2025 | Volume 10 | Issue 77

Government of
Northwest Territories

Research Bulletin

NWT Cumulative Impact Monitoring Program

Assessment of Mercury Concentrations in Fish in Sahtú Lakes

Summary

Fish are an important resource for Sahtú communities and residents are interested in mercury concentrations in fish in local lakes. We compiled mercury data collected between 1978-2022 from fish in 25 lakes—22 within the Sahtú and three within in the Deh Cho region that drain into the Sahtú area. Mercury concentrations were influenced by fish length, weight, body condition, age and feeding behaviour. Mercury concentrations were also influenced by lake area, catchment area, the ratio of catchment to lake area, longitude and latitude. Mercury concentrations were lowest in suckers, lake whitefish, and burbot, higher in predatory species, including lake trout and northern pike, and highest in walleye. We identified lakes and species where average mercury concentrations in fish have exceeded 0.5 µg/g, the maximum recommended guideline for the commercial sale of fish, on at least one occasion and where there may be interest in future data collection.

Why is This Important?

Past studies have determined which species and locations historically had high mercury concentrations and these can inform where future monitoring could occur.

What Did We Do?

We compiled data collected between 1978 and 2022 from various government and academic studies that measured mercury in fish. Fish included in these studies were: lake whitefish, longnose sucker, burbot, lake trout, northern pike, and walleye.

Next, we examined which variables appear to be most important in influencing mercury concentrations in fish, including length, age, weight and body condition, and longitude and latitude. We also calculated lake area and catchment area for 17 of the lakes to investigate the role of the catchment-to-lake-area ratio in influencing mercury concentrations in fish.

What Did We Find?

Mercury concentrations were:

- Lowest in lake whitefish, suckers and burbot
- Higher in predatory species, including lake trout and northern pike
- Highest in walleye

Average mercury concentrations exceeded 0.5 µg/g on at least one occasion for:

- Lake trout in six lakes
- Northern pike in four lakes
- Walleye in five lakes

Mercury concentrations increased with fish length and age and tended to be highest in small and medium sized lakes with large catchment-to-lake-area ratios, particularly lakes located in large river watersheds. Measurements from most lakes are dated.

Locations of all lakes for which data was collected between 1978-2013. The names are given for all lakes that contained fish that exceeded consumption guidelines on at least one occasion.

What Does This Mean?

NWT fish are recommended for a healthy diet. Monitoring information contributes to decisions about how often to eat fish. General fish consumption guidelines and dated site-specific fish consumption notices for Kelly Lake and Lac Ste Therese can be found at https://www.hss.gov.nt.ca/en/services/fish-consumption-guidance/site-specific-fish-consumption-advice.

Mercury

Mercury is a heavy metal which, when converted to its organic form, can biomagnify in lake food webs. This can pose health risks with the regular, long-term consumption of those fish whose average concentration exceed 0.5 µg/g.

For More Information

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NWT Cumulative Impact Monitoring Program (CIMP 228)

Evans, M. 2024. Updated assessments and investigations of mercury in Sahtú lakes food webs with a changing environment. 44 pp. Available on the NWT Discovery Portal (www.nwtdiscoveryportal.enr.gov.nt.ca).