Introduction - the breach:
- August 4th: the Mount Polley tailings pond breaches.
- ~25 million m³ of water & tailings were delivered into Polley Lake, Hazeltine Creek and the West Arm of Quesnel Lake (266 km²).
- This pulse of material generated a seiche which rocked back and forth in the lake for 12 hrs with an amplitude of ~20 cm and a wave period of ~84 min.
- When seiching ceased the water level remained raised by 7.7 cm, suggesting an increased volume of ~20 million m³.
- An extensive lake bottom deposit mixture of tailings, eroded soil and sediment was created in front of the mouth of Hazeltine Creek. This material now stretches across the entire width of Quesnel Lake at the breach site and exhibits a height of 1-3 m (pers. comm. Mt Polley Mining Corp, 6 Oct ‘14).

Environments impacted:
- Polley Lake, Hazeltine Creek, Quesnel Lake
- Down-lake river systems (Quesnel and Fraser Rivers)
- Up-lake river systems (east via potential sockeye salmon vector to Horsefly River, Mitchell River)

Following the breach:
- Imperial Metals received permission to pump water from Polley Lake, an end point for tailings and wastewater following the breach, into Hazeltine. Polley Lake was considered unstable and unsafe due to a plug of tailings elevating the lake outlet by 1.7 m.
- Pumping continued through October and were close to maximum annual flows. Pumped flows continued to erode and deliver sediment and tailings deposited/exposed by the event.
- Contents of tailings pond water and sediment are reported on the Mt Polley and BC Ministry of Environment (MoE) websites.

Preliminary Results:
- A plume of fine sediment is located at depth in the water column of Quesnel Lake that originates from where Hazeltine Creek enters the lake.
- The plume moves both down-lake (towards Likely) and up-lake (towards East and North Arms).
- Analyses of water samples collected from the plume show that it is composed of very fine particles (median size of ~1 micron).
- [Metal] in water from the plume are higher than in water above the plume. These metals are predominantly associated with fine sediment.
- These pulses associated with increases in fine minerogenic sediment, and some geochemical properties.

Potential research directions:
- Metals and other elements (e.g., P) that entered this watershed as a function of the breach are likely particle-bound and may thus be subject to transport over long distances, resulting in the potential for chronic exposures and thus toxicological effects in exposed biota.
- Metals (e.g., Hg, Se) undergo bioaccumulation and biomagnification, once incorporated into the food web. Thus, even small [metal] in water can lead to elevated [metal] in top predators.
- Over time, we thus predict that food web transfer will lead to an increase in [metal] from water to invertebrates to fishes.
- Pacific salmon travel great distances in this watershed and may be exposed to contaminated water during their migrations. Resident species in the study lakes will be exposed year round.
- Moreover, it is crucial to understand the food web transfer and potential long-term effects of the released metals on organisms.