

# Research Bulletin

## NWT Cumulative Impact Monitoring Program

### Hot then cold: how paired wildfire and permafrost thaw events are shaping boreal caribou habitat

#### Summary

Wildfire and permafrost thaw are disturbances that can co-occur on the landscape and are becoming more common in the NWT due to climate change. This project looked at how wildfire and permafrost thaw are impacting the recovery of vegetation important to boreal caribou in southern NWT. We found that recovery of different types of vegetation is sensitive to many environmental factors, including time since fire, soil moisture, and the presence of permafrost.

#### Why is This Important?

The increasing frequency and intensity of wildfires may prompt increasing permafrost thaw in areas that historically would have been resistant to this disturbance. The combined disturbances of wildfire and permafrost thaw may degrade caribou habitat, but exactly how it will impact important vegetation eaten by caribou is unclear.

#### What Did We Do?

Expanding from an earlier project (CIMP170 – see NERB #35), we:

- Conducted a literature review identifying key vegetation types eaten by boreal caribou.
- Surveyed vegetation types at 200+ sites that burned over the past 100 years, including areas recovering from recent burn and experiencing permafrost thaw.



Examining study area regrowth post wildfire. (Credit: E. Wegener)



## What Did We Find?

- Thaw is occurring at most permafrost sites that we monitored, but the greatest rates of thaw were at sites impacted by recent wildfires.
- Vegetation types are sensitive to many environmental factors when recovering from wildfire, including time since fire, soil moisture, and the presence or absence of permafrost.
- Vegetation impacted by both wildfire and permafrost thaw can have different initial recovery patterns from those only recovering from wildfire. There are some signs that sampling sites impacted by both disturbances may be slower to recover.

## What Does This Mean?

- Permafrost ecosystems, such as wet black spruce stands, can still be relatively resistant to wildfires. However, when they do burn, intensified thaw of the permafrost layer is likely.
- The combined disturbance of wildfire and permafrost thaw may alter patterns of how the initial vegetation recovers.
- This suggests that wet black spruce stands and other permafrost sites may serve as poor caribou habitat for a longer time period following wildfire if permafrost thaw also occurs.

## What's Next?

Results of this project are being used to develop a tool that can be used by decision-makers to help them identify ecosystems at risk of permafrost thaw and anticipate the impact on caribou habitat.

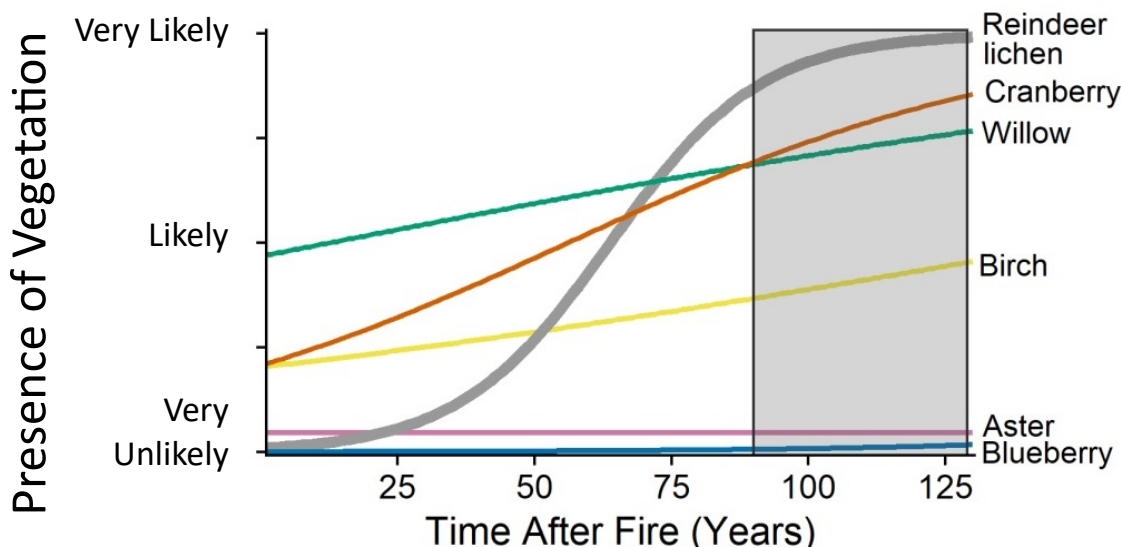
## For More Information

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NWT Cumulative Impact Monitoring Program (CIMP219)

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The likelihood of vegetation, eaten by boreal caribou, being present after a wildfire at wet sites and/or sites underlain by permafrost in the southern NWT. Grey area indicates when greatest habitat use by caribou is anticipated. (Adapted from: Jorgensen, A. and Baltzer, J. 2021. *Wildlife Forage Recovery Following Boreal Wildfire. Theses and Dissertations (Comprehensive)*. 2411. <https://scholars.wlu.ca/etd/2411>)

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