



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.

How do forest fires affect wetland water quality in Ts'ude Niline Tuyeta?

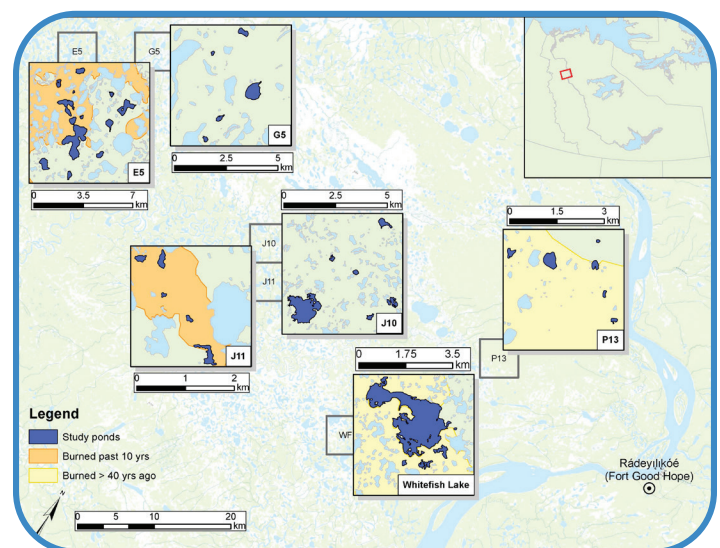
How forest fires affect the water quality of wetlands in the Sahtú region is not well understood. Environment and Climate Change Canada has been working with community members to study the water quality of important wetland ecosystems in the protected area of Ts'ude Niline Tuyeta (Ramparts Wetlands), near Rádeyɪłıkóé (Fort Good Hope). Early findings show the wetlands in Ts'ude Niline Tuyeta hold clean water with low levels of contaminants, and that differences in water quality conditions are likely related to forest fire history.

Why is this research important?

The many diverse wetlands of the Sahtú region are highly valued for their unique ecological and cultural significance. Monitoring will teach us about wetland water quality, and it will help us make informed decisions about water management in Ts'ude Niline Tuyeta.

What did we do?

Between 2017 and 2019, partners from Rádeyɪłıkóé and Environment and Climate Change Canada collected water samples from 49 wetlands and lakes in Ts'ude Niline Tuyeta to look at water quality. The wetlands were chosen based on forest fire histories: recently-burned (within the past 10 years), long-ago burned (more than 40 years ago), or not-burned.



Samples were collected from 49 wetlands across six different sites within Ts'ude Niline Tuyeta.

What did we find?

- Levels of toxic metals (including cadmium, lead and mercury) were very low in all wetlands, and in most cases were not detected.
- Wetlands in the recently-burned sites had lower conductivity, lower dissolved organic carbon, higher chlorophyll-a, and different nutrient levels, compared to long-ago burned or not-burned sites. Many of these impacts from fire were strongest in smaller wetlands.

What does this mean?

The wetlands in Ts'ude Niline Tuyeta hold clean water. Researchers believe that forest fire history and wetland size are linked to the differences in water quality between the sites. Climate warming might cause more forest fires in the region. The resulting changes in water quality could impact ecosystem health and performance.

What's next?

The sampling protocols and future potential locations explored in this project could be used for long-term community-based monitoring of wetlands in Ts'ude Niline Tuyeta by Rádeyǎǰkóé Guardians.

It is important to continue monitoring metals, basic chemistry and wetland size.

Finally, sediment coring might help identify historical changes in water quality related to forest fires. This involves extracting a core of sediment from under a lake while being careful to preserve the individual layers for analysis.



John Tobac collects wetland water samples near Rádeyǎǰkóé.

What does water quality tell you?

Water quality can tell you how suitable water is for drinking as well as for plants, bugs and fish to live in.

Conductivity is an indirect measure of the saltiness of the water. Fish and other organisms that live in freshwater cannot tolerate large increases in saltiness.

Dissolved organic carbon can affect how light enters the water and provides a food source for aquatic life.

Chlorophyll-a is a measure of the amount of algae in the water. Algae are important as they are the base of the food chain, but too much is dangerous because they deplete oxygen levels.

Recommended Reading

Burd, K., Tank, S.E., Dion, N., Tanentzap, A.J., Olefeldt, D. 2018. *Seasonal shifts in export of DOC and nutrients from burned and unburned peatland-rich catchments, Northwest Territories, Canada*. Hydrology and Earth System Sciences 22: 4455-4472.

McCullough, I. M., Cheruvellil, K. S., Lapierre, J. F., Lottig, N. R., Moritz, M. A., Stachelek, J., & Soranno, P. A. 2019. *Do lakes feel the burn? Ecological consequences of increasing exposure of lakes to fire in the continental United States*. Global Change Biology, 25(9), 2841-2854.

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