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Assessing Mercury Contamination in the St. Lawrence River Area of Concern Food Web

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The St. Lawrence River at Cornwall/Akwesasne was designated an Area of Concern (AOC) in the late 1980s, largely due to high levels of contaminant inputs along an 80 km stretch of river causing a variety of issues. Past production facilities, which included chemical, textiles and pulp and paper, released large amounts of mercury (Hg) in the river that led to very high levels in the sediments and elevated levels in biota, especially in nearby depositional zones. Despite remediation efforts (Cornwall Sediment Strategy), sediments and fish in one area (Zone 1) still display consistently higher Hg levels compared to other zones of the AOC. Furthermore, after many years of decreasing methylmercury (MeHg) in Zone 1 juvenile fish, MeHg is increasing in the last decade. The purpose of this project is to assess sources contributing to increases in Hg in Zone 1 fish using concentration and stable isotope data. Mercury isotopes will help determine if legacy Hg contamination or other potential Hg sources (e.g., landscape runoff, atmospheric deposition, or newer industrial sources) are present in the food web.

Samples collected in 2024 and 2025 show elevated levels of Hg in Zone 1with Hg concentrations in fish more than three times higher compared to reference fish. Plankton tows and macrophytes show at least two times higher Hg in Zone 1 than reference area. Although the highest Hg levels in sediment are more than 20 cm below the surface based on sediment cores, surface sediments (top 10 cm) in Zone 1 are still five times higher than reference surface sediment and two times higher than another historically contaminated area (Zone 2) surface sediment. Mercury isotope analyses are ongoing, the deeper highly contaminated Zone 1 sediment will hopefully provide an isotopic endmember to assess whether historic Hg is still entering the St. Lawrence AOC food web. By helping identify the source of Hg in the Zone 1, Hg isotopes will aid in evidence-based decision making for the management of Zone 1 by the Cornwall Sediment Strategy steering committee and for management decisions in other impacted systems that are experiencing similar continued problems with legacy Hg.