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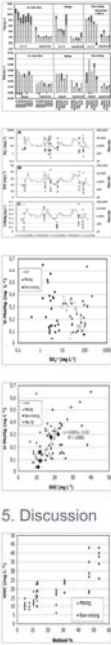


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Mercury in the Laurentian Great Lakes Region



Methylmercury and dissolved organic carbon relationships in a wetland-rich watershed impacted by elevated sulfate from mining

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Abstract

Methylmercury (MeHg), dissolved organic carbon (DOC), and sulfate (SO_4^-) relationships were investigated in the mining-influenced St. Louis River watershed in northeast Minnesota. Fewer wetlands and higher SO_4^- in the mining region lead to generally lower availability and solubility of DOC in mining streams compared to non-mining streams. MeHg concentrations, however, are similarly low in mining and non-mining streams during low flow periods, implying that the extra DOC found in non-mining streams carries little MeHg with it during these periods. High water levels elevated MeHg concentrations in both stream types owing to release from wetlands of DOC species that contain MeHg and remain relatively soluble in streams with elevated ionic strength. In-river methylation appeared to be a negligible component of the MeHg budget for the St. Louis River during this study as MeHg and DOC concentrations were intermediate to those observed in its mining-influenced and wetland-dominated tributaries.

Highlights

► St. Louis River tributaries were sampled for MeHg, SO_4^- , and DOC. ► Mine land tributaries had elevated SO_4^- and low DOC compared to other streams. ► MeHg concentration ranges overlapped for mining and non-mining streams. ► MeHg is carried by a DOC component found in both types of streams. ► Mining streams lack the low-MeHg DOC type common in non-mining streams.

Keywords

Methylmercury; Sulfate; Dissolved organic carbon; Iron mining; Wetlands

Figures and tables from this article:

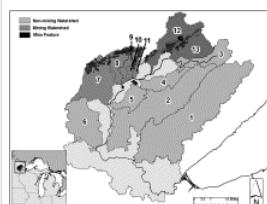


Fig. 1. St. Louis River basin and major sub-watersheds within the basin sampled in the study. These include: (1) Cloquet, (2) Whiteface, (3) Upper St. Louis (upstream from the mining region), (4) Mud Hen Creek, (5) Stony Creek, (6) Floodwood, (7) Swan, (8) West Two, (9) East Two, (10) Long Lake, (11) Elbow, (12) Embarrass, and (13) Partridge Rivers.

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