0.106	0.0458	----	0.160	0.182
Tin	7440-31-5	E440/VA	0.10	mg/kg		----	----	<0.10	----	----
Tin	7440-31-5	E475/VA	0.10	mg/kg		<0.10	<0.10	----	<0.10	<0.10

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-LI-3X_2024-10	MP_QUR_RB-KI-3X_2024-10	MP_QUR_RB-MU-7X_2024-10	MP_QUR_RB-LI-7X_2024-10	MP_QUR_RB-KI-7X_2024-10
					Client sampling date / time	19-Oct-2024 00:00	19-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00	20-Oct-2024 00:00
						VA24C9932-031	VA24C9932-032	VA24C9932-033	VA24C9932-034	VA24C9932-035
						Result	Result	Result	Result	Result
Metals										
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg		----	----	<0.25	----	----
Titanium	7440-32-6	E475.Ti/VA	0.50	mg/kg		<0.50	0.69	----	<0.50	2.30
Uranium	7440-61-1	E440/VA	0.0020	mg/kg		----	----	<0.0020	----	----
Uranium	7440-61-1	E475/VA	0.0020	mg/kg		0.0090	0.0135	----	0.0321	0.0798
Vanadium	7440-62-2	E440/VA	0.10	mg/kg		----	----	<0.10	----	----
Vanadium	7440-62-2	E475/VA	0.10	mg/kg		<0.10	0.12	----	1.96	2.78
Zinc	7440-66-6	E440/VA	0.50	mg/kg		----	----	11.9	----	----
Zinc	7440-66-6	E475/VA	1.0	mg/kg		136	83.5	----	154	134
Zirconium	7440-67-7	E440/VA	0.20	mg/kg		----	----	<0.20	----	----
Zirconium	7440-67-7	E475/VA	0.20	mg/kg		<0.20	<0.20	----	<0.20	<0.20

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Analytical Results

Sub-Matrix: Tissue (Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-7X_2024-10	----	----	----	----
					Client sampling date / time	20-Oct-2024 00:00	----	----	----	----
						VA24C9932-036	----	----	----	----
						Result	----	----	----	----
Physical Tests										
Moisture	----	E144/VA	0.50	%		81.2	----	----	----	----
Metals										
Aluminum	7429-90-5	E440/VA	2.0	mg/kg		3.0	----	----	----	----
Antimony	7440-36-0	E440/VA	0.010	mg/kg		<0.010	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP_QUR_RB-OV-7X_2024-10	----	----	----	----
					Client sampling date / time	20-Oct-2024 00:00	----	----	----	----
						VA24C9932-036	----	----	----	----
						Result	----	----	----	----
Metals										
Arsenic	7440-38-2	E440/VA	0.020	mg/kg		0.047	----	----	----	----
Barium	7440-39-3	E440/VA	0.050	mg/kg		0.972	----	----	----	----
Beryllium	7440-41-7	E440/VA	0.010	mg/kg		<0.010	----	----	----	----
Bismuth	7440-69-9	E440/VA	0.010	mg/kg		<0.010	----	----	----	----
Boron	7440-42-8	E440/VA	1.0	mg/kg		<1.0	----	----	----	----
Cadmium	7440-43-9	E440/VA	0.0050	mg/kg		0.0109	----	----	----	----
Calcium	7440-70-2	E440/VA	20	mg/kg		2610	----	----	----	----
Cesium	7440-46-2	E440/VA	0.0050	mg/kg		0.0195	----	----	----	----
Chromium	7440-47-3	E440/VA	0.050	mg/kg		0.133	----	----	----	----
Cobalt	7440-48-4	E440/VA	0.020	mg/kg		0.312	----	----	----	----
Copper	7440-50-8	E440/VA	0.10	mg/kg		23.2	----	----	----	----
Iron	7439-89-6	E440/VA	3.0	mg/kg		157	----	----	----	----
Lead	7439-92-1	E440/VA	0.020	mg/kg		<0.020	----	----	----	----
Lithium	7439-93-2	E440/VA	0.50	mg/kg		<0.50	----	----	----	----
Magnesium	7439-95-4	E440/VA	2.0	mg/kg		2870	----	----	----	----
Manganese	7439-96-5	E440/VA	0.050	mg/kg		15.9	----	----	----	----
Mercury	7439-97-6	E510/VA	0.0050	mg/kg		0.0323	----	----	----	----
Mercury	7439-97-6	E510A/VA	0.0010	mg/kg wwt		0.0060	----	----	----	----
Molybdenum	7439-98-7	E440/VA	0.020	mg/kg		0.029	----	----	----	----
Nickel	7440-02-0	E440/VA	0.20	mg/kg		<0.20	----	----	----	----
Phosphorus	7723-14-0	E440/VA	10	mg/kg		19500	----	----	----	----

Analytical Results

Sub-Matrix: Tissue
(Matrix: Biota)

					Client sample ID	MP_QUR_RB-OV-7X_2024-10	----	----	----	----
					Client sampling date / time	20-Oct-2024 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA24C9932-036	----	----	----	----	
					Result	----	----	----	----	
Metals										
Potassium	7440-09-7	E440/VA	20	mg/kg	8680	----	----	----	----	
Rubidium	7440-17-7	E440/VA	0.050	mg/kg	7.28	----	----	----	----	
Selenium	7782-49-2	E440/VA	0.050	mg/kg	28.7	----	----	----	----	
Silver	7440-22-4	E440.Ag/VA	0.0050	mg/kg	0.0227	----	----	----	----	
Sodium	7440-23-5	E440/VA	20	mg/kg	5230	----	----	----	----	
Strontium	7440-24-6	E440/VA	0.050	mg/kg	8.29	----	----	----	----	
Tellurium	13494-80-9	E440/VA	0.020	mg/kg	<0.020	----	----	----	----	
Thallium	7440-28-0	E440/VA	0.0020	mg/kg	0.0106	----	----	----	----	
Tin	7440-31-5	E440/VA	0.10	mg/kg	<0.10	----	----	----	----	
Titanium	7440-32-6	E440.Ti/VA	0.25	mg/kg	<0.25	----	----	----	----	
Uranium	7440-61-1	E440/VA	0.0020	mg/kg	0.0099	----	----	----	----	
Vanadium	7440-62-2	E440/VA	0.10	mg/kg	0.18	----	----	----	----	
Zinc	7440-66-6	E440/VA	0.50	mg/kg	165	----	----	----	----	
Zirconium	7440-67-7	E440/VA	0.20	mg/kg	<0.20	----	----	----	----	

Please refer to the General Comments section for an explanation of any result qualifiers detected.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA24C9932**	Page	: 1 of 33
Client	: **Minnow Environmental Inc.**	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: 306-885 Don Mills Road Toronto ON Canada M3C 1V9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 30-Oct-2024 12:20
PO	: 5590017616	Issue Date	: 14-Jan-2025 09:07
C-O-C number	: ----		
Sampler	: KBa		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 36		
No. of samples analysed	: 36		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Biota**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Copper	7440-50-8	E440	48.3 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Aluminum	7429-90-5	E472	137 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	Iron	7439-89-6	E472	79.8 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E512	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E512	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E511	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E511	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E511	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E511	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E511	20-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-4_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-5_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-6_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-8_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-8_2024-10	E510	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-1_2024-10	E510	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-2_2024-10	E510	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3_2024-10	E510	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3X_2024-10	E510	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E512A	20-Oct-2024	18-Dec-2024	365 days	59 days	✓	19-Dec-2024	365 days	60 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E512A	19-Oct-2024	18-Dec-2024	365 days	60 days	✓	19-Dec-2024	365 days	61 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E511A	20-Oct-2024	02-Jan-2025	365 days	74 days	✓	06-Jan-2025	365 days	78 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E511A	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E511A	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E511A	19-Oct-2024	02-Jan-2025	365 days	75 days	✓	06-Jan-2025	365 days	79 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E511A	20-Oct-2024	13-Jan-2025	365 days	85 days	✓	13-Jan-2025	365 days	85 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-4_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-5_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-6_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-7_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-8_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-OV-7_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-OV-8_2024-10	E510A	20-Oct-2024	06-Jan-2025	365 days	78 days	✓	08-Jan-2025	365 days	80 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-1_2024-10	E510A	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-2_2024-10	E510A	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-3_2024-10	E510A	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Mercury in Biota by CVAAS (WET units, Routine)										
LDPE bag MP_QUR_RB-MU-3X_2024-10	E510A	19-Oct-2024	06-Jan-2025	365 days	79 days	✓	08-Jan-2025	365 days	81 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E475	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Metals by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E475	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times* Rec	*Holding Times* Actual	*Eval*	*Analysis Date*	*Holding Times* Rec	*Holding Times* Actual	*Eval*
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E472	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E472	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E472	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E472	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E472	20-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-4_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-5_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓

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Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-6_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-8_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-8_2024-10	E440	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-1_2024-10	E440	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-2_2024-10	E440	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3_2024-10	E440	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Metals in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3X_2024-10	E440	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E475.Ag	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E475.Ag	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E472.Ag	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E472.Ag	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E472.Ag	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E472.Ag	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E472.Ag	20-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-4_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-5_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-6_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-8_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-8_2024-10	E440.Ag	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-1_2024-10	E440.Ag	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-2_2024-10	E440.Ag	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3_2024-10	E440.Ag	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Silver in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3X_2024-10	E440.Ag	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E475.Ti	20-Oct-2024	18-Dec-2024	730 days	59 days	✓	18-Dec-2024	730 days	59 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E475.Ti	19-Oct-2024	18-Dec-2024	730 days	60 days	✓	18-Dec-2024	730 days	60 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E472.Ti	20-Oct-2024	02-Jan-2025	730 days	74 days	✓	03-Jan-2025	730 days	75 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E472.Ti	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E472.Ti	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E472.Ti	19-Oct-2024	02-Jan-2025	730 days	75 days	✓	03-Jan-2025	730 days	76 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E472.Ti	20-Oct-2024	13-Jan-2025	730 days	85 days	✓	13-Jan-2025	730 days	85 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-4_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-5_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-6_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-8_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-OV-8_2024-10	E440.Ti	20-Oct-2024	06-Jan-2025	730 days	78 days	✓	07-Jan-2025	730 days	79 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-1_2024-10	E440.Ti	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-2_2024-10	E440.Ti	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3_2024-10	E440.Ti	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Metals : Titanium in Biota by CRC ICPMS (DRY units, Routine)										
LDPE bag MP_QUR_RB-MU-3X_2024-10	E440.Ti	19-Oct-2024	06-Jan-2025	730 days	79 days	✓	07-Jan-2025	730 days	80 days	✓
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-KI-7_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-KI-7X_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-LI-7_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-LI-7X_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-OV-5_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-OV-6_2024-10	E144A	20-Oct-2024	----	----	----		18-Dec-2024	----	59 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-KI-2_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	

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Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-KI-3X_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-LI-2_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-LI-3_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-LI-3X_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	
Physical Tests : Moisture Content by Gravimetry (Biopsy)										
LDPE bag MP_QUR_RB-OV-1_2024-10	E144A	19-Oct-2024	----	----	----		18-Dec-2024	----	60 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-4_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-5_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-6_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-LI-4_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	

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			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-LI-5_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-LI-6_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-LI-8_2024-10	E144-H	20-Oct-2024	----	----	----		02-Jan-2025	----	74 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-1_2024-10	E144-H	19-Oct-2024	----	----	----		02-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-3_2024-10	E144-H	19-Oct-2024	----	----	----		02-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-LI-1_2024-10	E144-H	19-Oct-2024	----	----	----		02-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry (Micro)										
LDPE bag MP_QUR_RB-KI-8_2024-10	E144-H	20-Oct-2024	----	----	----		13-Jan-2025	----	85 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-4_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-5_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-6_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-7_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-7X_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-8_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-OV-7_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-OV-7X_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-OV-8_2024-10	E144	20-Oct-2024	----	----	----		03-Jan-2025	----	75 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-1_2024-10	E144	19-Oct-2024	----	----	----		03-Jan-2025	----	76 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag MP_QUR_RB-MU-2_2024-10	E144	19-Oct-2024	----	----	----		03-Jan-2025	----	76 days	

Matrix: **Biota**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUR_RB-MU-3_2024-10	E144	19-Oct-2024	----	----	----		03-Jan-2025	----	76 days	
Physical Tests : Moisture Content by Gravimetry										
LDPE bag										
MP_QUR_RB-MU-3X_2024-10	E144	19-Oct-2024	----	----	----		03-Jan-2025	----	76 days	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Biota**

Evaluation: ✖ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1828246	1	21	4.7	5.0	✖
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1830375	1	13	7.6	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1828245	1	21	4.7	5.0	✖
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1830374	1	18	5.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1828248	1	21	4.7	5.0	✖
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1830372	1	13	7.6	5.0	✓
Moisture Content by Gravimetry	E144	1828867	1	18	5.5	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1828250	1	21	4.7	5.0	✖
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1828243	0	12	0.0	5.0	✖
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1830373	1	13	7.6	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1828244	0	12	0.0	5.0	✖
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1830376	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1814709	2	12	16.6	10.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1828246	4	21	19.0	10.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1830375	2	13	15.3	10.0	✓
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1814710	2	12	16.6	10.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1828245	4	21	19.0	10.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1830374	2	18	11.1	10.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1814706	2	19	10.5	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1828248	4	21	19.0	10.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1830372	2	13	15.3	10.0	✓
Moisture Content by Gravimetry	E144	1828867	1	18	5.5	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1814891	1	19	5.2	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1828250	2	21	9.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1814707	2	12	16.6	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1828243	4	12	33.3	10.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1830373	2	13	15.3	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1814708	2	12	16.6	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1828244	4	12	33.3	10.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1830376	2	18	11.1	10.0	✓
Method Blanks (MB)							
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512	1814709	1	12	8.3	5.0	✓
Mercury in Biota by CVAAS (DRY units, Micro)	E511	1828246	2	21	9.5	5.0	✓
Mercury in Biota by CVAAS (DRY units, Routine)	E510	1830375	1	13	7.6	5.0	✓

Matrix: **Biota**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A	1814710	1	12	8.3	5.0	✓
Mercury in Biota by CVAAS (WET units, Micro)	E511A	1828245	2	21	9.5	5.0	✓
Mercury in Biota by CVAAS (WET units, Routine)	E510A	1830374	1	18	5.5	5.0	✓
Metals by CRC ICPMS (DRY units, Biopsy)	E475	1814706	1	19	5.2	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472	1828248	2	21	9.5	5.0	✓
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440	1830372	1	13	7.6	5.0	✓
Moisture Content by Gravimetry	E144	1828867	1	18	5.5	5.0	✓
Moisture Content by Gravimetry (Biopsy)	E144A	1814891	1	19	5.2	5.0	✓
Moisture Content by Gravimetry (Micro)	E144-H	1828250	2	21	9.5	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag	1814707	1	12	8.3	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag	1828243	2	12	16.6	5.0	✓
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag	1830373	1	13	7.6	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti	1814708	1	12	8.3	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti	1828244	2	12	16.6	5.0	✓
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti	1830376	1	18	5.5	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Moisture Content by Gravimetry	E144 ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Moisture Content by Gravimetry (Biopsy)	E144A ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/CCME PHC in Soil - Tier 1	This analysis is carried out gravimetrically by drying the sample at < 60 deg. C for a minimum of three days.
Moisture Content by Gravimetry (Micro)	E144-H ALS Environmental - Vancouver	Biota	Puget Sound Water Quality Authority/BC MOE Lab Manual	Moisture is measured gravimetrically by drying the sample at < 60°C for a minimum of 3 days to constant weight. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of sample, expressed as a percentage.
Metals in Biota by CRC ICPMS (DRY units, Routine)	E440 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Routine)	E440.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Routine)	E440.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals in Biota by CRC ICPMS (DRY units, Micro)	E472 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Silver in Biota by CRC ICPMS (DRY units, Micro)	E472.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Micro)	E472.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Tissue samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Metals by CRC ICPMS (DRY units, Biopsy)	E475 ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Silver in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ag ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Titanium in Biota by CRC ICPMS (DRY units, Biopsy)	E475.Ti ALS Environmental - Vancouver	Biota	EPA 200.3/6020B (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by Collision/Reaction Cell ICPMS. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.
Mercury in Biota by CVAAS (DRY units, Routine)	E510 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Routine)	E510A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with HNO3, HCl, and H2O2. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Micro)	E511 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Mercury in Biota by CVAAS (WET units, Micro)	E511A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (DRY units, Biopsy)	E512 ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.
Mercury in Biota by CVAAS (WET units, Biopsy)	E512A ALS Environmental - Vancouver	Biota	EPA 200.3/1631 Appendix (mod)	Samples are homogenized digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Analysis is by CVAAS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Metals and Mercury Biota Digestion (Routine)	EP440 ALS Environmental - Vancouver	Biota	EPA 200.3	This method uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Micro)	EP472 ALS Environmental - Vancouver	Biota	EPA 200.3	This method, designed for small sample amounts, uses a heated strong acid digestion with HNO3, HCl, and H2O2 and is intended to provide a conservative estimate of bio-available metals.
Metals and Mercury Biota Digestion (Biopsy)	EP475 ALS Environmental - Vancouver	Biota	EPA 200.3/200.8 (mod)	Samples are digested with nitric acid, hydrochloric acid, and hydrogen peroxide. Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **VA24C9932**	Page	: 1 of 20
Client	: Minnow Environmental Inc.	Laboratory	: ALS Environmental - Vancouver
Contact	: Sally Ju	Account Manager	: Can Dang
Address	: PO Box 12 Likely BC Canada V0L 1N0	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 30-Oct-2024 12:20
PO	: 5590017616	Date Analysis Commenced	: 18-Dec-2024
C-O-C number	: ----	Issue Date	: 14-Jan-2025 09:07
Sampler	: KBa		
Site	: ----		
Quote number	: VA24-MPMC100-004 (Minnow/Mt. Polley)		
No. of samples received	: 36		
No. of samples analysed	: 36		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cesar Mora	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Supervisor - Metals Prep & Mercury	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Maya Urquhart	Lab Analyst	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Shahrazad Firoozbakht	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Wingyee Cheng	Analyst- General	Vancouver Metals, Burnaby, British Columbia

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1828867)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Moisture	----	E144	0.50	%	77.1	77.4	0.332%	20%	----
Physical Tests (QC Lot: 1837560)											
VA24C8666-032	Anonymous	Moisture	----	E144-H	2.0	%	72.3	70.7	2.29%	20%	----
Metals (QC Lot: 1830372)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Aluminum	7429-90-5	E440	2.0	mg/kg	2.7	2.3	0.4	Diff <2x LOR	----
		Antimony	7440-36-0	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E440	0.020	mg/kg	0.070	0.059	0.011	Diff <2x LOR	----
		Barium	7440-39-3	E440	0.050	mg/kg	0.082	0.072	0.010	Diff <2x LOR	----
		Beryllium	7440-41-7	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
		Calcium	7440-70-2	E440	20	mg/kg	581	607	4.31%	60%	----
		Cesium	7440-46-2	E440	0.0050	mg/kg	0.0472	0.0484	2.55%	40%	----
		Chromium	7440-47-3	E440	0.050	mg/kg	0.123	0.180	0.057	Diff <2x LOR	----
		Cobalt	7440-48-4	E440	0.020	mg/kg	0.041	0.037	0.004	Diff <2x LOR	----
		Copper	7440-50-8	E440	0.10	mg/kg	2.32	1.42	48.3%	40%	DUP-H
		Iron	7439-89-6	E440	3.0	mg/kg	36.0	28.8	22.1%	40%	----
		Lead	7439-92-1	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium	7439-93-2	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	2.0	mg/kg	953	1040	8.70%	40%	----
		Manganese	7439-96-5	E440	0.050	mg/kg	0.423	0.431	1.80%	40%	----
		Molybdenum	7439-98-7	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Nickel	7440-02-0	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		Phosphorus	7723-14-0	E440	10	mg/kg	10800	11000	2.38%	40%	----
		Potassium	7440-09-7	E440	20	mg/kg	18300	18600	1.92%	40%	----
		Rubidium	7440-17-7	E440	0.050	mg/kg	12.1	12.8	5.81%	40%	----
		Selenium	7782-49-2	E440	0.050	mg/kg	2.40	2.40	0.0405%	40%	----
		Sodium	7440-23-5	E440	20	mg/kg	1360	1410	3.41%	40%	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1830372) - continued											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Strontium	7440-24-6	E440	0.050	mg/kg	0.721	0.699	3.07%	60%	----
		Tellurium	13494-80-9	E440	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.0020	mg/kg	0.0168	0.0161	4.39%	40%	----
		Tin	7440-31-5	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.0020	mg/kg	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium	7440-62-2	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc	7440-66-6	E440	0.50	mg/kg	19.4	19.4	0.00308%	40%	----
		Zirconium	7440-67-7	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
Metals (QC Lot: 1830373)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Silver	7440-22-4	E440.Ag	0.0050	mg/kg	<0.0050	<0.0050	0	Diff <2x LOR	----
Metals (QC Lot: 1830374)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Mercury	7439-97-6	E510A	0.0023	mg/kg wwt	0.0487	0.0503	3.13%	40%	----
Metals (QC Lot: 1830375)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Mercury	7439-97-6	E510	0.0102	mg/kg	0.213	0.220	3.13%	40%	----
Metals (QC Lot: 1830376)											
VA24C9932-001	MP_QUR_RB-MU-1_2024-10	Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	0.28	0.03	Diff <2x LOR	----
Metals (QC Lot: 1837538)											
VA24C8666-093	Anonymous	Mercury	7439-97-6	E511A	0.0010	mg/kg wwt	0.0402	0.0387	3.69%	40%	----
Metals (QC Lot: 1837539)											
VA24C8666-093	Anonymous	Mercury	7439-97-6	E511	0.0050	mg/kg	0.126	0.122	3.69%	40%	----
Metals (QC Lot: 1837541)											
VA24C8666-093	Anonymous	Aluminum	7429-90-5	E472	5.0	mg/kg	62.4	11.6	137%	40%	DUP-H
		Antimony	7440-36-0	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Arsenic	7440-38-2	E472	0.030	mg/kg	0.157	0.178	12.6%	40%	----
		Barium	7440-39-3	E472	0.050	mg/kg	30.0	26.3	13.1%	40%	----
		Beryllium	7440-41-7	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Bismuth	7440-69-9	E472	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
		Boron	7440-42-8	E472	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
		Cadmium	7440-43-9	E472	0.010	mg/kg	0.592	0.422	33.6%	40%	----
		Calcium	7440-70-2	E472	20	mg/kg	131000	115000	13.5%	60%	----
		Cesium	7440-46-2	E472	0.0050	mg/kg	0.0397	0.0304	26.4%	40%	----
		Chromium	7440-47-3	E472	0.20	mg/kg	0.37	0.21	0.16	Diff <2x LOR	----

Sub-Matrix: **Biota**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 1837541) - continued											
VA24C8666-093	Anonymous	Cobalt	7440-48-4	E472	0.020	mg/kg	0.196	0.188	4.23%	40%	----
		Copper	7440-50-8	E472	0.20	mg/kg	1.74	1.73	0.639%	40%	----
		Iron	7439-89-6	E472	5.0	mg/kg	148	63.7	79.8%	40%	DUP-H
		Lead	7439-92-1	E472	0.050	mg/kg	0.115	0.082	0.032	Diff <2x LOR	----
		Lithium	7439-93-2	E472	0.50	mg/kg	0.56	<0.50	0.06	Diff <2x LOR	----
		Magnesium	7439-95-4	E472	2.0	mg/kg	2400	2020	17.1%	40%	----
		Manganese	7439-96-5	E472	0.050	mg/kg	41.3	34.9	16.9%	40%	----
		Molybdenum	7439-98-7	E472	0.040	mg/kg	0.071	0.066	0.005	Diff <2x LOR	----
		Nickel	7440-02-0	E472	0.20	mg/kg	0.31	0.20	0.10	Diff <2x LOR	----
		Phosphorus	7723-14-0	E472	10	mg/kg	74500	65900	12.2%	40%	----
		Potassium	7440-09-7	E472	20	mg/kg	7880	8010	1.66%	40%	----
		Rubidium	7440-17-7	E472	0.050	mg/kg	4.68	4.62	1.13%	40%	----
		Selenium	7782-49-2	E472	0.10	mg/kg	3.81	4.18	9.41%	40%	----
		Sodium	7440-23-5	E472	20	mg/kg	4460	4380	1.87%	40%	----
		Strontium	7440-24-6	E472	0.10	mg/kg	102	87.5	15.7%	60%	----
		Tellurium	13494-80-9	E472	0.020	mg/kg	<0.020	<0.020	0	Diff <2x LOR	----
		Thallium	7440-28-0	E472	0.0020	mg/kg	0.0432	0.0365	16.7%	40%	----
		Tin	7440-31-5	E472	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		Uranium	7440-61-1	E472	0.0020	mg/kg	0.0664	0.0458	36.8%	40%	----
		Vanadium	7440-62-2	E472	0.10	mg/kg	1.22	1.00	19.4%	40%	----
		Zinc	7440-66-6	E472	1.0	mg/kg	131	128	2.04%	40%	----
		Zirconium	7440-67-7	E472	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1814891)						
Moisture	----	E144A	2	%	<2.0	----
Physical Tests (QCLot: 1828250)						
Moisture	----	E144-H	2	%	<2.0	----
Physical Tests (QCLot: 1828867)						
Moisture	----	E144	0.5	%	<0.50	----
Physical Tests (QCLot: 1837560)						
Moisture	----	E144-H	2	%	<2.0	----
Metals (QCLot: 1814706)						
Aluminum	7429-90-5	E475	5	mg/kg	<5.0	----
Antimony	7440-36-0	E475	0.02	mg/kg	<0.020	----
Arsenic	7440-38-2	E475	0.05	mg/kg	<0.050	----
Barium	7440-39-3	E475	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E475	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E475	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E475	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E475	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E475	20	mg/kg	<20	----
Cesium	7440-46-2	E475	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E475	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E475	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E475	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E475	5	mg/kg	<5.0	----
Lead	7439-92-1	E475	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E475	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E475	2	mg/kg	<2.0	----
Manganese	7439-96-5	E475	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E475	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E475	20	mg/kg	<20	----
Potassium	7440-09-7	E475	20	mg/kg	<20	----
Rubidium	7440-17-7	E475	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E475	0.1	mg/kg	<0.10	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1814706) - continued						
Sodium	7440-23-5	E475	20	mg/kg	<20	----
Strontium	7440-24-6	E475	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E475	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E475	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E475	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E475	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E475	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E475	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E475	0.2	mg/kg	<0.20	----
Metals (QCLot: 1814707)						
Silver	7440-22-4	E475.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1814708)						
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1814709)						
Mercury	7439-97-6	E512	0.01	mg/kg	<0.010	----
Metals (QCLot: 1814710)						
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	<0.0020	----
Metals (QCLot: 1828243)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1828244)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----
Metals (QCLot: 1828245)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1828246)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1828248)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1828248) - continued						
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1830372)						
Aluminum	7429-90-5	E440	2	mg/kg	<2.0	----
Antimony	7440-36-0	E440	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E440	0.02	mg/kg	<0.020	----
Barium	7440-39-3	E440	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E440	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E440	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E440	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E440	0.005	mg/kg	<0.0050	----
Calcium	7440-70-2	E440	20	mg/kg	<20	----
Cesium	7440-46-2	E440	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1830372) - continued						
Chromium	7440-47-3	E440	0.05	mg/kg	<0.050	----
Cobalt	7440-48-4	E440	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E440	0.1	mg/kg	<0.10	----
Iron	7439-89-6	E440	3	mg/kg	<3.0	----
Lead	7439-92-1	E440	0.02	mg/kg	<0.020	----
Lithium	7439-93-2	E440	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E440	2	mg/kg	<2.0	----
Manganese	7439-96-5	E440	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	<0.020	----
Nickel	7440-02-0	E440	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E440	10	mg/kg	<10	----
Potassium	7440-09-7	E440	20	mg/kg	<20	----
Rubidium	7440-17-7	E440	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E440	0.05	mg/kg	<0.050	----
Sodium	7440-23-5	E440	20	mg/kg	<20	----
Strontium	7440-24-6	E440	0.05	mg/kg	<0.050	----
Tellurium	13494-80-9	E440	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E440	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E440	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E440	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E440	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E440	0.5	mg/kg	<0.50	----
Zirconium	7440-67-7	E440	0.2	mg/kg	<0.20	----
Metals (QCLot: 1830373)						
Silver	7440-22-4	E440.Ag	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1830374)						
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1830375)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1830376)						
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	<0.25	----
Metals (QCLot: 1837538)						
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	<0.0010	----
Metals (QCLot: 1837539)						
Mercury	7439-97-6	E511	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1837541)						
Aluminum	7429-90-5	E472	5	mg/kg	<5.0	----
Antimony	7440-36-0	E472	0.01	mg/kg	<0.010	----
Arsenic	7440-38-2	E472	0.03	mg/kg	<0.030	----
Barium	7440-39-3	E472	0.05	mg/kg	<0.050	----
Beryllium	7440-41-7	E472	0.01	mg/kg	<0.010	----
Bismuth	7440-69-9	E472	0.01	mg/kg	<0.010	----
Boron	7440-42-8	E472	1	mg/kg	<1.0	----
Cadmium	7440-43-9	E472	0.01	mg/kg	<0.010	----
Calcium	7440-70-2	E472	20	mg/kg	<20	----
Cesium	7440-46-2	E472	0.005	mg/kg	<0.0050	----
Chromium	7440-47-3	E472	0.2	mg/kg	<0.20	----
Cobalt	7440-48-4	E472	0.02	mg/kg	<0.020	----
Copper	7440-50-8	E472	0.2	mg/kg	<0.20	----
Iron	7439-89-6	E472	5	mg/kg	<5.0	----
Lead	7439-92-1	E472	0.05	mg/kg	<0.050	----
Lithium	7439-93-2	E472	0.5	mg/kg	<0.50	----
Magnesium	7439-95-4	E472	2	mg/kg	<2.0	----
Manganese	7439-96-5	E472	0.05	mg/kg	<0.050	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	<0.040	----
Nickel	7440-02-0	E472	0.2	mg/kg	<0.20	----
Phosphorus	7723-14-0	E472	10	mg/kg	<10	----
Potassium	7440-09-7	E472	20	mg/kg	<20	----
Rubidium	7440-17-7	E472	0.05	mg/kg	<0.050	----
Selenium	7782-49-2	E472	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E472	20	mg/kg	<20	----
Strontium	7440-24-6	E472	0.1	mg/kg	<0.10	----
Tellurium	13494-80-9	E472	0.02	mg/kg	<0.020	----
Thallium	7440-28-0	E472	0.002	mg/kg	<0.0020	----
Tin	7440-31-5	E472	0.1	mg/kg	<0.10	----
Uranium	7440-61-1	E472	0.002	mg/kg	<0.0020	----
Vanadium	7440-62-2	E472	0.1	mg/kg	<0.10	----
Zinc	7440-66-6	E472	1	mg/kg	<1.0	----
Zirconium	7440-67-7	E472	0.2	mg/kg	<0.20	----
Metals (QCLot: 1837542)						
Silver	7440-22-4	E472.Ag	0.005	mg/kg	<0.0050	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1837543)						
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	<0.50	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1814891)									
Moisture	----	E144A	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1828250)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Physical Tests (QCLot: 1828867)									
Moisture	----	E144	0.5	%	50 %	99.6	90.0	110	----
Physical Tests (QCLot: 1837560)									
Moisture	----	E144-H	2	%	100 %	100	90.0	110	----
Metals (QCLot: 1814706)									
Aluminum	7429-90-5	E475	5	mg/kg	50 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E475	0.02	mg/kg	25 mg/kg	100	80.0	120	----
Arsenic	7440-38-2	E475	0.05	mg/kg	25 mg/kg	108	80.0	120	----
Barium	7440-39-3	E475	0.05	mg/kg	6.25 mg/kg	99.2	80.0	120	----
Beryllium	7440-41-7	E475	0.01	mg/kg	2.5 mg/kg	98.2	80.0	120	----
Bismuth	7440-69-9	E475	0.01	mg/kg	25 mg/kg	98.4	80.0	120	----
Boron	7440-42-8	E475	1	mg/kg	25 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E475	0.01	mg/kg	2.5 mg/kg	95.2	80.0	120	----
Calcium	7440-70-2	E475	20	mg/kg	1250 mg/kg	93.6	80.0	120	----
Cesium	7440-46-2	E475	0.005	mg/kg	1.25 mg/kg	97.0	80.0	120	----
Chromium	7440-47-3	E475	0.2	mg/kg	6.25 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E475	0.02	mg/kg	6.25 mg/kg	98.0	80.0	120	----
Copper	7440-50-8	E475	0.2	mg/kg	6.25 mg/kg	96.1	80.0	120	----
Iron	7439-89-6	E475	5	mg/kg	25 mg/kg	96.1	80.0	120	----
Lead	7439-92-1	E475	0.05	mg/kg	12.5 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E475	0.5	mg/kg	6.25 mg/kg	98.1	80.0	120	----
Magnesium	7439-95-4	E475	2	mg/kg	1250 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E475	0.05	mg/kg	6.25 mg/kg	101	80.0	120	----
Molybdenum	7439-98-7	E475	0.04	mg/kg	6.25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E475	0.2	mg/kg	12.5 mg/kg	97.9	80.0	120	----
Phosphorus	7723-14-0	E475	20	mg/kg	250 mg/kg	108	80.0	120	----
Potassium	7440-09-7	E475	20	mg/kg	1250 mg/kg	101	80.0	120	----
Rubidium	7440-17-7	E475	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Selenium	7782-49-2	E475	0.1	mg/kg	25 mg/kg	97.8	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1814706) - continued									
Sodium	7440-23-5	E475	20	mg/kg	1250 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E475	0.1	mg/kg	6.25 mg/kg	98.1	80.0	120	----
Tellurium	13494-80-9	E475	0.02	mg/kg	2.5 mg/kg	98.7	80.0	120	----
Thallium	7440-28-0	E475	0.002	mg/kg	25 mg/kg	96.5	80.0	120	----
Tin	7440-31-5	E475	0.1	mg/kg	12.5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E475	0.002	mg/kg	0.125 mg/kg	103	80.0	120	----
Vanadium	7440-62-2	E475	0.1	mg/kg	12.5 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E475	1	mg/kg	12.5 mg/kg	96.9	80.0	120	----
Zirconium	7440-67-7	E475	0.2	mg/kg	2.5 mg/kg	101	80.0	120	----
Metals (QCLot: 1814707)									
Silver	7440-22-4	E475.Ag	0.005	mg/kg	2.5 mg/kg	91.2	80.0	120	----
Metals (QCLot: 1814708)									
Titanium	7440-32-6	E475.Ti	0.5	mg/kg	6.25 mg/kg	102	80.0	120	----
Metals (QCLot: 1814709)									
Mercury	7439-97-6	E512	0.01	mg/kg	0.05 mg/kg	90.0	80.0	120	----
Metals (QCLot: 1814710)									
Mercury	7439-97-6	E512A	0.002	mg/kg wwt	0.05 mg/kg wwt	90.0	80.0	120	----
Metals (QCLot: 1828243)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	94.6	80.0	120	----
Metals (QCLot: 1828244)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	107	80.0	120	----
Metals (QCLot: 1828245)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	101	80.0	120	----
Metals (QCLot: 1828246)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	101	80.0	120	----
Metals (QCLot: 1828248)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	105	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	101	80.0	120	----
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	107	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	106	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	104	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	103	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	98.9	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	98.1	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	102	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	101	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1828248) - continued									
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	104	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	101	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	98.6	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	98.4	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	104	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	100	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	101	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	107	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	98.6	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	110	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	104	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	97.5	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	104	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	101	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	101	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	101	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	105	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	106	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	105	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	95.7	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	105	80.0	120	----
Metals (QCLot: 1830372)									
Aluminum	7429-90-5	E440	2	mg/kg	20 mg/kg	94.1	80.0	120	----
Antimony	7440-36-0	E440	0.01	mg/kg	10 mg/kg	106	80.0	120	----
Arsenic	7440-38-2	E440	0.02	mg/kg	10 mg/kg	96.8	80.0	120	----
Barium	7440-39-3	E440	0.05	mg/kg	2.5 mg/kg	96.1	80.0	120	----
Beryllium	7440-41-7	E440	0.01	mg/kg	1 mg/kg	97.4	80.0	120	----
Bismuth	7440-69-9	E440	0.01	mg/kg	10 mg/kg	102	80.0	120	----
Boron	7440-42-8	E440	1	mg/kg	10 mg/kg	99.8	80.0	120	----
Cadmium	7440-43-9	E440	0.005	mg/kg	1 mg/kg	92.5	80.0	120	----
Calcium	7440-70-2	E440	20	mg/kg	500 mg/kg	99.7	80.0	120	----
Cesium	7440-46-2	E440	0.005	mg/kg	0.5 mg/kg	102	80.0	120	----
Chromium	7440-47-3	E440	0.05	mg/kg	2.5 mg/kg	95.3	80.0	120	----
Cobalt	7440-48-4	E440	0.02	mg/kg	2.5 mg/kg	93.6	80.0	120	----

Sub-Matrix: **Biota**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1830372) - continued									
Copper	7440-50-8	E440	0.1	mg/kg	2.5 mg/kg	94.1	80.0	120	----
Iron	7439-89-6	E440	3	mg/kg	10 mg/kg	94.5	80.0	120	----
Lead	7439-92-1	E440	0.02	mg/kg	5 mg/kg	102	80.0	120	----
Lithium	7439-93-2	E440	0.5	mg/kg	2.5 mg/kg	105	80.0	120	----
Magnesium	7439-95-4	E440	2	mg/kg	500 mg/kg	100	80.0	120	----
Manganese	7439-96-5	E440	0.05	mg/kg	2.5 mg/kg	93.9	80.0	120	----
Molybdenum	7439-98-7	E440	0.02	mg/kg	2.5 mg/kg	105	80.0	120	----
Nickel	7440-02-0	E440	0.2	mg/kg	5 mg/kg	93.2	80.0	120	----
Phosphorus	7723-14-0	E440	10	mg/kg	100 mg/kg	97.4	80.0	120	----
Potassium	7440-09-7	E440	20	mg/kg	500 mg/kg	91.8	80.0	120	----
Rubidium	7440-17-7	E440	0.05	mg/kg	1 mg/kg	97.0	80.0	120	----
Selenium	7782-49-2	E440	0.05	mg/kg	10 mg/kg	94.1	80.0	120	----
Sodium	7440-23-5	E440	20	mg/kg	500 mg/kg	92.7	80.0	120	----
Strontium	7440-24-6	E440	0.05	mg/kg	2.5 mg/kg	111	80.0	120	----
Tellurium	13494-80-9	E440	0.02	mg/kg	1 mg/kg	105	80.0	120	----
Thallium	7440-28-0	E440	0.002	mg/kg	10 mg/kg	98.9	80.0	120	----
Tin	7440-31-5	E440	0.1	mg/kg	5 mg/kg	95.5	80.0	120	----
Uranium	7440-61-1	E440	0.002	mg/kg	0.05 mg/kg	101	80.0	120	----
Vanadium	7440-62-2	E440	0.1	mg/kg	5 mg/kg	96.4	80.0	120	----
Zinc	7440-66-6	E440	0.5	mg/kg	5 mg/kg	92.0	80.0	120	----
Zirconium	7440-67-7	E440	0.2	mg/kg	1 mg/kg	102	80.0	120	----
Metals (QCLot: 1830373)									
Silver	7440-22-4	E440.Ag	0.005	mg/kg	1 mg/kg	95.0	80.0	120	----
Metals (QCLot: 1830374)									
Mercury	7439-97-6	E510A	0.001	mg/kg wwt	0.02 mg/kg wwt	96.2	80.0	120	----
Metals (QCLot: 1830375)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.02 mg/kg	96.2	80.0	120	----
Metals (QCLot: 1830376)									
Titanium	7440-32-6	E440.Ti	0.25	mg/kg	2.5 mg/kg	94.8	80.0	120	----
Metals (QCLot: 1837538)									
Mercury	7439-97-6	E511A	0.001	mg/kg wwt	0.02 mg/kg wwt	88.8	80.0	120	----
Metals (QCLot: 1837539)									
Mercury	7439-97-6	E511	0.005	mg/kg	0.02 mg/kg	88.8	80.0	120	----
Metals (QCLot: 1837541)									
Aluminum	7429-90-5	E472	5	mg/kg	20 mg/kg	100	80.0	120	----
Antimony	7440-36-0	E472	0.01	mg/kg	10 mg/kg	97.1	80.0	120	----

Sub-Matrix: **Biota**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1837541) - continued									
Arsenic	7440-38-2	E472	0.03	mg/kg	10 mg/kg	98.9	80.0	120	----
Barium	7440-39-3	E472	0.05	mg/kg	2.5 mg/kg	96.8	80.0	120	----
Beryllium	7440-41-7	E472	0.01	mg/kg	1 mg/kg	97.0	80.0	120	----
Bismuth	7440-69-9	E472	0.01	mg/kg	10 mg/kg	103	80.0	120	----
Boron	7440-42-8	E472	1	mg/kg	10 mg/kg	88.6	80.0	120	----
Cadmium	7440-43-9	E472	0.01	mg/kg	1 mg/kg	97.7	80.0	120	----
Calcium	7440-70-2	E472	20	mg/kg	500 mg/kg	96.3	80.0	120	----
Cesium	7440-46-2	E472	0.005	mg/kg	0.5 mg/kg	99.9	80.0	120	----
Chromium	7440-47-3	E472	0.2	mg/kg	2.5 mg/kg	99.7	80.0	120	----
Cobalt	7440-48-4	E472	0.02	mg/kg	2.5 mg/kg	97.2	80.0	120	----
Copper	7440-50-8	E472	0.2	mg/kg	2.5 mg/kg	95.7	80.0	120	----
Iron	7439-89-6	E472	5	mg/kg	10 mg/kg	102	80.0	120	----
Lead	7439-92-1	E472	0.05	mg/kg	5 mg/kg	101	80.0	120	----
Lithium	7439-93-2	E472	0.5	mg/kg	2.5 mg/kg	101	80.0	120	----
Magnesium	7439-95-4	E472	2	mg/kg	500 mg/kg	97.7	80.0	120	----
Manganese	7439-96-5	E472	0.05	mg/kg	2.5 mg/kg	100	80.0	120	----
Molybdenum	7439-98-7	E472	0.04	mg/kg	2.5 mg/kg	101	80.0	120	----
Nickel	7440-02-0	E472	0.2	mg/kg	5 mg/kg	96.0	80.0	120	----
Phosphorus	7723-14-0	E472	10	mg/kg	100 mg/kg	102	80.0	120	----
Potassium	7440-09-7	E472	20	mg/kg	500 mg/kg	99.5	80.0	120	----
Rubidium	7440-17-7	E472	0.05	mg/kg	1 mg/kg	99.3	80.0	120	----
Selenium	7782-49-2	E472	0.1	mg/kg	10 mg/kg	94.1	80.0	120	----
Sodium	7440-23-5	E472	20	mg/kg	500 mg/kg	96.5	80.0	120	----
Strontium	7440-24-6	E472	0.1	mg/kg	2.5 mg/kg	101	80.0	120	----
Tellurium	13494-80-9	E472	0.02	mg/kg	1 mg/kg	94.6	80.0	120	----
Thallium	7440-28-0	E472	0.002	mg/kg	10 mg/kg	98.2	80.0	120	----
Tin	7440-31-5	E472	0.1	mg/kg	5 mg/kg	102	80.0	120	----
Uranium	7440-61-1	E472	0.002	mg/kg	0.05 mg/kg	102	80.0	120	----
Vanadium	7440-62-2	E472	0.1	mg/kg	5 mg/kg	101	80.0	120	----
Zinc	7440-66-6	E472	1	mg/kg	5 mg/kg	95.2	80.0	120	----
Zirconium	7440-67-7	E472	0.2	mg/kg	1 mg/kg	100	80.0	120	----
Metals (QCLot: 1837542)									
Silver	7440-22-4	E472.Ag	0.005	mg/kg	1 mg/kg	90.2	80.0	120	----
Metals (QCLot: 1837543)									
Titanium	7440-32-6	E472.Ti	0.5	mg/kg	2.5 mg/kg	97.8	80.0	120	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 1814706)									
QC-1814706-003	RM	Aluminum	7429-90-5	E475	147 mg/kg	74.8	70.0	130	----
QC-1814706-003	RM	Arsenic	7440-38-2	E475	14.5 mg/kg	98.0	70.0	130	----
QC-1814706-003	RM	Barium	7440-39-3	E475	0.352 mg/kg	105	70.0	130	----
QC-1814706-003	RM	Boron	7440-42-8	E475	3.47 mg/kg	102	70.0	130	----
QC-1814706-003	RM	Cadmium	7440-43-9	E475	0.153 mg/kg	96.9	70.0	130	----
QC-1814706-003	RM	Calcium	7440-70-2	E475	2010 mg/kg	110	70.0	130	----
QC-1814706-003	RM	Cesium	7440-46-2	E475	0.089 mg/kg	95.2	70.0	130	----
QC-1814706-003	RM	Chromium	7440-47-3	E475	0.453 mg/kg	88.7	50.0	150	----
QC-1814706-003	RM	Cobalt	7440-48-4	E475	0.057 mg/kg	93.4	65.0	135	----
QC-1814706-003	RM	Copper	7440-50-8	E475	3.3 mg/kg	95.0	70.0	130	----
QC-1814706-003	RM	Iron	7439-89-6	E475	102 mg/kg	88.4	70.0	130	----
QC-1814706-003	RM	Lead	7439-92-1	E475	0.058 mg/kg	97.6	15.0	185	----
QC-1814706-003	RM	Magnesium	7439-95-4	E475	899 mg/kg	88.2	70.0	130	----
QC-1814706-003	RM	Manganese	7439-96-5	E475	0.948 mg/kg	95.4	70.0	130	----
QC-1814706-003	RM	Molybdenum	7439-98-7	E475	0.134 mg/kg	99.0	70.0	130	----
QC-1814706-003	RM	Nickel	7440-02-0	E475	0.33 mg/kg	91.7	40.0	160	----
QC-1814706-003	RM	Phosphorus	7723-14-0	E475	6700 mg/kg	103	70.0	130	----
QC-1814706-003	RM	Potassium	7440-09-7	E475	11600 mg/kg	101	70.0	130	----
QC-1814706-003	RM	Rubidium	7440-17-7	E475	2.53 mg/kg	97.9	70.0	130	----
QC-1814706-003	RM	Selenium	7782-49-2	E475	2.48 mg/kg	98.2	70.0	130	----
QC-1814706-003	RM	Sodium	7440-23-5	E475	9620 mg/kg	102	70.0	130	----
QC-1814706-003	RM	Strontium	7440-24-6	E475	10.6 mg/kg	96.2	70.0	130	----
QC-1814706-003	RM	Vanadium	7440-62-2	E475	0.269 mg/kg	84.8	70.0	130	----
QC-1814706-003	RM	Zinc	7440-66-6	E475	28.7 mg/kg	96.3	70.0	130	----
Metals (QCLot: 1814707)									
QC-1814707-003	RM	Silver	7440-22-4	E475.Ag	0.139 mg/kg	96.0	70.0	130	----
Metals (QCLot: 1814708)									
QC-1814708-003	RM	Titanium	7440-32-6	E475.Ti	1.15 mg/kg	81.1	70.0	130	----
Metals (QCLot: 1814709)									
QC-1814709-003	RM	Mercury	7439-97-6	E512	0.281 mg/kg	107	70.0	130	----
Metals (QCLot: 1814710)									
QC-1814710-003	RM	Mercury	7439-97-6	E512A	0.281 mg/kg wwt	107	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1828243)									
QC-1828243-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	96.5	70.0	130	----
Metals (QCLot: 1828244)									
QC-1828244-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	109	70.0	130	----
Metals (QCLot: 1828245)									
QC-1828245-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	71.0	70.0	130	----
Metals (QCLot: 1828246)									
QC-1828246-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	71.0	70.0	130	----
Metals (QCLot: 1828248)									
QC-1828248-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	93.0	70.0	130	----
QC-1828248-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	97.7	70.0	130	----
QC-1828248-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	99.4	70.0	130	----
QC-1828248-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	105	70.0	130	----
QC-1828248-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	101	70.0	130	----
QC-1828248-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	99.1	70.0	130	----
QC-1828248-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	94.5	70.0	130	----
QC-1828248-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	134	50.0	150	----
QC-1828248-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	101	65.0	135	----
QC-1828248-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	94.4	70.0	130	----
QC-1828248-003	RM	Iron	7439-89-6	E472	102 mg/kg	94.3	70.0	130	----
QC-1828248-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	99.0	15.0	185	----
QC-1828248-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	97.8	70.0	130	----
QC-1828248-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	130	70.0	130	----
QC-1828248-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	103	70.0	130	----
QC-1828248-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	107	40.0	160	----
QC-1828248-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	100	70.0	130	----
QC-1828248-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	99.4	70.0	130	----
QC-1828248-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	95.9	70.0	130	----
QC-1828248-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	100	70.0	130	----
QC-1828248-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	102	70.0	130	----
QC-1828248-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	90.5	70.0	130	----
QC-1828248-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	94.4	70.0	130	----
QC-1828248-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	95.6	70.0	130	----
Metals (QCLot: 1830372)									
QC-1830372-003	RM	Aluminum	7429-90-5	E440	147 mg/kg	101	70.0	130	----
QC-1830372-003	RM	Arsenic	7440-38-2	E440	14.5 mg/kg	95.2	70.0	130	----
QC-1830372-003	RM	Barium	7440-39-3	E440	0.352 mg/kg	93.8	70.0	130	----
QC-1830372-003	RM	Boron	7440-42-8	E440	3.47 mg/kg	108	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1830372) - continued									
QC-1830372-003	RM	Cadmium	7440-43-9	E440	0.153 mg/kg	93.6	70.0	130	----
QC-1830372-003	RM	Calcium	7440-70-2	E440	2010 mg/kg	96.3	70.0	130	----
QC-1830372-003	RM	Cesium	7440-46-2	E440	0.089 mg/kg	90.5	70.0	130	----
QC-1830372-003	RM	Chromium	7440-47-3	E440	0.453 mg/kg	102	70.0	130	----
QC-1830372-003	RM	Cobalt	7440-48-4	E440	0.057 mg/kg	107	65.0	135	----
QC-1830372-003	RM	Copper	7440-50-8	E440	3.3 mg/kg	97.0	70.0	130	----
QC-1830372-003	RM	Iron	7439-89-6	E440	102 mg/kg	96.4	70.0	130	----
QC-1830372-003	RM	Lead	7439-92-1	E440	0.058 mg/kg	92.3	70.0	130	----
QC-1830372-003	RM	Magnesium	7439-95-4	E440	899 mg/kg	97.6	70.0	130	----
QC-1830372-003	RM	Manganese	7439-96-5	E440	0.948 mg/kg	98.9	70.0	130	----
QC-1830372-003	RM	Molybdenum	7439-98-7	E440	0.134 mg/kg	92.2	70.0	130	----
QC-1830372-003	RM	Nickel	7440-02-0	E440	0.33 mg/kg	115	40.0	160	----
QC-1830372-003	RM	Phosphorus	7723-14-0	E440	6700 mg/kg	95.7	70.0	130	----
QC-1830372-003	RM	Potassium	7440-09-7	E440	11600 mg/kg	95.7	70.0	130	----
QC-1830372-003	RM	Rubidium	7440-17-7	E440	2.53 mg/kg	97.9	70.0	130	----
QC-1830372-003	RM	Selenium	7782-49-2	E440	2.48 mg/kg	98.4	70.0	130	----
QC-1830372-003	RM	Sodium	7440-23-5	E440	9620 mg/kg	101	70.0	130	----
QC-1830372-003	RM	Strontium	7440-24-6	E440	10.6 mg/kg	92.4	70.0	130	----
QC-1830372-003	RM	Vanadium	7440-62-2	E440	0.269 mg/kg	98.8	70.0	130	----
QC-1830372-003	RM	Zinc	7440-66-6	E440	28.7 mg/kg	96.4	70.0	130	----
Metals (QCLot: 1830373)									
QC-1830373-003	RM	Silver	7440-22-4	E440.Ag	0.139 mg/kg	90.6	70.0	130	----
Metals (QCLot: 1830374)									
QC-1830374-003	RM	Mercury	7439-97-6	E510A	0.281 mg/kg wwt	90.6	70.0	130	----
Metals (QCLot: 1830375)									
QC-1830375-003	RM	Mercury	7439-97-6	E510	0.281 mg/kg	90.6	70.0	130	----
Metals (QCLot: 1830376)									
QC-1830376-003	RM	Titanium	7440-32-6	E440.Ti	1.15 mg/kg	95.6	70.0	130	----
Metals (QCLot: 1837538)									
QC-1837538-003	RM	Mercury	7439-97-6	E511A	0.281 mg/kg wwt	90.7	70.0	130	----
Metals (QCLot: 1837539)									
QC-1837539-003	RM	Mercury	7439-97-6	E511	0.281 mg/kg	90.7	70.0	130	----
Metals (QCLot: 1837541)									
QC-1837541-003	RM	Aluminum	7429-90-5	E472	147 mg/kg	76.6	70.0	130	----
QC-1837541-003	RM	Arsenic	7440-38-2	E472	14.5 mg/kg	96.8	70.0	130	----
QC-1837541-003	RM	Barium	7440-39-3	E472	0.352 mg/kg	114	70.0	130	----
QC-1837541-003	RM	Boron	7440-42-8	E472	3.47 mg/kg	102	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%): RM	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Metals (QCLot: 1837541) - continued									
QC-1837541-003	RM	Cadmium	7440-43-9	E472	0.153 mg/kg	96.6	70.0	130	----
QC-1837541-003	RM	Calcium	7440-70-2	E472	2010 mg/kg	106	70.0	130	----
QC-1837541-003	RM	Cesium	7440-46-2	E472	0.089 mg/kg	96.5	70.0	130	----
QC-1837541-003	RM	Chromium	7440-47-3	E472	0.453 mg/kg	82.9	50.0	150	----
QC-1837541-003	RM	Cobalt	7440-48-4	E472	0.057 mg/kg	90.6	65.0	135	----
QC-1837541-003	RM	Copper	7440-50-8	E472	3.3 mg/kg	93.5	70.0	130	----
QC-1837541-003	RM	Iron	7439-89-6	E472	102 mg/kg	89.3	70.0	130	----
QC-1837541-003	RM	Lead	7439-92-1	E472	0.058 mg/kg	104	15.0	185	----
QC-1837541-003	RM	Magnesium	7439-95-4	E472	899 mg/kg	89.9	70.0	130	----
QC-1837541-003	RM	Manganese	7439-96-5	E472	0.948 mg/kg	93.6	70.0	130	----
QC-1837541-003	RM	Molybdenum	7439-98-7	E472	0.134 mg/kg	97.5	70.0	130	----
QC-1837541-003	RM	Nickel	7440-02-0	E472	0.33 mg/kg	95.8	40.0	160	----
QC-1837541-003	RM	Phosphorus	7723-14-0	E472	6700 mg/kg	105	70.0	130	----
QC-1837541-003	RM	Potassium	7440-09-7	E472	11600 mg/kg	102	70.0	130	----
QC-1837541-003	RM	Rubidium	7440-17-7	E472	2.53 mg/kg	96.4	70.0	130	----
QC-1837541-003	RM	Selenium	7782-49-2	E472	2.48 mg/kg	98.5	70.0	130	----
QC-1837541-003	RM	Sodium	7440-23-5	E472	9620 mg/kg	99.8	70.0	130	----
QC-1837541-003	RM	Strontium	7440-24-6	E472	10.6 mg/kg	93.5	70.0	130	----
QC-1837541-003	RM	Vanadium	7440-62-2	E472	0.269 mg/kg	84.2	70.0	130	----
QC-1837541-003	RM	Zinc	7440-66-6	E472	28.7 mg/kg	101	70.0	130	----
Metals (QCLot: 1837542)									
QC-1837542-003	RM	Silver	7440-22-4	E472.Ag	0.139 mg/kg	96.3	70.0	130	----
Metals (QCLot: 1837543)									
QC-1837543-003	RM	Titanium	7440-32-6	E472.Ti	1.15 mg/kg	89.0	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Page 1 of 4

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	9932

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Can Dang	Sampler:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P)

Environmental Division Vancouver
Work Order Reference
VA24C9932

Telephone : +1 604 253 4188

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440-Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440-Ti)							
	MP_QUR_RB-MU-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-4_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-5_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-6_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-7_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-MU-8_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-LI-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-LI-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-LI-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R							1
	MP_QUR_RB-LI-4_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R							1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			[redacted]		4,4,3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Oct- -2024	Time:	Received by:	Date:	Time:	Received by:	Date: Oct 30	Time: 12:20pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2024 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Page 2 of 4

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Can Dang	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUR_RB-LI-5_2024-10	26-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-LI-6_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-LI-7_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-LI-8_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-2_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-3_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-4_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-5_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-6_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-7_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-8_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

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SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					4/4/3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Oct- -2024	Time:	Received by:	Date:	Time:	Received by:	Date: Oct 30	Time: 12:20 PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Page 3 of 4 4

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: kbatchelar@minnow.ca
Email 2: gabriel.holmes@mountpolley.com
Email 3: slatimer@minnow.ca; simone.derosemond@minnow.ca

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐
EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax: gabriel.holmes@mountpolley.com
Email 2:

Project Information	
ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang | Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUR_RB-OV-1_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUR_RB-OV-2_2024-10~~	~~Oct-24~~	~~-~~	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUR_RB-OV-3_2024-10~~	~~Oct-24~~	~~-~~	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	~~MP_QUR_RB-OV-4_2024-10~~	~~Oct-24~~	~~-~~	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
	MP_QUR_RB-OV-5_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-OV-6_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-OV-7_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-OV-8_2024-10	20-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-MU-3X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-LI-3X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-KI-3X_2024-10	19-Oct-24	-	Tissue	R	R	R	R	R	R	1
	~~MP_QUR_RB-OV-X_2024-10~~	~~Oct-24~~	~~-~~	~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					4, 4, 3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: Oct- -2024	Time:	Received by:	Date:	Time:	Received by: MC	Date: Oct 30	Time: 12:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Page 4 of 4

Report To	Contact and company name below will appear on the final report
Company:	Mount Polley Mining Corporation
Contact:	Gabriel Holmes
Phone:	236-317-4939
	Company address below will appear on the final report
Street:	PO Box 12
City/Province:	Likely, BC
Postal Code:	V0L 1N0
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kbatchelar@minnow.ca
Email 2	gabriel.holmes@mountpolley.com
Email 3	slatimer@minnow.ca; simone.derosemond@minnow.ca

Invoice Distribution

Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX
Email 1 or Fax	gabriel.holmes@mountpolley.com
Email 2	

Project Information

ALS Account # / Quote #:	VA24-MPMC100-004
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Can Dang

Sampler:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Moisture Content by Gravimetry (E144)	Mercury in Biota by CVAAS (DRY units, Routine) (E510)	Mercury in Biota by CVAAS (WET units, Routine) (E510A)	Metals in Biota by CRC ICPMS (DRY units, Routine) (E440)	Silver in Biota by CRC ICPMS (DRY units, Routine) (E440.Ag)	Titanium in Biota by CRC ICPMS (DRY units, Routine) (E440.Ti)	Number of Containers
	MP_QUR_RB-MU-7X_2024-10	20-Oct-24	—	Tissue	R	R	R	R	R	R	1
	MP_QUR_RB-LI-7X_2024-10	20-Oct-24	—	Tissue	R	R	R	R	R	R	1
	MP-QUR-RB-KI-7X_2024-10	20-Oct-24	—	Tissue	R	R	R	R	R	R	1
	MP_QUR-RB-OV-7X_2024-10	20-Oct-24	—	Tissue	R	R	R	R	R	R	1
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		~~Tissue~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~
		~~Oct-24~~		Tissue	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~1~~

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

If sample is insufficient for regular digestion and analysis, please contact kbatchelar@minnow.ca or pstecko@minnow.ca to discuss analysis options.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☑ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
					14.4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
						MC	Oct 30	12:20 pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

FISH AGING

AAE Laboratory Report 24-04-3

(Finalized July 28, 2024)

1. SAMPLE SET

AAE Tech Services Inc. (AAE) was contracted by Minnow Environmental to provide ageing structure processing and age estimation services for samples collected under Project 24-04 Task 3, received May 17, 2024. This included 16 pairs of Rainbow Trout otoliths and 16 Longnose Sucker fin rays. A full data spreadsheet, including sample ID, structure type, ageing process used, and age estimation results, is provided in the data sheets accompanying this report.

2. AGEING METHOD: OTOLITHS

Sagittal otolith pairs were provided for Rainbow Trout in individual enumerated sample envelopes, along with sets of scales as the secondary ageing structure, for a total of 16 samples.

All otoliths in this sample set were analyzed using the "Sectioning" method. This method is used primarily for larger otoliths with a deep sulcus or irregular shape. This method was selected only after the "Read Whole" method (non-destructive, often used in smaller otoliths) was found to be inaccurate.

OTOLITH PREPARATION

Otolith pairs were examined under magnification and evaluated for any issues related to structural integrity (e.g. cracks, fractures, chips, pieces missing) and deformation (crystallization, misshapen lobes). One otolith is selected for processing and is embedded in Cold Cure epoxy resin. Samples are allowed to cure for 48 hours before sectioning. Samples are marked for sectioning under magnification using a fine tip marker to identify the nucleus (centre) and section plane (cut edge to be examined) for each otolith. Using the marks as a guide, a Buehler Isomet low speed dual-blade saw is used to cut a single section, with the section plane passing through the nucleus. This surface is then polished with a series of lapping film (30, 12, and 0.3 microns) to improve clarity of the section plane.

To carry out age estimation, an otolith section is submerged in water under magnification with the polished surface facing up.

AGE ESTIMATION

Annuli are counted outward from the nucleus. Checking (false-annuli) is common in many species, including Rainbow Trout, particularly within the first 1-3 years of growth. Annuli are assessed for density (contrast between summer and winter growth), clarity (ability to differentiate individual annuli) and continuity (e.g. segmentation, merging, fading). Photographs under magnification are taken of each sample for reference and revision. Ages are recorded with a Confidence Index (CI) based on the condition of the otolith, annuli assessment, and the confidence of the reader in the age recorded, as described in Table 1.

Table 1. Confidence Index (CI) table; applied to each age estimate, reflecting the reader's confidence in the age recorded.

Confidence Index (CI)	Abbreviation	Qualitative Meaning	Quantitative Meaning
Good	G	Pattern very clear with no interpretational problems	Reader would always get the same age
Fairly Good	FG	Pattern is clear with few easy interpretational problems	Reader would get the same age most of the time for fish <20 years
Fair	F	Pattern is fairly clear with some areas presenting easy and moderate interpretational problems	Reader would be within one year most of the time for fish <20 years
Fairly Poor	FP	Pattern is fairly unclear, presenting a number of difficult interpretational problems	Reader would be within 2-3 years for fish <20 years
Poor	P	Pattern is very unclear, presenting significant interpretational problems	Reader has little confidence in repeatability of age

3. AGEING METHOD: FIN RAYS

Fin ray clips for Longnose Sucker samples were provided in individual enumerated sample envelopes, along with sets of scales as the secondary ageing structure, for a total of 16 samples.

Fin rays are often used instead of otoliths for age estimation (e.g. non-lethal sampling). Fin rays are the preferred ageing structure in instances where otolith samples are not available; the accuracy and precision of age estimation from fin clips or dorsal spines is much higher than scales. When sampling fish species known to have a consistently low-quality otolith (e.g. Catostomidae spp.), fin rays are the preferred structure with which to derive age estimates. When possible, AAE should be consulted prior to sample collection or shipment to determine the ideal ageing structure for a particular fish species.

All fin ray clips in this sample set were processed and analyzed using the "Sectioning" method, similar to that used for the otoliths.

FIN RAY PREPARATION

Fin rays are embedded in Cold Cure epoxy resin to increase the structural integrity of the sample and prevent damage or degradation of the sample during processing. Samples are cured for 48 hours before sectioning. A fine-tip marker is used to mark a cut line on the sample, following the base of the fin rays and perpendicular to the primary (1st) ray. A Buehler Isomet low speed single-blade saw is used to cut three successive sections beginning at the marked base of the rays. Three sections (minimum) are taken to compensate for misalignment or staggering of the rays or spines, due to shifting during the embedding process, or the inherent shape of the structure; the first section may not pass through the base of all three (or more) rays. Each section is enumerated by the order of cut (I, II, III, etc.) directly onto the sample using a fine-tip pencil. The analysis of multiple spines enables age verification and improves the reliability of the age estimate, especially in the case of heavy checking or faint/thin annuli.

The three sections are submerged in a dish of water under magnification with the ageing surface facing up. Orientation is matched across all three sections to ensure accurate comparison.

AGE ESTIMATION

Annuli are counted out from the nucleus (center ring) in the first cut section, followed by the second and third; age estimation is based on analysis of all available sections. Photographs under magnification are taken of each sample for reference and revision. Ages are recorded with a Confidence Index (CI) based on the condition of the fin ray section, and the confidence of the reader in the age recorded (Table 1).

4. AGEING RESULTS

Age estimates were provided in July 2024 based on the otolith and fin ray samples provided.

Rainbow Trout age estimates ranged from 4 to 6 years of age, with a modal 4 years. CI values were fairly high, with six samples recorded as FG, six samples recorded as F, and four samples recorded as FP.

Longnose Sucker age estimates ranged from 3 to 12 years of age, with a modal age of 10 years. CI values were also fairly high, with the majority of samples recorded as either F or FG. Noted difficulties included checking, as well as the outer annuli of older fish becoming faint.

Samples were photographed under magnification for reference and revision. Representative photographs of each species are presented in Section 6.

5. QA/QC PROTOCOL

AAE's QA/QC protocols have been developed in consultation with Fisheries and Oceans Canada ageing experts to ensure accurate age estimations while addressing potential issues related to confidence index, reader bias, and human error. For this project 50% of samples were aged for QA/QC.

6. REPRESENTATIVE SAMPLE PHOTOGRAPHS

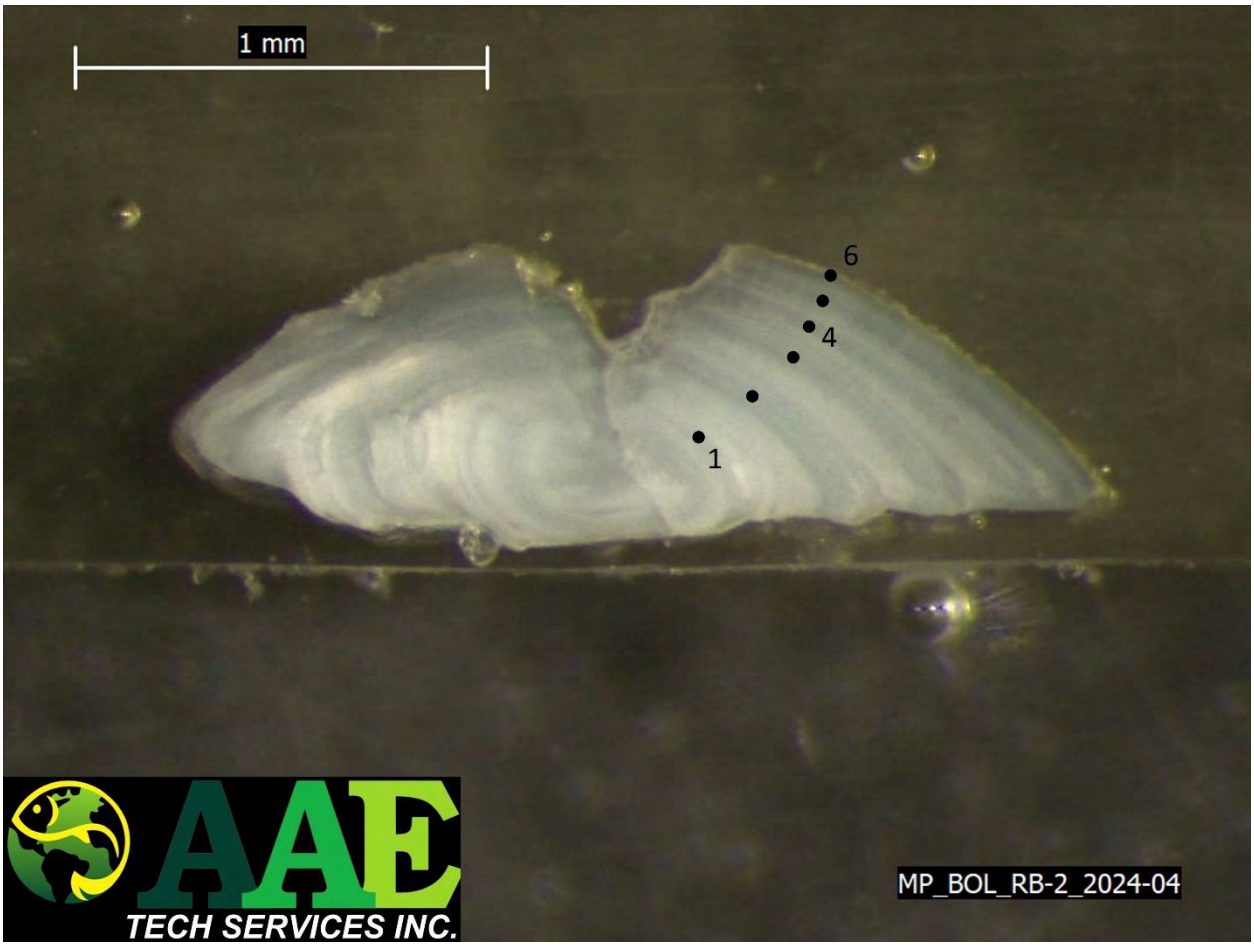

Figure 1. Rainbow Trout (sagittal otolith), showing counted annuli for age estimate.

Figure 2. Longnose Sucker (fin rays), showing counted annuli for age estimate.

57 First Avenue
La Salle, Manitoba
R0G 0A2

AAE Fish Ageing, Polley Lake and Bootjack Lake, Spring 2024

Sample ID	Date Sampled	Species	Sex	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QA/QC Ager	Age Estimate	CI	Final Age	Notes
MP_POL_RB-1_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	6	FP	JS	6	F	**6**	-
MP_POL_RB-2_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	F				**4**	Otoliths crystallized
MP_POL_RB-3_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	FP	JS	4	FP	**4**	-
MP_POL_RB-4_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	F				**5**	-
MP_POL_RB-5_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	6	FG	JS	6	F	**6**	-
MP_POL_RB-6_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	F				**5**	-
MP_POL_RB-7_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	FG	JS	4	FG	**4**	-
MP_POL_RB-8_2024-04	25-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	FG				**4**	-
MP_BOL_RB-1_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	FP	JS	5	FP	**5**	-
MP_BOL_RB-2_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	6	FG				**6**	-
MP_BOL_RB-3_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	F	JS	5	F	**5**	-
MP_BOL_RB-4_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	F				**5**	-
MP_BOL_RB-5_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	FG	JS	4	FG	**4**	-
MP_BOL_RB-6_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	5	FP				**5**	-
MP_BOL_RB-7_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	F	JS	4	F	**4**	-
MP_BOL_RB-8_2024-04	26-Apr-24	Rainbow Trout	F	Otolith	Section	JL	4	FG				**4**	-
MP_POL_LSU-1_2024-04	25-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	5	F	JS	5	F	**5**	-
MP_POL_LSU-2_2024-04	25-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	6	F				**6**	-
MP_POL_LSU-3_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	5	FG	JS	5	F	**5**	-
MP_POL_LSU-4_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	5	F				**5**	-
MP_POL_LSU-5_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	6	FG	JS	6	FG	**6**	-
MP_POL_LSU-6_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	6	F				**6**	-
MP_POL_LSU-7_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	11	F	JS	11	F	**11**	-
MP_POL_LSU-8_2024-04	27-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	3	FG				**3**	-
MP_BOL_LSU-1_2024-04	28-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	12	FP	JS	13	FP	**12**	-
MP_BOL_LSU-2_2024-04	28-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	10	FP				**10**	-
MP_BOL_LSU-3_2024-04	28-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	8	F	JS	8	F	**8**	-
MP_BOL_LSU-4_2024-04	28-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	10	FP				**10**	-
MP_BOL_LSU-5_2024-04	28-Apr-24	Longnose Sucker	F	Pectoral fin	Section	JL	10	FP	JS	11	FP	**10**	-
MP_BOL_LSU-6_2024-05	2-May-24	Longnose Sucker	F	Pectoral fin	Section	JL	6	F				**6**	-
MP_BOL_LSU-7_2024-05	2-May-24	Longnose Sucker	F	Pectoral fin	Section	JL	10	FP	JS	10	FP	**10**	-
MP_BOL_LSU-8_2024-05	2-May-24	Longnose Sucker	F	Pectoral fin	Section	JL	10	FP				**10**	-

Note: "-" = no comment/ note from laboratory.

FISH AGING

AAE Laboratory Report 24-04-6

(Finalized September 23, 2024)

1. SAMPLE SET

AAE Tech Services Inc. (AAE) was contracted by Minnow Environmental to provide ageing structure processing and age estimation services for samples collected under Project 24-04 Task 6, received August 26, 2024. This included 25 sets of Rainbow Trout scales and 2 sets of Coho Salmon scales. A full data spreadsheet, including sample ID, structure type, ageing process used, and age estimation results, is provided in the data sheets accompanying this report.

2. AGEING METHOD: SCALES

Sets of scales were provided for Rainbow Trout and Coho Salmon in individual enumerated sample envelopes, for a total of 27 samples.

SCALE PREPARATION

Scales were examined under magnification, while remaining dry. Individual scales were isolated, examined for completeness and placed on a standard microscope slide. Between six and twelve scales were examined under magnification to determine age estimation.

AGE ESTIMATION

Annuli were identified as a zone of crowded circuli, particularly around the central part of the scale, and were associated with crossovers of circuli. Photographs under magnification were taken of each sample for reference and revision. Ages were recorded with a Confidence Index (CI) based on the condition of the scales, annuli assessment, and the confidence of the reader in the age recorded, as described in Table 1.

Table 1. Confidence Index (CI) table; applied to each age estimate, reflecting the reader's confidence in the age recorded.

Confidence Index (CI)	Abbreviation	Qualitative Meaning	Quantitative Meaning
Good	G	Pattern very clear with no interpretational problems	Reader would always get the same age
Fairly Good	FG	Pattern is clear with few easy interpretational problems	Reader would get the same age most of the time for fish <20 years
Fair	F	Pattern is fairly clear with some areas presenting easy and moderate interpretational problems	Reader would be within one year most of the time for fish <20 years
Fairly Poor	FP	Pattern is fairly unclear, presenting a number of difficult interpretational problems	Reader would be within 2-3 years for fish <20 years
Poor	P	Pattern is very unclear, presenting significant interpretational problems	Reader has little confidence in repeatability of age

3. AGEING RESULTS

Age estimates were provided in September 2024 based on the scale samples provided.

Rainbow Trout age estimates ranged from 0 to 1 years of age, with a modal age of 0. CI values were fairly high, with all samples recorded as either F or FG.

Both samples of Coho Salmon received were aged as young of year (0 years of age). CI values were recorded as F for both samples.

Samples were photographed under magnification for reference and revision. Representative photographs of each species are presented in Section 5.

4. QA/QC PROTOCOL

AAE's QA/QC protocols have been developed in consultation with Fisheries and Oceans Canada ageing experts to ensure accurate age estimations while addressing potential issues related to confidence index, reader bias, and human error. For this project 50% of samples were aged for QA/QC.

5. REPRESENTATIVE SAMPLE PHOTOGRAPHS

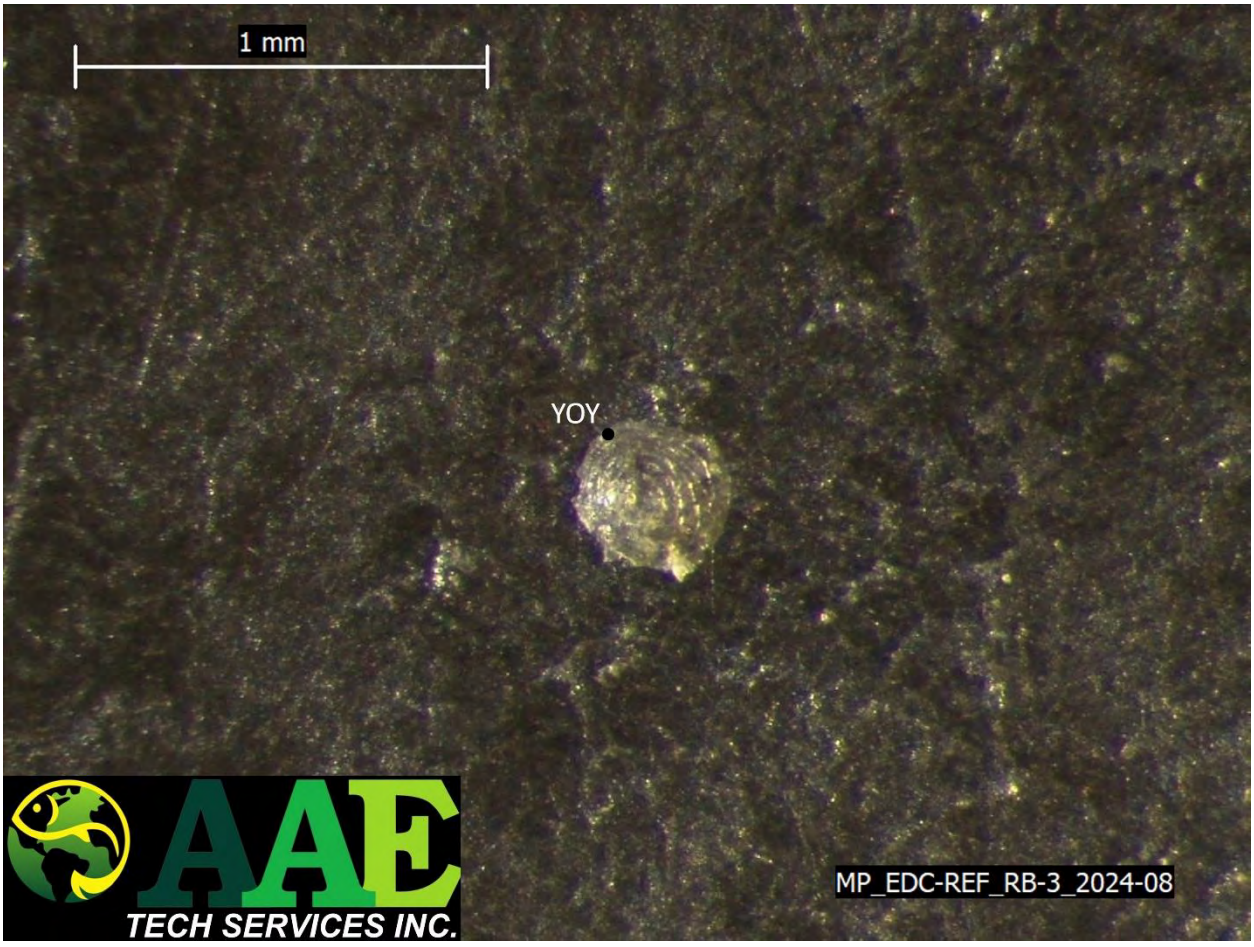

Figure 1. Rainbow Trout (scale), showing age estimate of 0 years of age.

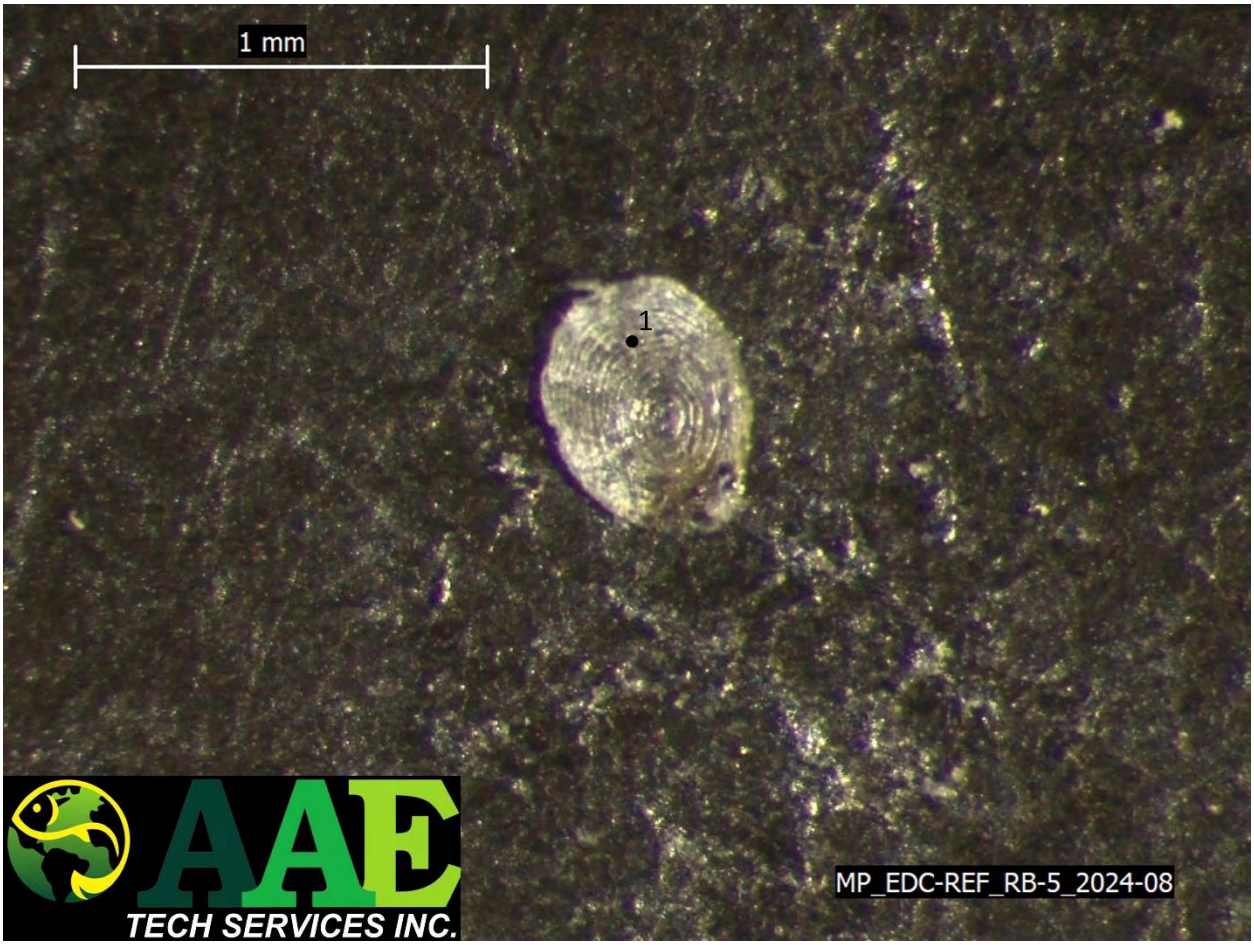

Figure 2. Rainbow Trout (scale), showing counted annuli for age estimate.

Figure 3. Coho Salmon (scale), showing age estimate of 0 years of age.

57 First Avenue
La Salle, Manitoba
R0G 0A2

AAE Fish Ageing, Hazeltine, Edney, and Frypan Creeks, August 2024

Sample ID	Sample Date	Species	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QA/QC Ager	Age Estimate	CI	Final Age
MP_HAC-R2S4_RB-1_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_HAC-R2S4_RB-2_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F	JS	0	F	**0**
MP_HAC-R2S4_RB-11_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG				**0**
MP_HAC-R2S4_RB-12_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	F	**0**
MP_HAC-R2S4_RB-19_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_HAC-R2S4_RB-20_2024-08	7-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	FG	**0**
MP_HAC-R2S2_RB-1_2024-08	11-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_HAC-R2S2_RB-3_2024-08	11-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	FG	**0**
MP_HAC-R5_RB-1_2024-08	14-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_HAC-R5_CO-1_2024-08	14-Aug-24	Coho Salmon	+	Scales	Whole	JL	0	F	JS	0	F	**0**
MP_HAC-R5_CO-2_2024-08	14-Aug-24	Coho Salmon	+	Scales	Whole	JL	0	F				**0**
MP_EDC-REF_RB-1_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F	JS	0	F	**0**
MP_EDC-REF_RB-2_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG				**0**
MP_EDC-REF_RB-3_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	FG	**0**
MP_EDC-REF_RB-4_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG				**0**
MP_EDC-REF_RB-5_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	1	F	JS	1	F	**1**
MP_EDC-REF_RB-6_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_EDC-REF_RB-7_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	FG	**0**
MP_EDC-REF_RB-8_2024-08	9-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_FPC-R2S1_RB-1_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F	JS	0	F	**0**
MP_FPC-R2S1_RB-2_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG				**0**
MP_FPC-R2S1_RB-3_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F	JS	0	F	**0**
MP_FPC-R2S1_RB-4_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG				**0**
MP_FPC-R2S1_RB-5_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	FG	**0**
MP_FPC-R2S1_RB-6_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**
MP_FPC-R2S1_RB-7_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	FG	JS	0	F	**0**
MP_FPC-R2S1_RB-8_2024-08	12-Aug-24	Rainbow Trout	+	Scales	Whole	JL	0	F				**0**

FISH AGING

AAE Laboratory Report 24-04-6 (Set 2)

(Finalized November 21, 2024)

1. SAMPLE SET

AAE Tech Services Inc. (AAE) was contracted by Minnow Environmental to provide age estimation services for samples collected under Project 24-04 Task 6, received November 12, 2024, which included 14 sets of Coho Salmon scales. A full data spreadsheet, including sample ID, structure type, ageing process used, and age estimation results, is provided in the data sheets accompanying this report.

2. AGEING METHOD: SCALES

Sets of scales were provided for Coho Salmon in individual enumerated sample envelopes, for a total of 14 samples.

SCALE PREPARATION

Scales were examined under magnification, while remaining dry. Individual scales were isolated, examined for completeness and placed on a standard microscope slide. Between six and twelve scales were examined under magnification to determine age estimation.

AGE ESTIMATION

Annuli were identified as a zone of crowded circuli, particularly around the central part of the scale, and were associated with crossovers of circuli. Photographs under magnification were taken of each sample for reference and revision. Ages were recorded with a Confidence Index (CI) based on the condition of the scales, annuli assessment, and the confidence of the reader in the age recorded, as described in Table 1.

Table 1. Confidence Index (CI) table; applied to each age estimate, reflecting the reader's confidence in the age recorded.

Confidence Index (CI)	Abbreviation	Qualitative Meaning	Quantitative Meaning
Good	G	Pattern very clear with no interpretational problems	Reader would always get the same age
Fairly Good	FG	Pattern is clear with few easy interpretational problems	Reader would get the same age most of the time for fish <20 years
Fair	F	Pattern is fairly clear with some areas presenting easy and moderate interpretational problems	Reader would be within one year most of the time for fish <20 years
Fairly Poor	FP	Pattern is fairly unclear, presenting a number of difficult interpretational problems	Reader would be within 2-3 years for fish <20 years
Poor	P	Pattern is very unclear, presenting significant interpretational problems	Reader has little confidence in repeatability of age

3. AGEING RESULTS

Age estimates were provided in November 2024 based on the scale samples provided.

Coho Salmon age estimates ranged from 0 to 1 years of age, with a modal age of 0. CI values were fairly high, with all samples recorded as either F or FG.

Samples were photographed under magnification for reference and revision. Representative photographs of each species are presented in Section 5.

4. QA/QC PROTOCOL

AAE's QA/QC protocols have been developed in consultation with Fisheries and Oceans Canada ageing experts to ensure accurate age estimations while addressing potential issues related to confidence index, reader bias, and human error. For this project 100% of samples were aged for QA/QC.

5. REPRESENTATIVE SAMPLE PHOTOGRAPHS

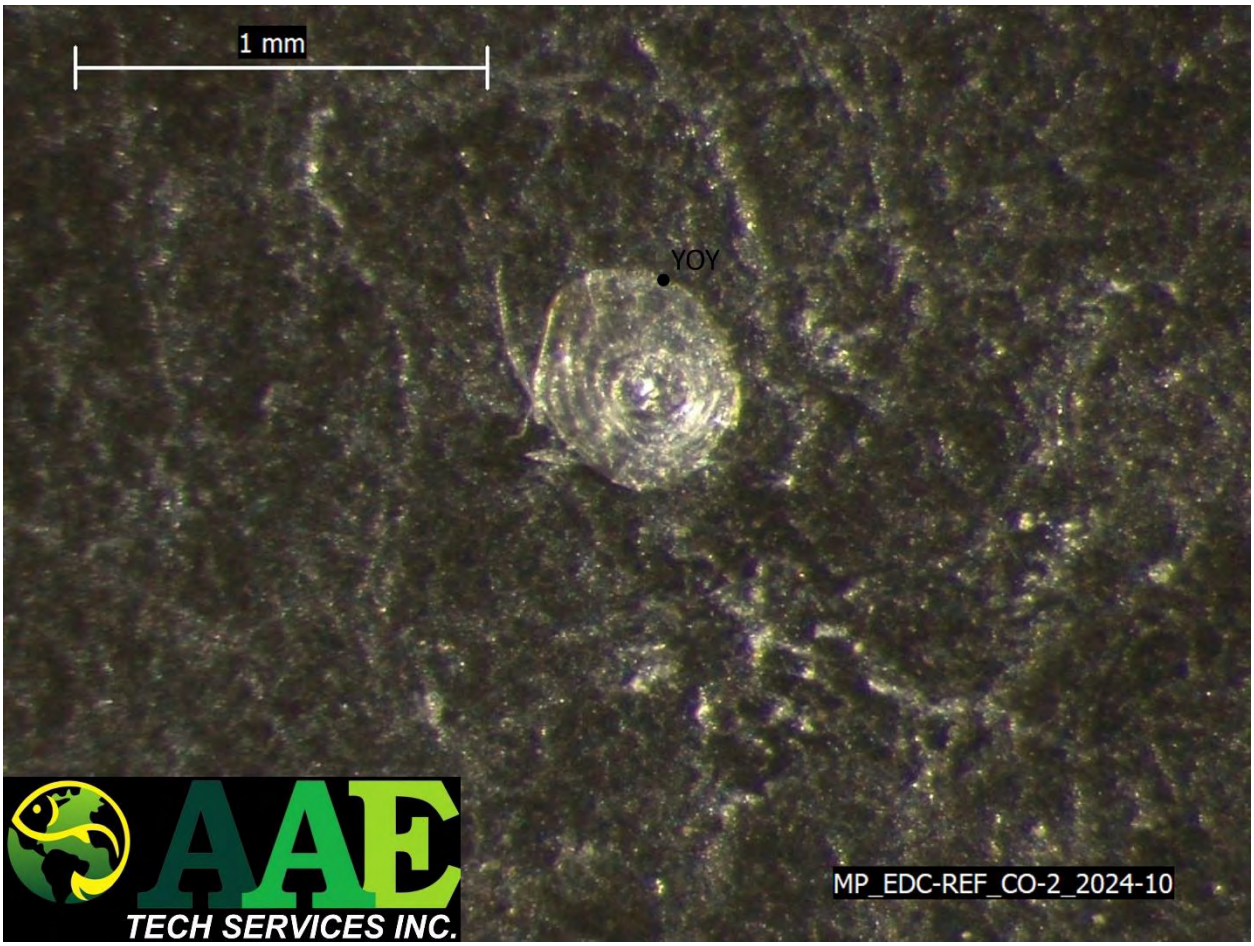

Figure 1. Rainbow Trout (scale), showing age estimate of 0 years of age.

Figure 2. Coho Salmon (scale), showing age estimate of 1 year of age.

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AAE Fish Ageing, Hazeltine and Edney Creeks, October 2024

Sample ID	Sample Date	Species	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QA/QC Ager	Age Estimate	CI	Final Age
MP_HAC-R5_CO-1_2024-10	20-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	FG	JL	0	F	**0**
MP_HAC-R5_CO-2_2024-10	20-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	F	**0**
MP_HAC-R5_CO-3_2024-10	22-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	FG	**0**
MP_HAC-R5_CO-4_2024-10	22-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	FG	JL	0	FG	**0**
MP_HAC-R5_CO-5_2024-10	22-Oct-24	Coho Salmon	+	Scales	Whole	JS	1	F	JL	1	F	**1**
MP_HAC-R5_CO-6_2024-10	22-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	F	**0**
MP_EDC-REF_CO-1_2024-10	19-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	FG	JL	0	FG	**0**
MP_EDC-REF_CO-2_2024-10	19-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	FG	JL	0	FG	**0**
MP_EDC-REF_CO-3_2024-10	19-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	F	**0**
MP_EDC-REF_CO-4_2024-10	21-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	FG	**0**
MP_EDC-REF_CO-5_2024-10	25-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	F	**0**
MP_EDC-REF_CO-6_2024-10	25-Oct-24	Coho Salmon	+	Scales	Whole	JS	1	F	JL	1	F	**1**
MP_EDC-REF_CO-7_2024-10	25-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	F	JL	0	F	**0**
MP_EDC-REF_CO-8_2024-10	25-Oct-24	Coho Salmon	+	Scales	Whole	JS	0	FG	JL	0	F	**0**

FISH AGING

AAE Laboratory Report 24-04-8

(Finalized January 2, 2025)

1. SAMPLE SET

AAE Tech Services Inc. (AAE) was contracted by Minnow Environmental to provide ageing structure processing and age estimation services for samples collected under Project 24-04 Task 8, received November 12, 2024. This included 16 sets of Northern Pikeminnow scales, 13 Peamouth Chub heads, 14 Lake Trout otoliths, 2 sets of Lake Trout scales, and 8 Rainbow Trout otoliths. A full data spreadsheet, including sample ID, structure type, ageing process used, and age estimation results, is provided in the data sheets accompanying this report.

2. AGEING METHOD: OTOLITHS

Lapillus otolith pairs were extracted for Peamouth Chub, and sagittal otolith pairs were provided for Lake Trout and Rainbow Trout in enumerated sample envelopes, along with sets of scales as the secondary ageing structure, for a total of 35 samples. Frozen heads were provided for Peamouth Chub samples and the lapillus otoliths were extracted and placed in individual enumerated sample envelopes.

All otoliths in this sample set were analyzed using the "Sectioning" method. This method is used primarily for larger otoliths with a deep sulcus or irregular shape. This method was selected only after the "Read Whole" method (non-destructive, often used in smaller otoliths) was found to be inaccurate. Two of the Lake Trout envelopes contained no otoliths, so scales were used as the primary ageing structure.

OTOLITH PREPARATION

Otolith pairs were examined under magnification and evaluated for any issues related to structural integrity (e.g. cracks, fractures, chips, pieces missing) and deformation (crystallization, misshapen lobes). One otolith is selected for processing and is embedded in Cold Cure epoxy resin. Samples are allowed to cure for 48 hours before sectioning. Samples are marked for sectioning under magnification using a fine tip marker to identify the nucleus (centre) and section plane (cut edge to be examined) for each otolith. Using the marks as a guide, a Buehler Isomet low speed dual-blade saw is used to cut a single section, with the section plane passing through the nucleus. This surface is then polished with a series of lapping film (30, 12, and 0.3 microns) to improve clarity of the section plane.

To carry out age estimation, an otolith section is submerged in water under magnification with the polished surface facing up.

AGE ESTIMATION

Annuli are counted outward from the nucleus. Checking (false-annuli) is common in many species, including Rainbow Trout and Lake Trout, particularly within the first 1-3 years of growth. Annuli are assessed for density (contrast between summer and winter growth), clarity (ability to differentiate individual annuli) and continuity (e.g. segmentation, merging, fading). Photographs under magnification are taken of each sample for reference and revision. Ages are recorded with a Confidence Index (CI) based on the condition of the otolith, annuli assessment, and the confidence of the reader in the age recorded, as described in Table 1.

Table 1. Confidence Index (CI) table; applied to each age estimate, reflecting the reader's confidence in the age recorded.

Confidence Index (CI)	Abbreviation	Qualitative Meaning	Quantitative Meaning
Good	G	Pattern very clear with no interpretational problems	Reader would always get the same age
Fairly Good	FG	Pattern is clear with few easy interpretational problems	Reader would get the same age most of the time for fish <20 years
Fair	F	Pattern is fairly clear with some areas presenting easy and moderate interpretational problems	Reader would be within one year most of the time for fish <20 years
Fairly Poor	FP	Pattern is fairly unclear, presenting a number of difficult interpretational problems	Reader would be within 2-3 years for fish <20 years
Poor	P	Pattern is very unclear, presenting significant interpretational problems	Reader has little confidence in repeatability of age

3. AGEING METHOD: SCALES

Scales were used to age all 16 of the Northern Pikeminnow samples provided and 2 of the Lake Trout samples where scales were the only structure provided.

SCALE PREPARATION

Scales were examined under magnification, while remaining dry. Individual scales were isolated, examined for completeness and placed between two standard microscope slides. Between six and twelve scales were examined under magnification to determine age estimation.

AGE ESTIMATION

Annuli were identified as a zone of crowded circuli, particularly around the central part of the scale, and were associated with crossovers of circuli.

4. AGEING RESULTS

Age estimates were provided in December 2024 based on the otolith and scale samples provided.

Northern Pikeminnow age estimates ranged from 2 to 5 years of age, with a modal age of 4 years. CI values were fair, with all samples recorded as either F or FP. Scales are not the preferred ageing structure for Northern Pikeminnow and is the result of lower CI values.

Peamouth Chub age estimates ranged from 6 to 13 years of age, with a modal age of 7 years. CI values were fair, with the majority of samples recorded as F, three samples recorded as FP, and one sample recorded as FG.

Lake Trout age estimates ranged from 6 to 24 years of age. CI values were fair, with 9 samples recorded as F and 7 samples recorded as FP. Noted difficulties included the outer annuli of older fish becoming faint on samples and checking (false annuli) within the first few years.

Rainbow Trout age estimates ranged from 2 to 5 years of age, with a modal age of 4 and 5 years. CI values were fairly high, with all samples recorded as either F or FG besides one sample recorded as FP.

Samples were photographed under magnification for reference and revision. Representative photographs of each species are presented in Section 6.

5. QA/QC PROTOCOL

AAE's QA/QC protocols have been developed in consultation with Fisheries and Oceans Canada ageing experts to ensure accurate age estimations while addressing potential issues related to confidence index, reader bias, and human error. For this project, 40% of the samples were aged for QA/QC.

6. REPRESENTATIVE SAMPLE PHOTOGRAPHS

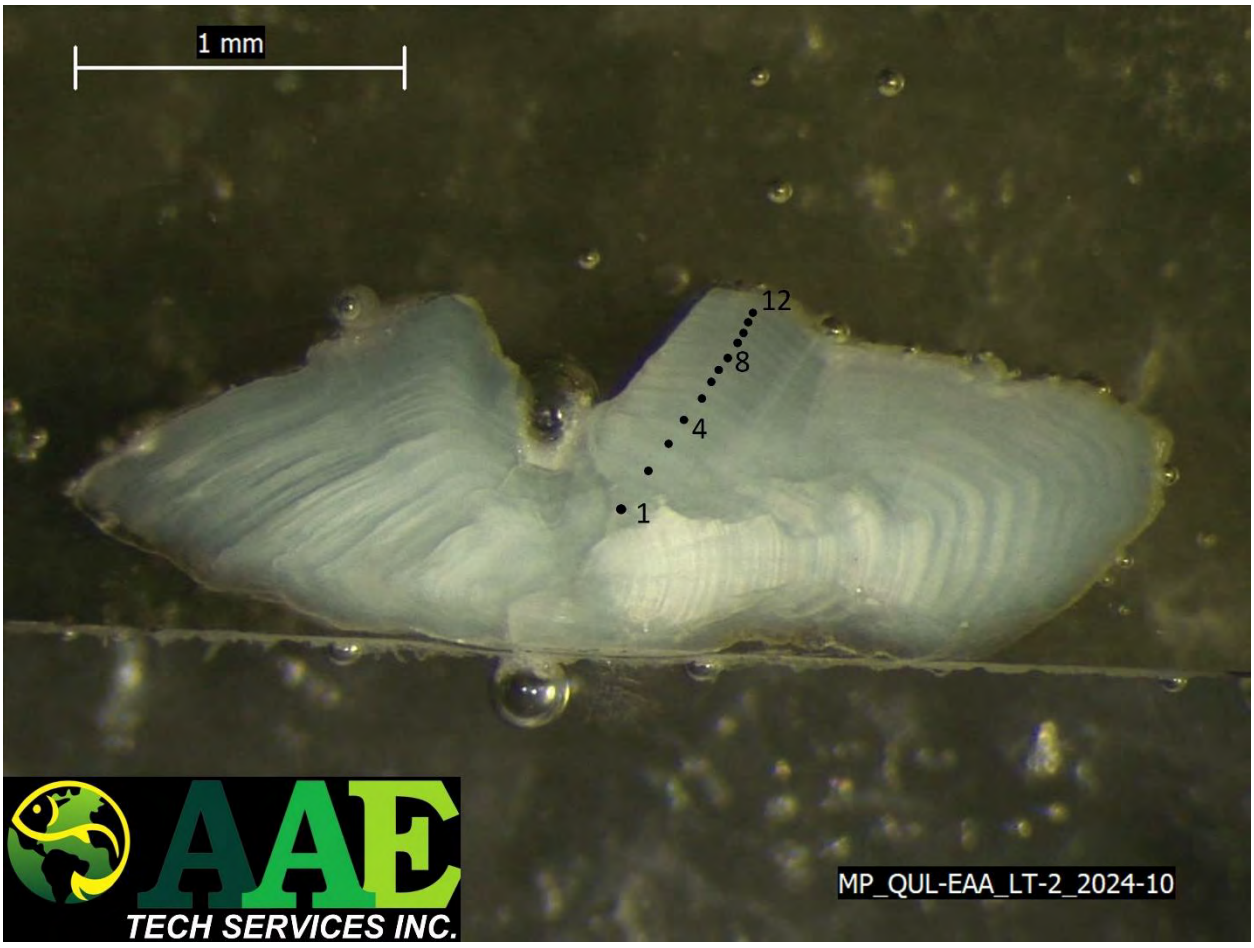

Figure 1. Lake Trout (sagittal otolith), showing counted annuli for age estimate.

Figure 2. Northern Pikeminnow (scale), showing counted annuli for age estimate.

Figure 3. Peamouth Chub (lapillus otolith), showing counted annuli for age estimate.

Figure 4. Rainbow Trout (sagittal otolith), showing counted annuli for age estimate.

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AAE Fish Ageing, Quesnel Lake and Quesnel River, October 2024

Sample ID	Sample Date	Species	Sex	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QA/QC Ager	Age Estimate	CI	Final Age
MP_QUL-NHC_NSC-1_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	3	F	JS	3	F	**3**
MP_QUL-NHC_NSC-2_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	FP				**4**
MP_QUL-NHC_NSC-3_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	F	JS	4	F	**4**
MP_QUL-NHC_NSC-4_2024-10	22-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	5	FP				**5**
MP_QUL-NHC_NSC-5_2024-10	22-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	2	F	JS	2	F	**2**
MP_QUL-NHC_NSC-6_2024-10	23-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	2	F				**2**
MP_QUL-NHC_NSC-7_2024-10	23-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	3	F	JS	3	F	**3**
MP_QUL-NHC_NSC-8_2024-10	23-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	2	F				**2**
MP_QUL-NGC_NSC-1_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	F	JS	3	F	**4**
MP_QUL-NGC_NSC-2_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	F				**4**
MP_QUL-NGC_NSC-3_2024-10	19-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	FP	JS	5	FP	**4**
MP_QUL-NGC_NSC-4_2024-10	20-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	F				**4**
MP_QUL-NGC_NSC-5_2024-10	20-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	3	F	JS	3	F	**3**
MP_QUL-NGC_NSC-6_2024-10	20-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	3	F				**3**
MP_QUL-NGC_NSC-7_2024-10	20-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	3	F	JS	3	F	**3**
MP_QUL-NGC_NSC-8_2024-10	20-Oct-24	Northern Pikeminnow	Unknown	+	Scales	Whole	JL	4	F				**4**
MP_QUL-NHC_PCC-1_2024-10	26-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	11	FP	JS	11	FP	**11**
MP_QUL-NHC_PCC-2_2024-10	23-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	9	F				**9**
MP_QUL-NHC_PCC-3_2024-10	24-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	7	F				**7**
MP_QUL-NHC_PCC-4_2024-10	26-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	12	F	JS	12	F	**12**
MP_QUL-NHC_PCC-5_2024-10	26-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	10	FP				**10**
MP_QUL-NHC_PCC-6_2024-10	26-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	9	F				**9**
MP_QUL-NHC_PCC-7_2024-10	26-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	8	FG	JS	8	F	**8**
MP_QUL-NHC_PCC-8_2024-10	26-Oct-24	Peamouth Chub	Male	+	Otolith	Whole	JL	10	FP				**10**
MP_QUL-NGC_PCC-1_2024-10	19-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	13	F				**13**
MP_QUL-NGC_PCC-2_2024-10	19-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	7	F	JS	7	F	**7**
MP_QUL-NGC_PCC-3_2024-10	19-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	6	F				**6**
MP_QUL-NGC_PCC-4_2024-10	19-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	11	F				**11**

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AAE Fish Ageing, Quesnel Lake and Quesnel River, October 2024

Sample ID	Sample Date	Species	Sex	Plus Growth	Ageing Structure	Ageing Method	Primary Ager	Age Estimate	CI	QA/QC Ager	Age Estimate	CI	Final Age
MP_QUL-NGC_PCC-5_2024-10	22-Oct-24	Peamouth Chub	Female	+	Otolith	Whole	JL	7	F	JS	7	F	**7**
MP_QUL-NCP_LT-1_2024-10	17-Oct-24	Lake Trout	Female	+	Scales	Whole	JL	7	F				**7**
MP_QUL-NCP_LT-2_2024-10	17-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	6	FP				**6**
MP_QUL-NCP_LT-3_2024-10	18-Oct-24	Lake Trout	Male	+	Scales	Whole	JL	6	F	JS	6	F	**6**
MP_QUL-NCP_LT-4_2024-10	18-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	6	FP				**6**
MP_QUL-NCP_LT-5_2024-10	18-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	10	FP				**10**
MP_QUL-NCP_LT-6_2024-10	18-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	10	F	JS	10	F	**10**
MP_QUL-NCP_LT-7_2024-10	18-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	24	F				**24**
MP_QUL-NCP_LT-8_2024-10	18-Oct-24	Lake Trout	Female	+	Otolith	Section	JL	9	FP				**9**
MP_QUL-EAA_LT-1_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	24	FP	JS	25	FP	**24**
MP_QUL-EAA_LT-2_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	12	F				**12**
MP_QUL-EAA_LT-3_2024-10	21-Oct-24	Lake Trout	Female	+	Otolith	Section	JL	24	F				**24**
MP_QUL-EAA_LT-4_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	22	F	JS	22	F	**22**
MP_QUL-EAA_LT-5_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	13	F				**13**
MP_QUL-EAA_LT-6_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	10	FP				**10**
MP_QUL-EAA_LT-7_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	18	F	JS	18	F	**18**
MP_QUL-EAA_LT-8_2024-10	21-Oct-24	Lake Trout	Male	+	Otolith	Section	JL	22	FP				**22**
MP_QUR_RB-1_2024-10	19-Oct-24	Rainbow Trout	Female	+	Otolith	Section	JL	4	F				**4**
MP_QUR_RB-2_2024-10	19-Oct-24	Rainbow Trout	Male	+	Otolith	Section	JL	2	F	JS	2	F	**2**
MP_QUR_RB-3_2024-10	19-Oct-24	Rainbow Trout	Male	+	Otolith	Section	JL	5	F				**5**
MP_QUR_RB-4_2024-10	20-Oct-24	Rainbow Trout	Male	+	Otolith	Section	JL	5	F				**5**
MP_QUR_RB-5_2024-10	20-Oct-24	Rainbow Trout	Female	+	Otolith	Section	JL	4	FP	JS	4	FP	**4**
MP_QUR_RB-6_2024-10	20-Oct-24	Rainbow Trout	Female	+	Otolith	Section	JL	3	F				**3**
MP_QUR_RB-7_2024-10	20-Oct-24	Rainbow Trout	Female	+	Otolith	Section	JL	5	FG				**5**
MP_QUR_RB-8_2024-10	20-Oct-24	Rainbow Trout	Female	+	Otolith	Section	JL	4	FG	JS	4	FG	**4**