Mount Polley Mining Corporation

an Imperial Metals company

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Mount Polley supports scientific research into the health and activity of soil microorganisms in the Quesnel River Watershed

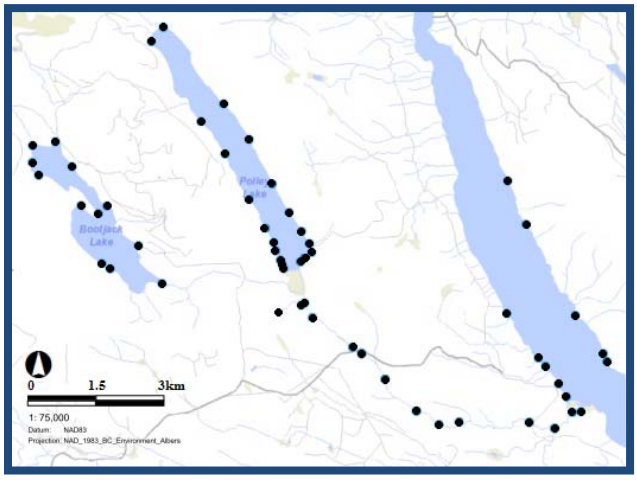
Since the breach of the tailings storage facility, Mount Polley Mining Corporation (MPMC) has initiated a number of research projects to study the impacts of the materials released into the surrounding watershed, and has been working actively to restore impacted areas.

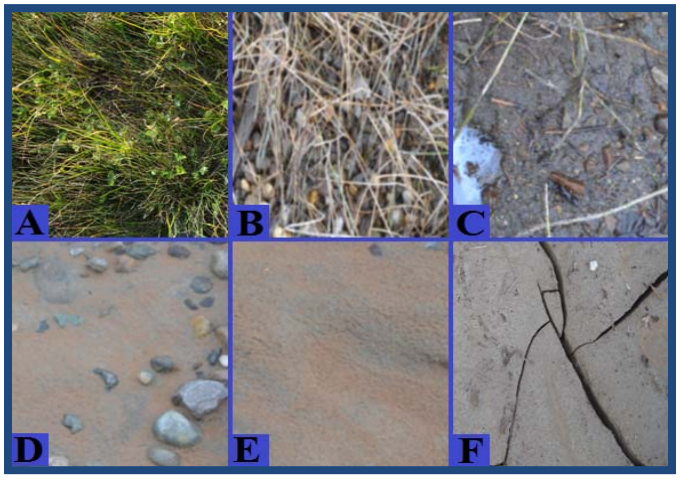
One of these projects, pursued in partnership with Thompson Rivers University (TRU) and the University of British Columbia (UBC), involves investigating the role of organic-rich soils and their associated microbial communities in improving the quality of soil habitat for soil microbes and realizing a number of functional improvements.

MPMC geochemistry work is in progress. This work will identify whether or not environmentally consequential amounts of metals might be released from deposited tailings materials. The geochemistry studies are not yet complete, but this soil genomics project offers a potential contingency remediation option, should it be determined to be necessary. Organic-rich soils harbor a diverse community of microorganisms that not only promote functioning soil ecosystems, but also can help immobilize potential contaminants.

MPMC has committed $130,000 to a 3 year project co-funded by NSERC, Mitacs, Genome BC and Genome Canada to study the role that microorganisms can play in the remediation of the affected soils. In addition to the possibility of benefits of this work to MPMC's restoration efforts, the knowledge gained by the scientific community from this research will improve the understanding of soil restoration elsewhere. It is also expected to offer benefits to the science of mine closure and reclamation, and is part of MPMC's efforts to identify contingencies to their restoration program.

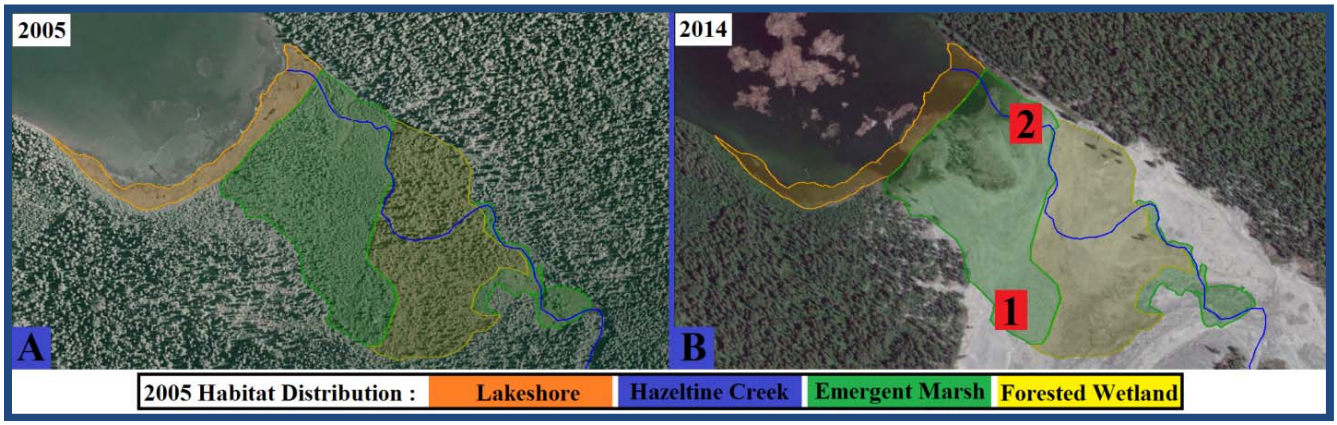
An environmental database is under development in collaboration with TRU and UBC that combines measurements of water chemistry, soil mineralogy and composition, vegetation, and soil microbial communities. Sites in the Mount Polley area were identified in the fall of 2014 and an initial round of sample collection and processing is underway. The researchers hope to paint a comprehensive picture of soil microbial communities in the impacted areas downstream of the breach, and determine to what extent microbial activity can provide beneficial effects for soil quality, and thus water quality in the future.





Permanent Sampling Locations: TRU/UBC researchers established 61 permanent sample sites in the fall of 2014, including sites around Quesnel, Polley, and Bootjack Lakes, and the major sedimentation areas (deposits at the South end of Polley Lake and the Hazeltine Creek floodplains). These sites will provide the research community with opportunities to track long-term changes in soil habitat.

Soil/Habitat Types: Samples were collected to represent the types of soil habitats affected by the incident including: (a) organic soil supporting a diverse wetland community; (b) vegetated lakeshore; (c) unvegetated lakeshore; (d) forested wetland sediments mixed with tailings; (e) burial of natural substrate in coarse tailings (sands); (f) replacement of natural substrate with a mixture of fine tailings (sand-silt).



Soil Amendment Experiment Locations: Major habitat boundaries were identified from before the incident (left) and are represented over current imagery (right). Two sites (1 & 2, *approximate*) have been selected to conduct a series of soil amendment trials. These sites are both impacted, and will be amended with a mixture of carbon rich material from the site, which may include native till, highly-degraded compost, hay, or mulch. Soil amendments may also be inoculated with microbial communities from a pilot-scale biological reactor that has been treating water from the Tailings Storage Facility since 2009 and has demonstrated a capacity to improve water quality on the site.

The physical and biological records produced from these projects will be available as baseline data for future scientific investigations at the site and elsewhere. Genomic records will be submitted to a public database (MG-RAST) that provides researchers from around the world with access to the composition of the soil microbiota at the time of the incident, and the changes made to microbial activity resulting from different soil amendments.

In Partnership with: