

## **Monitoring critically endangered Atlantic Whitefish (*Coregonus huntsmani*) using environmental DNA**

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Biodiversity is in crisis and current species extinction rates are roughly 1,000 times greater than historical levels. Unlike previous mass extinctions, the current trend can be attributed to human-induced impacts including habitat destruction and climate change. Freshwater species are particularly vulnerable, with nearly one-third of freshwater species threatened with extinction. One such at-risk species is Atlantic Whitefish (*Coregonus huntsmani*). Globally, Atlantic Whitefish are only found in three small lakes near Bridgewater, NS, and within these lakes they are difficult to detect and highly threatened by invasive predators. In order to preserve biodiversity, we need accurate methods to detect and monitor species presence and changes within the environment. Traditional methods for monitoring aquatic species include trapping or netting which can be time- and labour-intensive, as well as stressful to the animals. The collection of DNA from the environment (so-called environmental DNA or 'eDNA') is a promising, non-invasive alternative as it can be used to detect a single species of interest or to examine the broader community composition without species being present at the time of sampling. As eDNA is an emerging tool, there remain knowledge gaps regarding the advantages of different methodology choices. We address these uncertainties using Atlantic Whitefish as a model species, creating eDNA tools to detect their presence in the wild at different times of the year, as well as the presence of their predators. The eDNA tools created for Atlantic Whitefish can then be used as a framework to develop protocols to detect other at-risk freshwater species.

Keywords: environmental DNA, Atlantic Whitefish, DNA, biodiversity, species at risk

Presentation type: Oral presentation