



Water quality impacts and river system recovery following the 2014 Mount Polley mine tailings dam spill, British Columbia, Canada

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The Mount Polley mine tailings embankment breach on August 4th 2014, in British Columbia, Canada, is the second largest mine waste spill on record. The mine operator responded swiftly by removing significant quantities of tailings from the primary receiving watercourse (Hazelton Creek), stabilizing the river corridor and beginning construction of a new river channel. This presented a unique opportunity to study spatial patterns of element cycling in a partially-restored and alkaline river system. Overall, water quality impacts are considered low with Cu, and to a lesser extent V, being the only elements of concern. However, the spatial pattern of stream Cu loading suggested chemical and physical mobilization processes operating in different parts of the watershed. Although elevated aqueous Cu was evident in Hazelton Creek, this is considered a relatively minor perturbation to a watershed with naturally elevated stream Cu concentrations. The alkaline nature of the tailings and the receiving watercourse ensures most aqueous Cu is rapidly complexed or precipitates as secondary mineral phases. Our data highlights how swift removal of spilled tailings and river corridor stabilization can limit chemical impacts in affected watersheds but also how chemical mobilization (of Cu) can still occur when the spilled tailings and the receiving environment are alkaline.