2022 Volume 7, Issue 35

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.

Impacts of Fire on Woodland and Barren-ground Caribou Habitat

The 2014 Northwest Territories' (NWT) fire season resulted in burn scars covering 2.845 million hectares. The severity of the burn and how quickly the vegetation regrew following the fire season was studied to learn the impacts of extreme fires on caribou habitat. We identified that the tree types (i.e., Black Spruce, Jack Pine, Aspen or Birch) that regrew and the availability of lichen for caribou depended on the type of habitat, the length of time that has passed, and how severe the fire was. We also found that lichens, important to caribou habitat, needed 45 to 70 years to recover after a fire. This is longer than the 40 years used to define disturbed habitat in the national recovery strategy for boreal woodland caribou.

Why is this research important?

The 2014 fires impacted the ranges of both Barren-ground and Woodland caribou. These impacts are a great concern for many NWT communities as fire reduces caribou habitat quality by decreasing food availability, especially lichen (Figure 1).

Figure 1: 2014 Burn Scar within caribou habitat (Credit: K. Reid)

What did we do?

During the summers of 2015-2018, we established over 650 study plots in the NWT Taiga Plains and Taiga Shield ecozones, some in areas that burned in 2014 and some in older forest stands that burned from 19 to 232 years ago (Figure 2). We measured how these plots burned and what types of trees or other plants grew back following a fire.

What did we find?

- Burn severity varied across the landscape. Sites where 2014 fires burned deep into the forest soil showed changes in the types of plants and tree seedlings recovering. Where the trees were severely burned, fewer seeds of Black Spruce were available to support forest recovery.
- For most sites, the fires did not burn deep enough to damage below-ground rooting structures. This is important as most plant species recovering immediately after a fire regenerated from roots and stems below ground.
- In the Taiga Plains, Black Spruce was often replaced by Jack Pine and Aspen, and in the Taiga Shield by Birch. These changes happened more frequently at drier sites where the soils were more severely burned.
- Ground lichens used by caribou need about 45 to 70 years to recover from a fire.

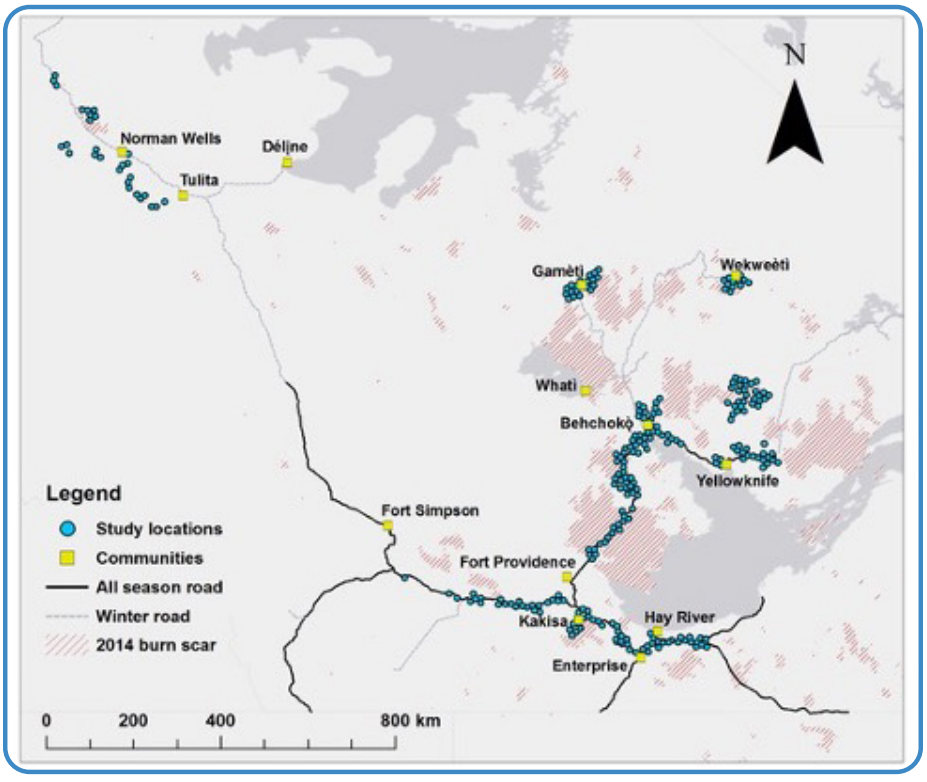

Figure 2: Map of the study locations and 2014 burn scars

What does this mean?

- Dry, well-drained parts of the landscape appear more vulnerable to fire and changes in forest type and soil structure as a result of fire.
- Wetter parts of the landscape were more resilient to deep burning of the soil and will continue to provide important caribou habitat (spruce-lichen forests) in the future.
- The forest types growing after fire differed from what was present before fire (more Birch, Aspen and Jack Pine, less Black Spruce) and in their availability of different forage species. These changes will affect caribou habitat quality.

What's next?

These results can be incorporated into models to better predict land cover changes across the NWT. Northern decision-makers can use this information to inform landscape and caribou management.

Recommended Reading

Day, NJ, Carriere, S., Baltzer, JL. **2017**. *Annual dynamics and resilience in post-fire boreal understory vascular plant communities.* Forest Ecology and Management 401: 264-272.

Walker, XJ, Baltzer, JL, Cummings, SR, Day, NJ, Johnstone, JF, Rogers, BM, Turetsky, MR, Mack, MC. **2018**. *Estimating depth of burn in boreal black spruce and jack pine stands of the NWT, Canada.* International Journal of Wildland Fire, 27: 125-134

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