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Title: *Mercury and sulfur-reducing bacteria in sub-Arctic lake sediments of Kusawa Lake, Yukon Territory*

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Northern ecosystems are subject to atmospheric mercury (Hg) deposits from distant industrial activity. Atmospheric Mercury Depletion Events (ADMEs) lead to an accumulation of Hg in northern environments. Once delivered, Hg is subject to transformations depending on its transport and fate. It can bind with sediments and be carried with snow and rain runoff to aquatic systems. In lake bottom sediments, Hg can be converted to toxic methylmercury (MeHg) by a group of microbes known as sulfur-reducing bacteria (SRB). The alteration of inorganic Hg to MeHg enables bioaccumulation through the food chain, causing potential harm to humans, terrestrial and aquatic organisms. Investigations to identify the bacterial relation with Hg in a sub-Arctic ecosystem will help assess the potential secondary impact on higher organisms, especially the local indigenous peoples whom still rely on country foods for sustenance. Currently, SRB and Hg abundance in sediments have only been assessed in temperate, high Arctic wetlands and marine environments.

In this study, the relation of Hg with total bacteria and SRB communities was assessed. MeHg was determined to be at undetectable levels, a finding complemented by SRB:Total bacteria ratios of 0.0009-0.05%. The abundance of Hg and SRB was also defined by atmospheric temperature, sediment size and sedimentation rates. As well, the Hg-SRB-Total Bacteria relationship was utilized to gain insight to the Hg algal-scavenging hypothesis.