



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.

Clues in the Water: Detecting Inconnu populations and spawning migrations in river systems around Great Slave Lake

Local knowledge suggests Inconnu are returning to northern river systems they have been absent from. This study collected Inconnu environmental DNA (eDNA) samples in ten river systems in the Great Slave Lake area in the fall of 2020 and 2021, and spring 2021 using a community-based sampling approach. Project results confirmed Inconnu eDNA presence at locations known to be used by the species. Seasonal eDNA sampling both produced positive detections, with the fall samples generally detecting more eDNA than spring samples.

Why is this research important?

Inconnu is a key species in Great Slave Lake and have been affected by human activities and environmental changes. Detecting Inconnu during the fall and spring can help identify possible new populations not previously sampled, and important areas, such as fall migration to spawning grounds, and spring migration-from-overwintering sites.

What did we do?

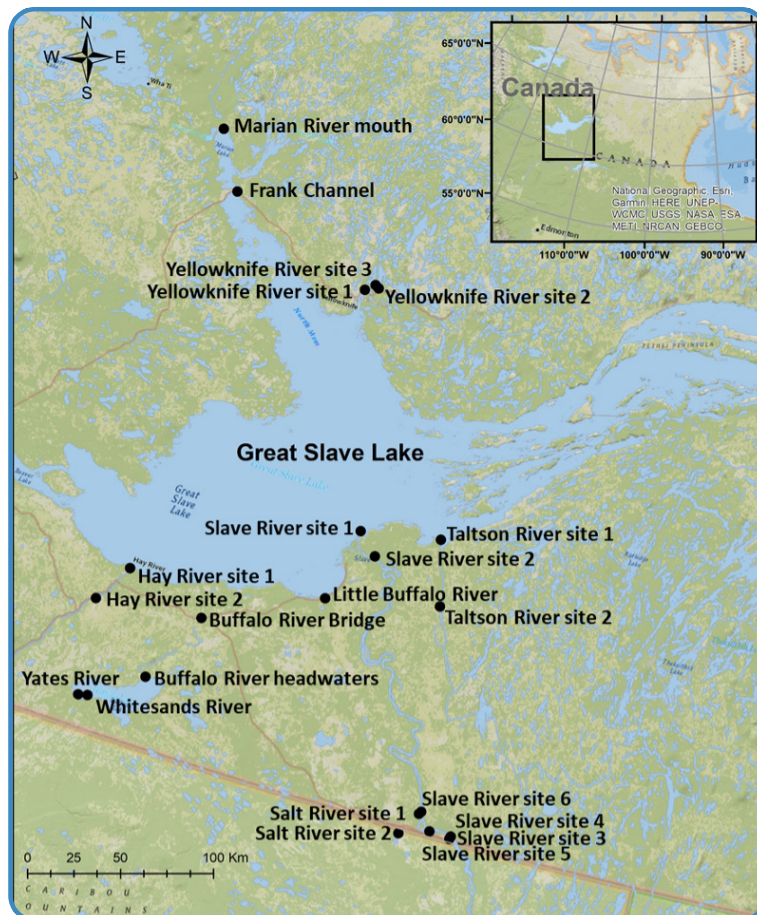
We partnered with the North Slave Métis Alliance, Tłı̨chǫ Government, Deninu Kue First Nation, K'atł'odeeche First Nation, and Nivek Ltd. (Fort Smith) to select site locations and collect eDNA samples in 10 river systems: Hay, Buffalo, Whitesands, Yates, Little Buffalo, Slave, Salt, Taltson, Yellowknife and Marian Rivers.

What did we find?

- Inconnu eDNA was detected in the Marian, Yellowknife, Hay, Buffalo, Yates, Whitesands, Salt and Slave Rivers.
- Inconnu eDNA was not detected in the Taltson and Little Buffalo Rivers, although it had been during an earlier pilot project.
- The rate of detection differed between seasons, with a higher rate being found in the fall.

What does this mean?

- Detection in river systems such as Yates, Whitesands, and Yellowknife Rivers highlights the importance of further monitoring in these river systems.
- Inconnu are moving into river systems where the population had previously been impacted (i.e. Yellowknife and Hay Rivers).
- Detection in the Buffalo, Whitesands and Yates Rivers in the fall has potentially identified important habitat.
- eDNA sampling in the fall increases the chance of detection compared to the spring.
- The improvement of eDNA approaches and community-based monitoring methods has advanced the use of eDNA as an important aquatic resource monitoring tool for northern areas.



Map of eDNA sampling sites from 2020 and 2021 in river systems around Great Slave Lake.



Collecting eDNA samples from the Slave River, at Fort Smith. (Credit: K. Antoniak)

Environmental DNA (eDNA)

An organism releases DNA into the environment (i.e. water) through feces, skin/scales, etc. Water is sampled and the DNA is detected using genetic markers.

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Recommended Reading

Lacoursière-Roussel, Howland, K., Normandeau, E., Grey, E. K., Archambault, P., Deiner, K., Lodge, D.M., Hernandez, C., Leduc, N., Bernatchez, L., 2018. eDNA metabarcoding as a new surveillance approach for coastal arctic diversity. *Ecol. Evol.* 8, 7763-7777.

Tallman, R. F., Howland, K. L., 2017. Factors that influence productivity and vulnerability of Inconnu, *Stenodus leucichthys nelma*, populations in Canada. *Fundam. Appl. Limnol.* 235-247.