

The DEEHR Group – AIS Section



Madison Bond
NS Crayfish
Near Tqoskue'jk

Erin Francheville
Chain pickerel & species at risk, Mes-Keq-qua-gum Lake
Utopia NB & Sipuk Blacketts Lake

Delbert Swinemar
Chain pickerel & 7. crassus Pijnuskaq
Now with Parks Canada

Kaylee MacLeod
Chain pickerel & 7. crassus Pijnuskaq
LaHave,
Now with Coastal Action

Sarah Kingsbury
Chinese mystery snails, K'ijipuktuk
Now with DFO AIS

Some of our recent publications



Funding & Collaborations



Native freshwater mussels: vulnerable to invasives

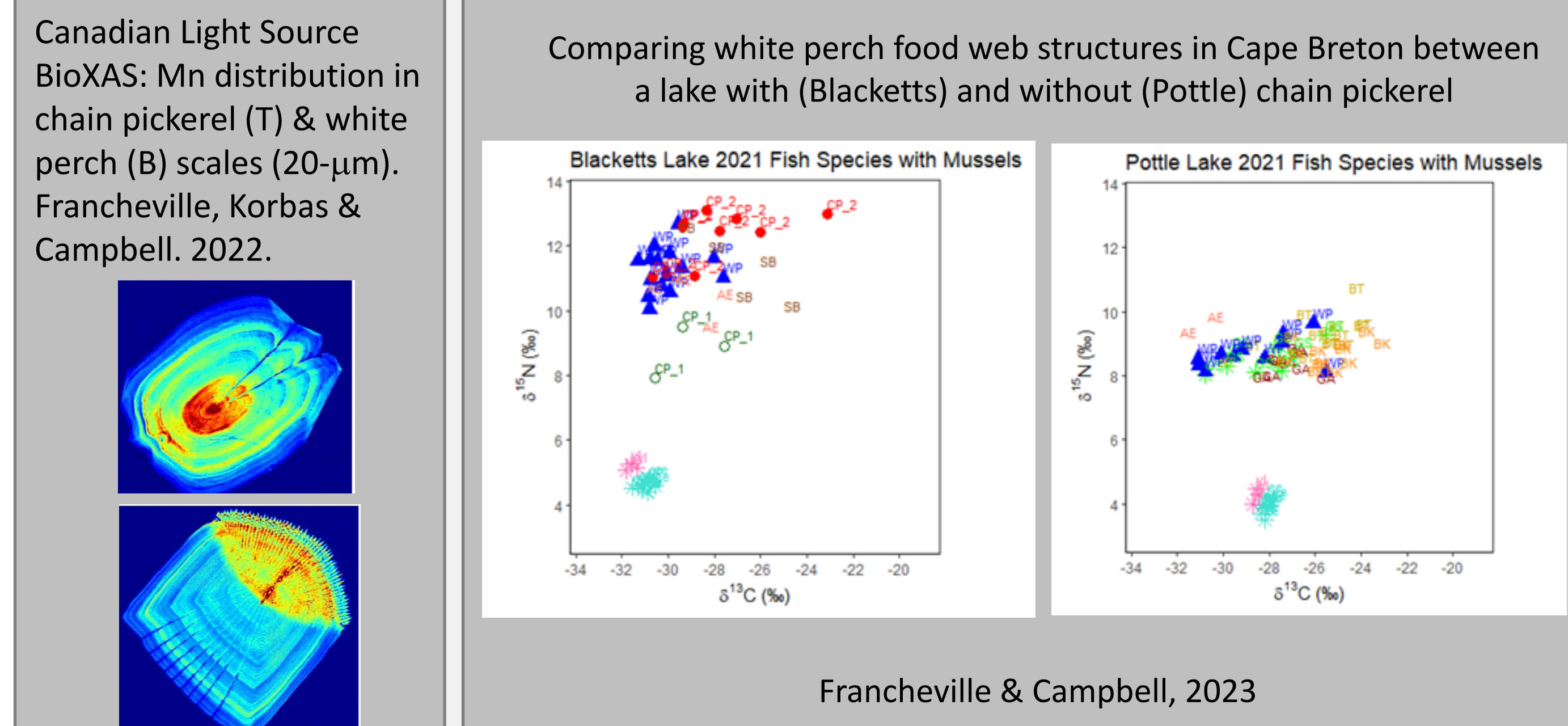
- Freshwater mussels play a vital ecological role and provide many ecosystem services..
- Eastern elliptio (*Elliptio complanata*)** is a very common species found throughout the province (top photo) and is used as a baseline species in our food web research.
- Yellow lampmussel (*Lampsilis cariosa*)** is a SARA at-risk species (middle photo) found in only 3 watersheds in Cape Breton County. This species relies on white perch as a fish host to continue its lifecycle.
- Invasive **zebra mussels (*Dreissena polymorpha*, bottom photo)** is now in the St. Johns Watershed, New Brunswick since 2022, and has a profound impacts on native mussels.

There are no indigenous crayfish in Nova Scotia.

- Madison Bond with Department of Fisheries and Oceans Canada (Aquatic Invasive Species), Nova Scotia Fisheries and Aquaculture, New Brunswick Museum & Nova Scotia Museum of Natural History.
- There are currently 3 species of non-indigenous crayfishes confirmed in NS.
- Red swamp crayfish (*Procambarus clarkii*)**, indigenous to the southern Mississippi watershed, is the most globally-widespread invasive crayfish.
- Red swamp crayfish was **first observed in Nova Scotia (Three Mile Lake) in September 2022**, and verified in August 2023.
- Three Mile Lake is connected to the Shubenacadie Waterway, leading to concerns for spread of this species.
- Red swamp crayfish is known for its wide array of negative impacts on its invaded ecosystem including premature bank erosion, aquatic vegetation density decrease, competition with and predation on native fish, invertebrate, and amphibian species, and water quality decline.
- We will be quantifying the role of red swamp crayfish in fish food webs through ecotracers (stable isotope ($\delta^{15}N$, $\delta^{13}C$) & mercury analyses).
- We will also be mapping substrates and habitats of the impacted systems to assess potential spread of this species to the Shubenacadie system.

The Chain Pickerel Project: impacts of invasive species on lake ecosystems.

- Erin Francheville, Delbert Swinemar & Kaylee MacLeod, with NS Fisheries & Aquaculture, DFO (Species at Risk & Aquatic Invasive Species), Parks Canada & Coastal Action Foundation.
- Chain pickerel (*Esox niger*)** is a widely-introduced invasive species in Nova Scotia and New Brunswick. It is an aggressive ambush predator and is linked with severe declines in native fish, invertebrate and amphibian populations.
- We are looking at how chain pickerel are becoming integrated into and impacting other vulnerable aquatic species, including Kejimikujik NPHS, the LaHave River system, Cape Breton, and Lake Utopia, NB.
- Our projects span a gradient of lakes from few chain pickerel to heavily populated as well as using temporal analyses with pre-invasion / early-invasion datasets. We are also examining spatial patterns, food web stable isotope ($\delta^{15}N$, $\delta^{13}C$) analyses, mercury trends, and scales for aging & elemental analyses.



Chinese Mystery Snail

- Cipangopaludina chinensis*** is a popular aquarium snail species.
- Like red swamp crayfish, it has been introduced globally in many freshwater ecosystems.
- Its native range extends across eastern Asia.
- Sarah Kingsbury has verified the distribution of *C. chinensis* across Nova Scotia. We have assessed its ecological tolerance to wide range of pH and salinity values of eastern Canada lakes.
- We also have published a review paper on this species in North America, including the map on the right

