

# Research Bulletin

## NWT Cumulative Impact Monitoring Program

### Permafrost thaw slumping and impacts to łuk dagaii (broad whitefish) habitat in the Peel River Watershed

#### Summary

In Northwestern Canada, increased temperatures and precipitation are intensifying permafrost thaw slump activity. Working with Gwich'in community members, we combined Gwich'in and scientific knowledge to map łuk dagaii (broad whitefish, *Coregonus nasus*) habitat in the Peel River Watershed at risk of being affected by thaw slumping. Project results will help inform regional decision-making and traditional resource users, assist adaptation planning and help fill gaps in our knowledge of fish habitat.

#### Why is This Important?

Broad whitefish are a culturally important species. Gwich'in fishers and resource managers are concerned about the impact of permafrost slumping on fish and traditional harvesting in the Peel River Watershed.

#### What Did We Do?

We combined spatial data on fish habitat from Gwich'in knowledge holders and scientific studies to create a new map layer identifying important fish habitat. Next, we combined the map layer of important fish habitat with data on slump impacts to identify areas that may be negatively affecting fish in the Peel. Based on presence of important fish habitat and the potential to be impacted by slump activity, stream segments were then grouped by risk of impact: very high, high, moderate, moderately low, low, and none.



Permafrost thaw slump with a debris tongue filling in a creek in the Peel Plateau, NWT.



## What Did We Find?

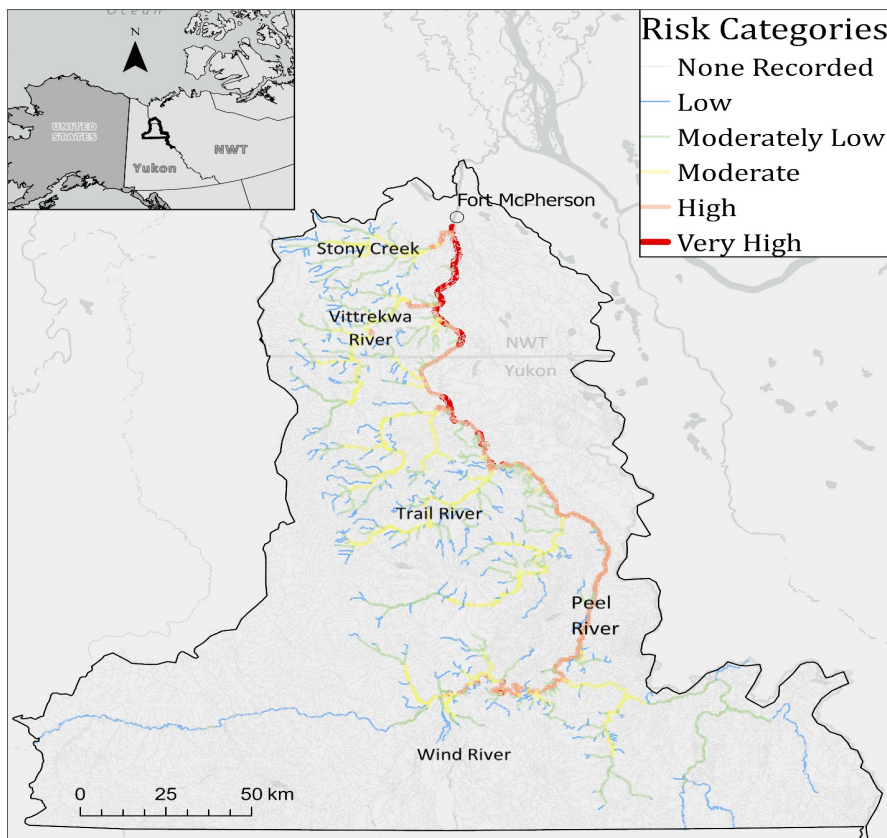
The Peel River from the mouth of Wind River to Teet'it Zheh (Fort McPherson) is in the high-to-very-high risk category. This means that this area contains important fish habitat but also has a high potential risk of experiencing the impact of heavy sediment input from the slumps upstream. Other areas of high risk include large sections of Stony Creek and Vittrekwa, and Trail Rivers.

## What Does This Mean?

This project improves our understanding of the impact of climate-driven permafrost thaw on important fish habitat. Knowing where slumps are likely affecting important fish habitat is needed for guiding future research on slump impacts on fish and to inform resource management decisions.

## What's Next?

Various training materials, including videos and pamphlets describing how to use the sampling equipment, were developed and provided to each community for future use. The Gwich'in Tribal Council may consider regional collaboration when designing future monitoring efforts to address some of the shortcomings identified in this project.



Culturally and ecologically important fish habitat at potential risk of slumping on in the Peel River Watershed within the Gwich'in Settlement Region (black line), NWT. Inset map shows the portion of the Peel River Watershed investigated; noteworthy rivers and creeks are labeled.

## What is a thaw slump?

Thaw slumps are a form of permafrost disturbance that occurs when ground ice in a hillslope melts, turning previously frozen sediment into a muddy slurry that slides to the base of the slope. Thaw slumps have the potential to impact fish and fish habitat by altering water chemistry and changing invertebrate (or bug) community structure.

## For More Information

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NWT CIMP is a source of environmental monitoring and research. The program coordinates, conducts and funds the collection, analysis and reporting of information related to NWT environmental conditions. If you're conducting environmental monitoring and research, consider sharing your information with northern residents and decision-makers in a Bulletin.