

**Innovative Strategies for the Investigation and Remediation of  
Metal-Contaminated Sediment in the St. Lawrence River**

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Clark Island, located in the St. Lawrence River near Valleyfield, Québec, was a site of a manufacturing facility that produced alum, hydrofluoric acid, and sulfuric acid. Past operating practices resulted in the losses of pyrite cinder wastes, which are high in metals, to local waters. An initial sediment quality survey was conducted to determine the general range of metals concentrations and to explore potential metals bioavailability based on an analysis of simultaneously extracted metals (SEM) and acid-volatile sulfides (AVS). Metals concentrations in all samples were found to exceed typical screening/advisory sediment quality guideline values. However, results of the SEM/AVS analysis indicated that the metals present in the sediment were not biologically available. Based in these initial findings, a detailed ecotoxicological evaluation was designed to verify that the metals present in the sediment were not impacting the aquatic community. The results of the sediment quality study indicated that risks to the benthic community were limited to a clearly defined area associated with a high occurrence of the pyrite cinder, possibly due to substrate issues. Adjacent areas with elevated metals showed a low concordance among metals concentrations, sediment toxicity, and altered benthic community structure. Fish tissue residue analyses showed metals concentrations that were not significantly different from the regional average for this section of the St. Lawrence River.