



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.

Does road dust affect waterfleas in lakes along the Dempster and Inuvik-Tuktoyaktuk highways?

Past studies in other jurisdictions have shown that road dust can affect water quality in roadside lakes. This study looked at lakes along the Dempster and Inuvik-Tuktoyaktuk highways to check if *Daphnia*, a group of zooplankton species commonly known as waterfleas and an important food source for fish, were affected by changes caused by road dust. Results suggest that these study lakes, and the types and quantities of waterfleas living in them, do not appear to be affected by road dust. Additional work is needed before reaching a definitive conclusion on the effects of road dust on waterfleas.

Why is this research important?

Communities have expressed concerns of dust from local highways affecting lakes. Past studies have shown that road dust can be a pollutant for roadside lakes. However, these studies have not examined how road dust pollution might affect the food web of lakes, including waterfleas.

What did we do?

- We visited 18 lakes along the Dempster and Inuvik-Tuktoyaktuk highways. These lakes were located either close to the highway (0-300 m) or further away (greater than 300 m).
- We measured water quality in the lakes and collected waterfleas that were later examined in the laboratory under a microscope.
- The types of waterfleas and their abundance were determined for each lake.

What did we find?

- Surprisingly, the water quality of the lakes we visited did not differ depending on how far they were from the road.
- The types and abundance of waterfleas in the lakes also did not differ based on how far the lakes were from the road.
- Our study suggests that there were no detectable effects of road dust for the 18 lakes we visited.

What does this mean?

- Past studies in other jurisdictions have shown that road dust can affect water quality in lakes and vegetation beside roads.
- If road dust has a significant effect on lakes, it would be important to consider these effects when considering mitigation options for construction and infrastructure projects.
- Given that no effects were detected, it would suggest that concerns about road dust might be unwarranted for some lakes.
- However, any potential effects of road pollution on lakes may have been undetected due to the small sample size and the natural variability among lakes.
- A larger study, including a greater number of lakes that are more similar in their physical characteristics, and have a greater variation in distance from the highways, is needed to confirm these results before they are applied to management decisions.



Graduate student Natasha Hannan collecting waterfleas for the study. (Credit: D. Gray)



A picture of the waterflea *Daphnia* under the microscope. Note the scale bar showing 1 mm of length. (Credit D. Gray).

What are waterfleas?

Waterfleas, a type of zooplankton, are microscopic animals that live in lakes and ponds. They are important components of the aquatic food web, eating algae which helps to keep lakes clear, and are eaten by fish. Waterfleas are sensitive to changes in water quality, so are often used in environmental studies to detect changes in the environment (Vucic et al. 2020).

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Recommended Reading

Vucic, J.M., Gray, D.K., Cohen, R.S., Syed, M., Murdoch, A.D., Sharma, S. (2020). Changes in water quality related to permafrost thaw may significantly impact zooplankton communities in small Arctic lakes. *Ecological Applications* 30: e02186.