

NWT Environmental

Research Bulletin (NERB)



NWT Cumulative Impact Monitoring Program (NWT CIMP)

A source of environmental monitoring and research in the NWT. The program coordinates, conducts and funds the collection, analysis and reporting of information related to environmental conditions in the NWT.

NWT Environmental Research Bulletin (NERB)

A series of brief plain language summaries of various environmental research findings in the Northwest Territories. If you're conducting environmental research in the NWT, consider sharing your information with northern residents in a bulletin. These research summaries are also of use to northern resource decision-makers.

Mercury levels in lake trout in Great Bear Lake, NWT

Since 2008, the Délı̨ne Renewable Resources Council (DRRC) and Environment and Climate Change Canada (ECCC) have worked together to test the amount of mercury found in lake trout and cisco (lake herring) from Great Bear Lake (GBL). This study is a part of ECCC's Chemical Management Plan which is monitoring the amount of chemicals, such as flame retardants and surfactants, in addition to mercury, in several lakes across Canada. In GBL, small lake trout and all ciscoes were found to have the lowest levels of mercury.

Why is this research important?

Fish in the NWT are recommended for a healthy diet and are an important and integral food source of northern communities. GBL, compared to other locations being monitored by ECCC, is relatively far from sources of pollution and is being used as a point of comparison to locations closer to pollution sources.

What did we do?

Between 2009 and 2021, members of the DRRC annually collected lake trout and cisco and provided them to ECCC for analysis. Various measurements were made including length, weight, and sex. Ear bones (otoliths) were removed to age the fish. A small piece of muscle was used in mercury analyses and for fish consumption recommendations. Stable isotope analyses were done, which provided information on where and what a fish eats. Finally, total body mercury concentrations, as well as concentrations of other metals and compounds, were measured. This NERB presents only the results of the mercury measured in fish muscle samples collected up to 2017.



Frank Tetso pulling in a trout from Great Bear Lake.
(Photo: E. Reeves)

What did we find?

- On average, lake trout were 64 cm long and 22 years old; cisco were 28 cm long and 12 years old.
- The average mercury level in lake trout was 0.23 parts per million (ppm). This is well below the 0.5 ppm guideline for the commercial sale of fish (marked by the dashed line in Figure 1).
- Cisco had lower mercury levels, with an average of only 0.04 ppm.
- Mercury levels differ with fish length and age:
 - ♦ All small lake trout (28-52 cm) had mercury concentrations less than 0.5 ppm.
 - ♦ Approximately 6% of the medium sized (53-78 cm) and large sized (79-102) lake trout has mercury levels greater than 0.5 ppm.
 - ♦ The few fish with mercury concentrations exceeding 0.5 ppm were old, ranging in age from 18-44 years (average 30 years).

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 site-specific fish consumption notices can be found at <http://www.hss.gov.nt.ca/en/services/fish-consumption-guidance>. These guidelines identify how many servings of lake trout longer and shorter than 60 cm can be eaten per month.

What do we do next?

Researchers are continuing to monitor mercury levels to better understand why mercury levels differ slightly in these fish from year to year. How climate change may or may not be impacting levels of mercury is of particular interest.

What does 'parts per million' mean?

Parts per million (ppm) is a form of measurement. In this project, ppm is calculated by weight. One part per million (1 ppm) by weight is equivalent to one kilometer in a million kilometers by distance. You would have to travel around the world 25 times to travel one million kilometers!

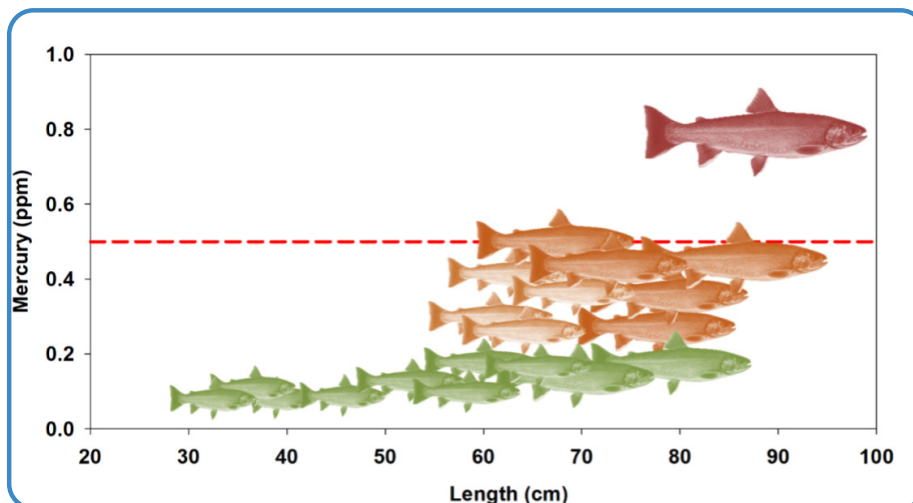


Figure 1. Mercury levels (ppm) lake trout measured over the course of the study. Green = mercury levels lower than 0.2 ppm. Orange = mercury levels between 0.2 and 0.5 ppm. Red = mercury levels greater than 0.5 ppm. This simplified graph does not show all fish caught.

Contacts

Marlene S. Evans
Environment and Climate Change Canada
marlene.evans@ec.gc.ca