# Department of Institute for a Sustainable Environment

## PhD Dissertation Defense

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# Evie Brahmstedt

*will present*

**" Mercury mobilization in Upper St. Lawrence River wetlands."**


**Abstract:**

In the riparian wetlands along the Upper St. Lawrence River (USLR), legacy mercury from historic atmospheric deposition poses risks for human and wildlife health. Here, wetlands are experience a shift in the water level management plan that has reinstated water level fluctuations previously absent for several decades (including flood events), which may increase the risk of legacy mercury mobilization from these wetlands. Early research suggested there may be differences in mercury burden among different wetland morphologies on the USLR. However, a more extensive follow-up study indicated that wetland types were rather similar in mercury contamination as well as revealing the prevalence of mercury-methylating genes in the microbial community in riparian hydric soils. These riparian wetlands are dominated by emergent plants (cattails; *Typha* spp.) known to bioaccumulate mercury. In the USLR legacy mercury is widespread, but at low concentrations in the soil relative to point-source areas. Accumulation of Hg within living cattail organs was minimal. However, results indicated that most of the wetland mercury burden was in soils and detritus, suggesting mercury may enter aquatic and terrestrial food chains via detritivores. A study of mercury in USLR yellow perch (*Perca flavescens*) and round goby (*Neogobius melanostomus*) indicated that those collected from in proximity to wetlands had significantly higher mercury than those from non-wetlands. To further describe Hg mobilization potential, the terrestrial food chain was examined by comparing invertebrate mercury burden along a riparian gradient. Invertebrate mercury burdens indicated that wetlands are consistent sources of mercury to aquatic and terrestrial food chains, but flooding can increase the mercury input to the terrestrial web. In contrast to cattail marsh wetlands, mercury in vernal pools found in regional forest ecosystems, becomes buried and unavailable in soil over time, while recent atmospheric deposition entering the pool via leaf litter is readily mobilized, as indicated by mercury burdens in fingernail clams. Although mercury is a well-studied, legacy pollutant, the hydrology, geochemistry, mercury-methylating microbes, and vegetation of wetlands, which dictate conditions under which mercury becomes methylated in wetlands, require further exploration. Risks of mercury bioavailability in wetlands may be exacerbated under shifts in water level management and flooding of terrestrial upland soils.


Date: Tuesday April 26
Time: 9:30am
Location: Snell 110
Zoom Link: https://clarkson.zoom.us/j/91586085591