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NWT Cumulative Impact Monitoring Program

Assessing Diet and Interactions Among Salmon and Arctic Fishes in the Mackenzie River

Summary

Salmon are increasingly being caught in more places across the Canadian Arctic. It is important to understand the potential impacts and opportunities associated with range-expanding species on Arctic species and ecosystems. We looked at the incidences of feeding among adult chum salmon caught in the Mackenzie River system and the potential competition for prey among Arctic freshwater fish and salmon. The potential for competition among salmon and key freshwater fishes for food was found to be low.

Why is This Important?

Harvesters in communities along the Mackenzie River are concerned that the presence of salmon may be impacting key freshwater fishes due to increased competition for food.

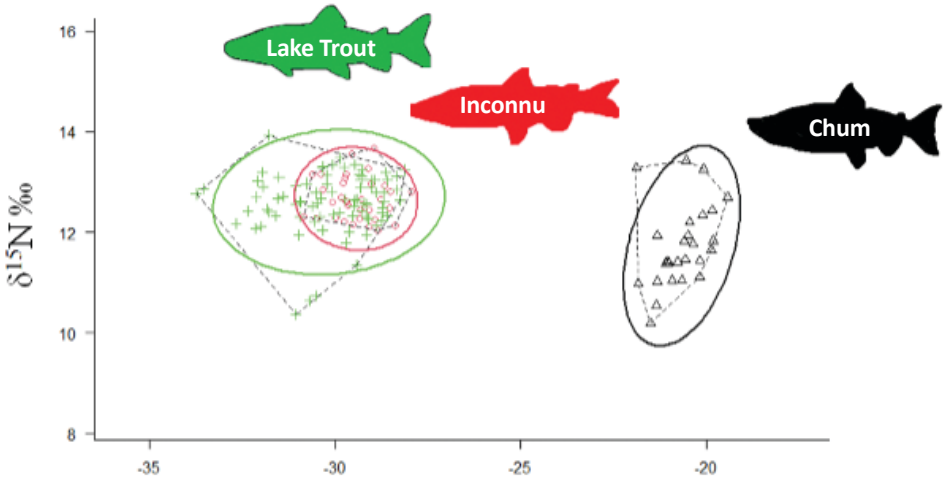
What Did We Do?

We assessed the diets of 3 species of fish (inconnu, lake trout, and chum salmon) and examined the stomach contents of adult chum salmon caught in the Mackenzie River. Stomach contents tell us what they were eating recently, and stable isotopes analyzed from muscle tissue tell us the dietary source and trophic position over approximately 30 days. We then looked for areas of diet overlap.

What Did We Find?

- Lake trout and inconnu in Great Slave Lake rely primarily on forage fishes, such as ciscoes, with lake trout consuming a wider variety of prey than Inconnu.
- Lake trout in Great Bear Lake ate more insects than in Great Slave Lake, but forage fishes remained the dominant prey.
- Over half of chum salmon stomachs were empty. And even when not empty, their stomachs were typically full of debris, such as woody plant matter, not prey.
- Only 13% of chum salmon stomachs contained prey or prey remnants, such as fish scales or invertebrate fragments.
- Chum salmon collected from Great Slave Lake appear to be at the same trophic position as lake trout and inconnu, although their prey were from rivers or shallow waters. Whereas inconnu and lake trout in Great Slave Lake appeared to be eating forage fishes in deeper/offshore habitats.

Frankie Dillon holding a chum salmon in the Big Fish River, near Aklavik. (Credit: C. Gallagher)



A biomarker plot demonstrating that lake trout and inconnu in Great Slave Lake relied primarily on forage fishes. Chum salmon in Great Slave Lake indicate that they also eat small fish but in rivers or shallow water. The spread of the points indicates that lake trout also eat other prey items, and therefore have a more varied diet than inconnu.

What Does This Mean?

Adult chum salmon rarely consume prey in fresh water in the Mackenzie River system, and likely only opportunistically rather than for energetic gains.

The potential for competition among salmon and Arctic fishes for food in the Mackenzie River system is currently low. This is because the incidence of active feeding among harvested salmon is low, and the identifiable prey types that were consumed are not in short supply.

For More Information

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