



### 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.

## Concentrations of mercury and other heavy metals in furbearers from the Slave River

This Slave River and Delta Partnership<sup>1</sup> (SRDP) project investigated heavy metals in furbearers commonly harvested by trappers in the Slave River watershed. The concentrations of mercury, cadmium, arsenic, lead and chromium were very low in muskrat, snowshoe hare, mink and beaver, and mercury concentrations have decreased in the livers of muskrat and hare over the last 25 years.

### Why is this research important?

Comparing heavy metal concentrations in animals to baseline can assist in monitoring cumulative environmental change over time. It is particularly important to monitor heavy metal concentrations in species people harvest and may use for food.



### What did we do?

This study addressed community concerns related to the health of furbearers in the Slave River watershed. Skinned carcasses of muskrat, snowshoe hare, mink and beaver were collected from trappers in the Slave River Delta. Muscle tissues from carcasses were tested for various heavy metal concentrations, including mercury, cadmium, arsenic, lead and chromium. Stomach contents were also examined to see if the diets of furbearers are possible pathways for heavy metals to get into their bodies.

<sup>1</sup>The SRDP consists of Deninu Kue First Nation, Fort Resolution Métis Council, Smith's Landing First Nation, Salt River First Nation, Fort Smith Métis Council, NWT Métis Nation, Hamlet of Fort Resolution, Town of Fort Smith, Aurora College, Aurora Research Institute, Environment and Natural Resources (GNWT), Parks Canada, Environment Canada and Fisheries and Oceans Canada.

## What did we find?

The concentrations of these heavy metals were very low in the muscle of mink, beaver, snowshoe hare and muskrat. Carnivores, like mink, feed higher in the food chain so they accumulate more mercury than plant-eating animals. This explains why there is higher mercury in mink. This process is known as biomagnification.

Researchers found that:

- Average mercury concentrations in the livers of mink and snowshoe hare were lower in the 2013 samples than from studies conducted in the early 1990s.
- Cadmium is commonly found in leafy vegetation like trees and was therefore highest in beaver and snowshoe hare.
- Unlike other heavy metals, arsenic biomagnifies, meaning that higher concentrations of arsenic are usually found lower in the food chain. This was the case with muskrats. They feed on sedges, which are lower in the food chain.
- As lead sticks to soil particles, it is possible that higher lead concentrations are found in beaver and muskrat because these animals build their homes with mud.
- Chromium concentrations were low and relatively consistent among furbearers.

## What does this mean?

Results indicate that concentrations of heavy metals that were investigated are low in furbearers near Fort Fitzgerald and in the Slave River Delta. Average mercury concentrations in the livers of mink and snowshoe hare were lower in the 2013 samples than from studies conducted in the early 1990s.

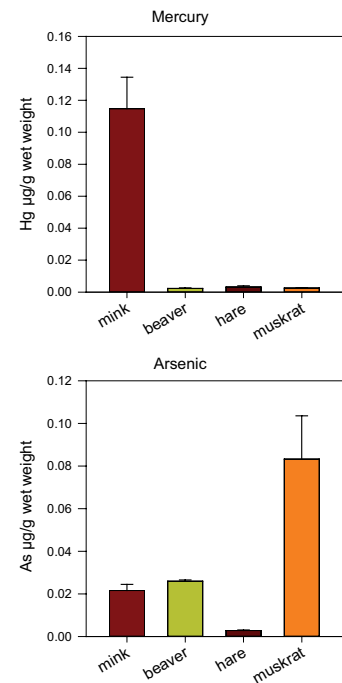
## What's next?

The same samples have been analyzed for organochlorine concentrations to better understand these pollutants now and how they have changed over time. Results will be analyzed and presented to partner communities.

## Contacts

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**Fig. 1. Heavy Metal Concentrations in Furbearers:** The graphs above show the average concentrations of two heavy metals – mercury and arsenic – in the muscle tissue of 30 mink, three beaver, 21 snowshoe hare and 30 muskrat collected in the Slave River watershed. These data are untransformed with standard error bars shown and represent total element concentrations.

## What are heavy metals?

Heavy metals are naturally occurring elements in the environment but can also come from man-made sources. At certain concentrations in food or water, heavy metals can be toxic to wildlife and humans.

## Are beaver, muskrat and hare safe to eat?

Yes, beaver, muskrat and hare are safe to eat. They are some of the healthiest foods available. The levels of metals in these animals are similar to levels found in meat across Canada. These levels are low and are not of concern to consumers.

## References and citations

- Poole KG, Elkin BT, Bethke RW. 1995. Environmental contaminants in wild mink in the Northwest Territories, Canada. *Science of the Total Environment*. 160:473-86.
- Poole KG, Elkin BT, Bethke RW. 1998. Organochlorine and heavy metal contaminants in wild mink in western Northwest Territories, Canada. *Archives of environmental contamination and toxicology*. 34:406-13.