2023 | Volume 8 | Issue 53

Government of
Northwest Territories

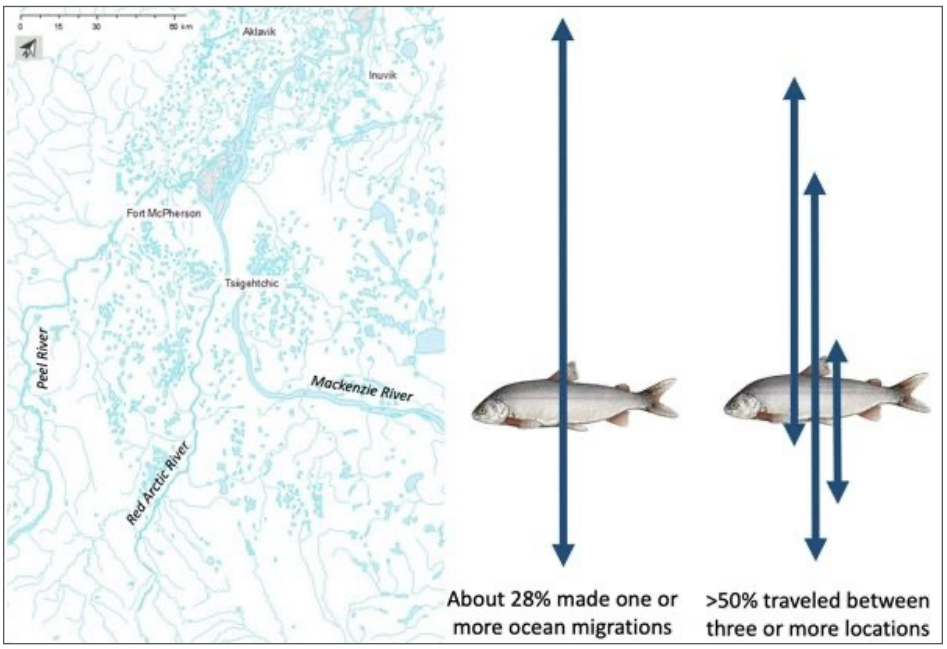
Research Bulletin

NWT Cumulative Impact Monitoring Program

Broad whitefish migration and fishery access in the lower Mackenzie River watershed

Summary

This community-based monitoring program collected data on luk dagaii (broad whitefish, Coregonus nasus) in the lower Mackenzie River watershed. Working with Gwich'in harvesters in three communities (Fort McPherson, Tsiigehtchic, and Aklavik) the goal was to identify fish migration patterns, habitat use, and possible changes to fishing site access. We found that fish use multiple habitats and that environmental change in one part of the region may affect the fish harvested in another part. We also identified emerging obstacles to fish harvesting, especially in the fall season.



In the lower Mackenzie River watershed, luk dagaii showed extensive movements between different river habitats and the ocean. (Credit: R. Hovel)

Why is This Important?

The lower Mackenzie River watershed is experiencing substantial environmental change and is home to migratory fish species that are important to human consumption, including luk dagaii. Understanding fish habitat use is key to understanding climate change-related impacts on fish populations.

What Did We Do?

From 2017 to 2021, our team of community members and academic researchers collected luk dagaii samples from the subsistence fishery at five locations across the Peel River, Arctic Red River, and Mackenzie River Delta. We used otolith microchemistry (see information box) to track fish movements and habitat use. Changes in river conditions, such as flow and debris, that affected fishing practices were recorded. We also developed a new sampling technique to estimate fish length and weight from photographs.

What Did We Find?

We found that:

- Luk dagaii move extensively through freshwater and marine habitats. Almost 30% of fish migrated to the ocean and over 50% used habitats in multiple rivers.
- Changes in river levels create challenges for setting nets at traditional locations and thinner ice during fall fish migrations is making it more dangerous to access traditional fishing locations.
- Photographing fish can provide a useful and low-effort method for collecting length and weight data.

What Does This Mean?

Luk dagaii rely on many habitats and impacts to their habitat at one location may affect the fish caught in a different part of the watershed. This is an important consideration for managing fisheries and evaluating climate change implications for fish populations. Also, evaluating impacts to the luk dagaii subsistence fishery requires identifying changes in river conditions, some of which are already creating obstacles to accessing fish. Future monitoring will help identify impacts to the species and fishery.

(L-R): Cassandra Francis, Ernest Vittrekwa, and Alice Vittrekwa sample a luk dagaii as part of the community-based monitoring program. (Credit: E. Hodgson)

What is otolith microchemistry?

As fish grow, they incorporate elements of surrounding water into their otoliths (ear bones). Otolith microchemistry identifies these elements and matches them to water chemistry in different locations where the fish has lived and helps identify habitat use.

For More Information

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NWT Cumulative Impact Monitoring Program (CIMP195)

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