

# 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.

## Understanding and predicting fish mercury levels in the Dehcho region

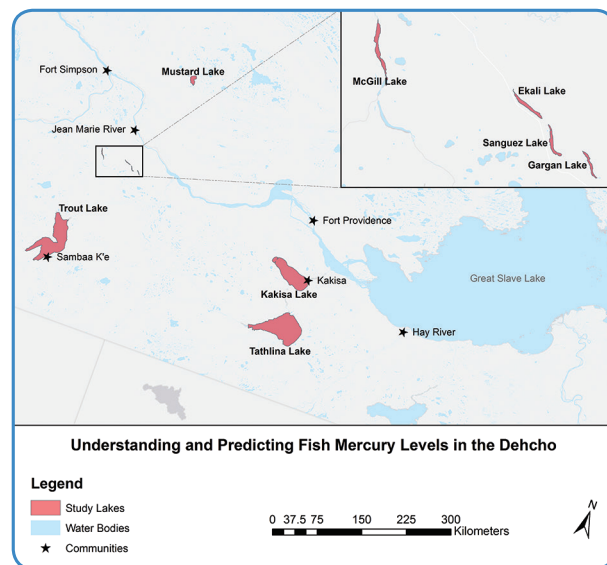
Fishers, community members, regulators, monitors and scientists in the Dehcho region want to understand why fish mercury levels are relatively low in some lakes, but higher in others, and why fish mercury levels are increasing in some lakes, but stable in others. Fish, water, other small animals and plants were sampled from eight Dehcho lakes between 2013 and 2015. We found that some fish mercury levels can be predicted from water quality measurements and fish age.

### Why is this research important?

Fish such as Northern Pike (jackfish), Walleye (pickerel) and Lake Whitefish are a source of food. In some traditional Dehcho fishing lakes, mercury levels are high enough to require consumption advisories. By understanding the dominant drivers of fish mercury in the Dehcho region, we can better predict how climate change and potential future resource development may affect fish mercury.

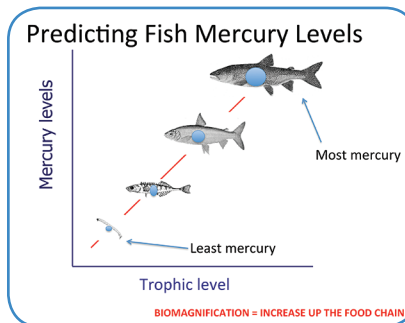
### What did we do?

Over three years, eight Dehcho lakes were sampled for water, sediments, fish and small organisms living in the water (benthic invertebrates) and sediments (zooplankton). We determined fish mercury levels as well as fish age, size, position in the food chain and food source. We also determined mercury levels in benthic invertebrates and water. Water chemistry was also measured.



## What did we find?

- Mercury levels in Lake Whitefish were generally below subsistence consumption advice and commercial sale guidelines.
- Of the eight lakes studied, Kakisa, Trout and Mustard have the lowest fish mercury levels, and Sanguex and McGill have the highest fish mercury levels.
- Mercury levels in some fish, and the rate of mercury *biomagnification* through the food web, can be predicted from water chemistry measurements; however, the best predictors were different for different types of fish.



## What does this mean?

These results tell us it is possible that some fish mercury levels may be predicted from simpler measurements of water chemistry. The information on fish mercury levels can help people make 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>.

The results are also informing discussions on management strategies that could reduce mercury levels in fish, such as fish-downs, where harvesting a certain number or type of fish could lead to faster growth and lower mercury levels.

## What's next?

Researchers continue to try to figure out why the relationships between fish mercury and water chemistry are different among species and across lakes. This new research will help us make even more accurate predictions of fish mercury levels across the Dehcho region.

## What is mercury biomagnification?

Mercury enters the food chain by transferring from water to microscopic organisms like algae. Insects consume these tiny organisms and, in turn, are eaten by fish, which are, in turn, eaten by other fish. Mercury builds up every time something eats something else. The more stages there are in the food chain, the higher the mercury levels in the top fish. This is called **biomagnification**, and it is why fish such as Northern Pike and Walleye can have high mercury levels, even when mercury levels in water are very low.



Steven Nadlii on Willow Lake.  
(Credit: B. Branfireun)



Elsie Lacorne, Steven Nadlii, Heidi Swanson and Shelley Lundvall surveying their findings near Willow Lake. (Credit: B. Branfireun)

## Contacts

George Low  
Dehcho Aboriginal Aquatic Resource  
and Oceans Management Program  
867-876-0441

Heidi Swanson  
University of Waterloo  
[hswanson@uwaterloo.ca](mailto:hswanson@uwaterloo.ca)

or  
NWT Cumulative Impact  
Monitoring Program  
(CIMP154)  
[www.nwtcimp.ca](http://www.nwtcimp.ca)