



### 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.

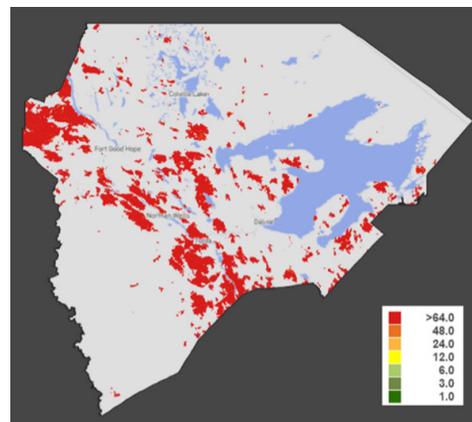
## Modeling Sahtú region landscape futures

Identifying land-use strategies that consider social, economic, and environmental objectives requires an understanding of how landscapes will change in the future. Online, computer-based simulations were performed to forecast the long-term (50 years) consequences of human disturbances (including oil and gas development, mining, transportation), fire, climate change, and permafrost, on the Sahtú landscape. Climate change was found to have the most crucial influence on the Sahtú's future environment.

### Why is this research important?

Simulating future landscape changes helps the decision-making processes by predicting the consequences of management strategies. The results can inform cumulative effects assessments and land use planning.

#### Current Burn Area



#### Year 50 Burn Area

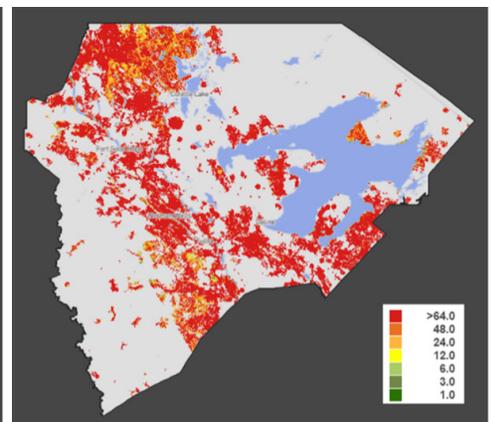


Figure 1. Current and future burns simulation assuming moderate climate change. Burns in the maps refer to areas burned within the past 40 years. Red indicates a higher percentage per km<sup>2</sup> of landscape disturbance.

## What did we do?

Traditional, local, and scientific knowledge holders in the community-driven project “Nío Nę P’ęné – Trails of the Mountain Caribou Plan” helped identify some implications of landscape change to Shúhtaꞛepe (Mackenzie Mountain caribou) habitat. We then used computer-based simulations to forecast potential long-term (50 year) changes to the Sahtú Regional landscape in response to human disturbances (oil and gas, transportation, mining), fire, and climate change. We examined risks to infrastructure, permafrost, and to Tǫdzı (Boreal Caribou) and Shúhtaꞛepe ranges.

## What did we find?

Our computer-based simulations predicted that:

- Permafrost will decline substantially, while burn areas are predicted to increase due to climate change.
- The amount of human disturbance will grow under simulations of moderate energy development, including potential future shale oil development to the west of Tulita.
- Reclamation of existing seismic lines will reduce the amount of disturbance to Tǫdzı and the Shúhtaꞛepe ranges.
- Fire, rather than development scenarios, will have a greater influence on Boreal Caribou range.
- Climate change effects that result in a loss of habitat quality and area will contribute to a reduction in the size of the Mountain Caribou herd.

## What does this mean?

- Increased range disturbance is expected, which will increase the risk to the Boreal Caribou population.
- Boreal and Mackenzie Mountain Caribou are predicted to be sensitive to increased fire disturbance.
- Land use planning and resource management strategies should consider the cumulative effects of climate change and land use.

## Recommended Reading

Carlson, M., T. Stubbs, **2018**. *Sahtú Scenario Analysis. Methods and Results*. Prepared for the Sahtú Renewable Resources Board, February 2018.

Carlson, M., D. Browne, and C. Callaghan. **2019**. *Application of land-use simulation to protected area selection for efficient avoidance of biodiversity loss in Canada's western boreal region*. Land Use Policy 82:821-831.

## Contacts

Deborah Simmons, Executive Director  
 ʔehdzo Got'įnę Gots'ę Nákedı  
 (Sahtú Renewable Resources Board)  
 director@srrb.nt.ca

NWT Cumulative Impact Monitoring Program  
 (CIMP178)  
 nwtcimp@gov.nt.ca