

## **Bioavailability of sediment-associated metals in the Slave River Delta, Northwest Territories, Canada**

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**Abstract** The Slave River delta is a highly productive and biologically diverse ecosystem located on the south shore of Great Slave Lake in the Northwest Territories, Canada. There is concern regarding water quality in the Slave River delta due to the transfer of sediment-associated contaminants from upstream sources and long-range atmospheric transport. Previous studies report elevated metal levels in suspended sediment collected in the Slave River at Fort Smith and sediment deposited in the Slave River delta, which either meet or exceed Canadian sediment quality guidelines. However, little is known about the bioavailability and toxicity of sediment-associated metals to aquatic life in the delta. The present study examines the bioavailability of sediment-associated metals and their distribution across the delta. Surface sediment samples were collected in the outer, mid and apex sections of the delta and analysed for total metals, grain size and organic carbon content. Four-week bioaccumulation and toxicity tests were conducted on cultured *Hyaella azteca*. Although some sediment-bound metal levels exceeded National Sediment Quality Guidelines, relatively high rates of survival (mean = 80%) were observed during the four-week tests and sediment toxicity in these samples was low. Of the 10 metals assessed in this study, only nickel was found to exceed the lethal body concentration at one site, which caused 25% mortality (LBC25). Accordingly, metal bioavailability in the Slave River delta samples is low.

**Key words** metals; sediment; bioavailability; bioaccumulation; Slave River Delta