



Norman Wells
Public Listening
**Climate Change
& Wildfire**



Effects of Climate Change and Wildfire on Caribou in the Sahtu

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Climate Adaption Programs - North America

- ▶ No specific climate adaption plans for boreal caribou found during this project.
- ▶ This report, reviewed plans developed in Canada, United States and Europe.
- ▶ This report emphasizes climate adaption plans by Indigenous peoples in Canada.

Key climate change topic:

- ▶ Summarize climate change adaptation programs in other areas of North America (or globally);
- ▶ Help inform Planning for the Future (PFF) options; and
- ▶ Find examples of caribou conservation measures defined specifically to address climate change impacts on boreal caribou.

Ontario First Nations Technical Service Corporation

- ▶ Partnership with Stantec
- ▶ Asses climate change vulnerability of First Nations communities in ON
- ▶ Oneida Nation – focus on housing, risk profile for assessed infrastructure with recommendations ¹
- ▶ Akwesasne and Moose Factory – water and wastewater assessment
- ▶ Kahnawà:ke – shoreline adaptations along St. Lawrence River

What We Do - Our Core Services



Water and Wastewater



Operations and Maintenance



Infrastructure



Housing



Fuel Systems Management



Fire and Safety



Environment



Engineering

¹ Stantec, 2018

Kanaka Bar Indian Band

- ▶ Vulnerability assessment ¹
- ▶ Community engagement
- ▶ Watersheds identified for assessment
- ▶ Determined baseline conditions
- ▶ Ranked low to high severity
- ▶ Identified potential adaptation strategies

Mitigation strategies identified:

- ▶ FireSmart strategy
- ▶ Updating emergency response
- ▶ Installing air filters and air conditioning
- ▶ Developing food production in community
- ▶ Maintaining roads
- ▶ Designing alternate access routes to community

¹ Indigenous Climate Hub 2022

Chippewas of Georgina Island First Nation

- ▶ Completed climate change adaptation planning.¹
- ▶ Ranked risk to prioritized activities to mitigate the effects of climate change.

Example Steps in Adaption Plan:

- ▶ Define methodology to collect Traditional Ecological Knowledge
- ▶ Explain how watershed vulnerabilities will be compared to Western science assessments.
- ▶ Outline how to prioritize risk
- ▶ Outline how to share results
- ▶ Build a process to collect and prioritize adaptation recommendation.

¹ Indigenous Climate Hub 2022

Poplar River First Nation

- ▶ Forest fire vulnerability assessment ¹
- ▶ Initiated by Elders noticing changes.

Possible mitigation activities:

- ▶ Discuss moving firefighting resources closer to the community and clearly understand provincial firefighting response.
- ▶ Reevaluate natural firebreak capability
- ▶ Activities to reduce amount of forest near community
- ▶ Develop fire management strategy

¹ Indigenous Climate Hub 2022

Alberta

- ▶ Climate adaptation plans for Ferruginous hawks and Burrowing owls ^{1, 2}
- ▶ Natural history and population trends
- ▶ Looked at climate parameters:
 - ▶ Rainfall
 - ▶ Snow quantity
 - ▶ Changes to wind

Future Predictive Models:

- ▶ Using climate change adaption models from hawks and owls will provide methodology to inform climate change adaption models for caribou.

¹ Shank and Bayne 2015

² Fisher and Bayne 2014

Government of Canada

Environment and Climate Change Canada

- ▶ Website with general information on climate change adaptation for Indigenous and other communities.

Services and information

Climate Action and Awareness Fund

Support projects that encourage engagement and build capacity to reduce greenhouse gas emissions.

Clean technology programs

Programs and initiatives supporting clean technology projects.

Carbon pollution pricing proceeds

Returning carbon pollution pricing proceeds to jurisdictions of origin.

Low Carbon Economy Fund

Fund to create jobs, deliver clean growth, support innovation and reduce energy bills.

Green Infrastructure Fund

Fund to support environmental infrastructure projects.

Environmental funding

For environmental projects and environmental assessments.

Public Transit Infrastructure Fund

Short-term funding to upgrade existing transit systems, build new ones, transit expansion projects.

United States

U.S. Climate Resilience Toolkit ¹

- ▶ Guide to adaptation and case studies.
- ▶ Tools, information and expertise to building climate resilience

Alaska Case Studies:

- ▶ Community of Shaktoolik building berm from driftwood and gravel to protect from flooding and erosion.
- ▶ Some communities shifting harvesting species.
- ▶ Build more efficient houses to reduce wind exposure.
- ▶ Piling snow at doors.

¹ U.S Federal Government 2014

Europe

Sámi-speaking peoples (Norway, Sweden, Finland, Kola Peninsula (Russia))

Commissioned climate change adaptation study to assess effects of climate change on:

- ▶ Fishing
- ▶ Hunting and gathering
- ▶ Reindeer husbandry
- ▶ Community health and well-being

Study concluded:

- ▶ Cross-disciplinary measures and adaptation strategies are required to respond to changes and risks.
- ▶ Coordinated action from institutions and governments is required to address issues.
- ▶ Actions require flexibility and must incorporate Indigenous Knowledge and acknowledge Rights.

Examples using Western science to write and implement climate change adaptation plans

- ▶ Many tools developed for other species.
- ▶ Adjusted to changes to boreal caribou habitat and changes to caribou.
- ▶ Approaches identified directly or indirectly benefit boreal caribou and other northern wildlife species.
- ▶ Western science provides data and methods.
- ▶ Local Indigenous knowledge needed for successful climate adaption planning.

Climate Change Adaptation Process¹



¹ Handler et al. 2022

Approaches and Tactics: Population Management

Maintaining and enhancing genetic diversity

- ▶ Declining populations may have trouble recovering due to low genetic diversity and inbreeding.¹
- ▶ Scientists can determine genetic variability via fecal pellet sampling.
- ▶ DNA can determine: population changes, family networks, individual health and inbreeding levels.²
- ▶ Svalbard reindeer: despite inbreeding/low genetic diversity, developed ability to digest mosses when lichens are unavailable.³

¹ ECCC 2020

² McFarlane et al., 2018

³ Hestvik, 2023

Approaches and Tactics: Population Management

Maintaining connectivity between populations

- ▶ Connectivity essential component of healthy populations.¹
- ▶ Land use and climate change two main drivers of biodiversity decline.
- ▶ Protected areas safeguard landscape from additional human–caused disturbances.
- ▶ Connectivity is required *within* ranges:
 - ▶ Seasonal movement between habitat to obtain and other survival resources.²
- ▶ Connectivity is required *between* ranges:
 - ▶ Movement between local populations.
 - ▶ Allows gene flow, maintains genetic diversity (helps caribou withstand disease and severe weather).³

Approaches and Tactics: Population Management

Facilitate shift in species ranges by anticipating future conditions

- ▶ Climate change forcing wildlife to change and find new habitats for food, shelter and rearing young.
- ▶ Some scientists using computer models to predicts how habitats are changing.
 - ▶ State-and-transition modelling: predicts changes to land cover and use. Possibly predict shifts in moisture and temperature due to climate.
- ▶ Alberta used models to predict upland vegetation coverage, developed a fire simulation model to project frequency and extent of wildfire.¹
 - ▶ Estimated food resources and prediction risk from future vegetation cover type and stand age.

¹ Barber et al. 2018

Approaches and Tactics: Population Management

Maintain a sustainable population size

- ▶ Recovery strategy requires population of at least 100 caribou and a range with 65% undisturbed habitat.¹
- ▶ Conservation breeding – breeding species in a controlled environment to prevent extinction
 - ▶ West Moberly First Nation and Saulneau First Nations
 - ▶ Maternal penning to counteract decline of Klinse-za caribou (250 in 1990 to 38 in 2013)
 - ▶ Cows and calves in captivity until 2 months old.
 - ▶ Released back into the wild.
 - ▶ Population has doubled since start of program ²

¹ ECCC 2020

² Lamb et al., 2023

Approaches and Tactics: Population Management

Adjust harvest regulations

- ▶ Hunting is a threat to boreal caribou.
- ▶ Non-Indigenous hunting is prohibited.
- ▶ Although government laws do not restrict Indigenous hunting, there is:
 - ▶ Voluntary closed,
 - ▶ Restricted, and
 - ▶ Managed hunting by Indigenous people across Canada ¹

Approaches and Tactics: Population Management

Reduce human disturbance and human-wildlife conflict

- ▶ ECCC determined 500 metre buffer from disturbance (cutline, road) for habitat to be used by caribou and be considered undisturbed.¹
- ▶ Restriction of activity periods in some jurisdiction:
 - ▶ Alberta activities are restricted Feb. 15 – July 15 in boreal caribou ranges to reduce late winter stress on adults.²

¹ ECCC 2020

² Alberta Government 2012

Approaches and Tactics: Habitat Management

Restore habitat to provide for wildlife

- ▶ Habitat very disturbed in Canada.
 - ▶ Alberta 100,000 km of unrestored seismic lines within caribou habitat. ¹
- ▶ Scientists developed and tested multiple ways to restore linear habitat, three-prong approach:
 - ▶ Obstruction access by humans and wildlife
 - ▶ Preparing site for revegetation
 - ▶ Planting trees
- ▶ Canadian Oil Sands Innovation Alliance (COSIA):²
 - ▶ Rollback of course, woody debris and tree felling to obstructing access to linear feature
 - ▶ Soil mounding
 - ▶ Decompacting/ripping to prepare site for revegetation
 - ▶ Summer and winter tree planting

¹ Pinzon 2020

² COSIA 2019

Approaches and Tactics: Habitat Management

Adjust management of habitat for wildlife

- ▶ Range plans and habitat management activities.
- ▶ Habitat management could include protected areas, no-development zones, conservation agreements.
- ▶ Saulteau First Nations and West Moberly First Nation, Canada and government of British Columbia signed partnership agreement to temporarily protect 734,000 hectares. It will:
 - ▶ Protect habitat;
 - ▶ Allow some mining and logging; and
 - ▶ Protect boreal caribou maternal penning.¹

¹ Saulteau First Nation 2020

Approaches and Tactics: Habitat Management

Establish or enhance protected areas

- ▶ Protected areas help safeguard landscape from anthropogenic disturbances.
- ▶ When properly designed, can help species cope with climate change. ¹
- ▶ May be necessary to identify and designate protected areas with biophysical attributes for boreal caribou. ²
- ▶ Establishment of protected areas is not limited to action by Western scientists and politicians. Several Indigenous Protected and Conserved Areas (IPCAs) have been formed in Canada.

¹ Bauduin et al., 2020

² ECCC 2020

Approaches and Tactics: Habitat Management

Promote habitat protection outside of protected areas

- ▶ Standardizing forest fire rating systems across North America.
 - ▶ Consistent reporting means allocation of resources to another area.

Approaches and Tactics: Other Activities

Intentionally no conservation activity

- ▶ Organisations can make active decision to do nothing, allowing for natural adaption.
- ▶ Organisations can decide resources be allocated for different purposed or focused on a different group of animals as a triage decision.¹
- ▶ An area can be part of conservation program where control area (one left alone) for comparison and evaluation to area of active conservation.

¹ Hagerman & Satterfield, 2014

Approaches and Tactics: Other Activities

Engage human communities in wildlife conservation

- ▶ Engagement of Indigenous communities in climate adaption is critical.
- ▶ Provide opportunity to incorporate Indigenous knowledge about environment, wildlife community and specific species.

Approaches and Tactics: Other Activities

Caribou Management and Recovery Plans

- ▶ Canada has Recovery Strategy for Woodland Caribou.
- ▶ Does not explicitly include climate change adaption but refers to climate change actions.
- ▶ Stresses importance of connectivity and changing habitats.
- ▶ Provinces/territories:
 - ▶ Protect caribou on non-federally administered lands
 - ▶ Report conservation activity every six months
 - ▶ NWT reports on conservation agreement commitment and implementation of the Protected Areas Act ¹
 - ▶ Reporting stopped but to COVID-19, reporting has not resumed.

¹ ECCC 2020

Approaches and Tactics: Other Activities

Conservation Agreements

- ▶ Canada's Species at Risk Act (SARA) collaborative approach to conservation
- ▶ Does not require federal government to override territorial or provincial jurisdiction
- ▶ Canada has entered into Conservation Agreements with:
 - ▶ Manitoba, Alberta, Saskatchewan, Labrador, *Northwest Territories*
- ▶ SARA also provides agreement with First Nations.
- ▶ Canada has entered into caribou conservation agreements with:
 - ▶ Athabasca Chipewyan First Nation
 - ▶ Mikisew Cree First Nation
 - ▶ Cold Lake First Nation

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